NWU®

Fakulteit
Natuur-en
Landbouwetenskappe

Faculty of
Natural and
Agricultural Sciences

Undergraduate
Voorgraads

2020 Yearbook *Jaarboek*

Address all correspondence to:

The Registrar
North-West University
Private Bag X1290
Potchefstroom
2520

Tel: (018) 299-1111/2222
Fax: (018) 299-4910
Internet: http://www.nwu.ac.za

PLEASE MENTION YOUR UNIVERSITY NUMBER IN ALL CORRESPONDENCE.

The General Academic Rules of the University, to which all students have to subject themselves and which apply to all the qualifications offered by the University, appear in a separate publication and are available on the web page at: http://www.nwu.ac.za/yearbooks.

Please note: Although the information in this Calendar has been compiled with the utmost care and accuracy, the Council and the Senate of the University accept no responsibility whatsoever for errors that may occur. Before students finally decide on the selection of modules, they must consult the class timetable. If a clash occurs in the planned selection of a student, the relevant module combination is not permitted.

Rig alle korrespondensie aan:

Die Registrateur
Noordwes-Universiteit
Privaatsak X1290
Potchefstroom
2520

Tel: (018)299-1111/2222
Faks: (018)299-4910
Internet: http://www.nwu.ac.za

U UNIVERSITEITSNOMMER MOET ASSEBLIEF IN ALLE KORRESPONDENSIE VERMELD WORD.

Die Algemene Akademiese Reëls van die Universiteit, waaraan alle studente hulle moet onderwerp en wat op al die kwalifikasies wat die Universiteit aanbied, van toepassing is, verskyn in 'n afsonderlike bundel op die web by: http://studies.nwu.ac.za/af/studies/jaarboeke

Let Wel: *Ofskoon die inligting wat in hierdie Jaarboek opgeneem is so noukeurig moontlik saamgestel is, aanvaar die Raad en die Senaat van die Universiteit hoegenaamd geen aanspreeklikheid vir onjuisthede wat hierin mag voorkom nie. In die besonder bly dit elke student se verantwoordelikheid om hom/haar deeglik te vergewis van die klasrooster en moontlike roosterbotsings voordat hy/sy finaal oor die keuse van modules besluit. Indien daar 'n botsing by 'n student se voorgenome keuse voorkom, is die betrokke kombinasie van modules ontoelaatbaar.*

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NORTH- WEST UNIVERSITY / *NOORDWES-UNIVERSITEIT*

OFFICE BEARERS / *AMPSDRAERS*

CHANCELLOR / *KANSELIER*

Dr A (Anna) Mokgokong

VICE-CHANCELLOR / *VISE-KANSELIER*

Prof ND (Dan) Kgwadi

DEPUTY VICE-CHANCELLOR: RESEARCH, INNOVATION AND TECHNOLOGY / *ADJUNK VISE-KANSELIER: NAVORSING, INNOVASIE EN TEGNOLOGIE*

Prof NR (Nancy Refilwe) Phaswana-Mafuya

DEPUTY VICE-CHANCELLOR: TEACHING AND LEARNING / *ADJUNK VISE-KANSELIER: ONDERRIG EN LEER*

Prof RJ (Robert) Balfour

DEPUTY VICE -CHANCELLOR: ASSIGNABLE FUNCTIONS AND POTCHEFSTROOM CAMPUS OPERATIONS / *VISE-KANSELIER: TOEWYSBARE FUNKSIES EN POTCHEFSTROOMKAMPUSBEDRYF*

Prof DM (Daryl) Balia

DEPUTY VICE-CHANCELLOR: ASSIGNED FUNCTIONS AND MAFIKENG CAMPUS OPERATIONS / *ADJUNK VISE-KANSELIER: TOEWYSBARE FUNKSIES EN MAFIKENGKAMPUSBEDRYF*

Prof BMP (Boitumelo Marilyn) Setlalentoa

DEPUTY VICE-CHANCELLOR: PLANNING AND VAAL TRIANGLE CAMPUS OPERATIONS / *ADJUNK VISE-KANSELIER: BEPLANNING EN VAALDRIEHOEKKAMPUSBEDRYF*

Prof LA du Plessis

EXECUTIVE DIRECTOR: STUDENT LIFE / *UITVOERENDE DIREKTEUR: STUDENTELEWE*

Acting Executive Director/*Waarnemende Uitvoerende Direkteur*: Prof (Ilyayambwa) Mwanawina

EXECUTIVE DIRECTOR CORPORATE RELATIONS AND MARKETING / ***UITVOERENDE DIREKTEUR KORPORATIEWE VERHOUDINGE EN BEMARKING***

Mr NC (Clement) Manoko

EXECUTIVE DIRECTOR FINANCE AND FACILITIES / ***UITVOERENDE DIREKTEUR FINANSIES EN FASILITEITE***

Ms E (Elmarie) de Beer

EXECUTIVE DIRECTOR PEOPLE AND CULTURE / ***UITVOERENDE DIREKTEUR MENSEKULTUUR***

Dr M (Mala) Singh

REGISTRAR / *REGISTRATEUR:*

Prof MM (Marlene) Verhoef

NWU EXECUTIVE DEANS / *NWU UITVOERENDE DEKANE*

Faculty of Economics and Management Sciences / *Fakulteit Ekonomiese en Bestuurswetenskappe*

Prof S (Sonia) Swanepoel

Faculty of Education / *Fakulteit Opvoedkunde*

Prof L (Lloyd) Conley

Faculty of Engineering / *Fakulteit Ingenieurswese*

Prof LI (Liezl) van Dyk

Faculty of Health Sciences / *Fakulteit Gesondheidswetenskappe*

Prof AF (Awie) Kotzé

Faculty of Humanities / *Fakulteit Geesteswetenskappe*

Prof P (Pamela) Maseko

Faculty of Law / *Fakulteit Regte*

Prof SPLR (Stephen) de la Harpe

Faculty of Natural and Agricultural Sciences / *Fakulteit Natuur- en Landbouwetenskappe*

Prof EE (Eno) Ebenso

Faculty of Theology / *Fakulteit Teologie*

Dr Hennie Goede

Centre for Teaching and Learning/ *Eenheid vir Onderrig en Leer*

Prof Willie van Vollenhoven

FACULTY OF NATURAL AND AGRICULTURAL SCIENCES (FNAS) OFFICE BEARERS / *FAKULTEIT NATUUR- EN LANDBOUWETENSKAPPE (FNLW) AMPSDRAERS*

EXECUTIVE DEAN / *UITVOERENDE DEKAAN*

Prof EE (Eno) Ebenso, BSc (Hons)(Calabar), MSc (Ibadan), PhD (Calabar)

DEPUTY DEANS / *ADJUNK DEKANE*

Teaching and Learning / *Onderrig en Leer*
Prof HP (Helen) Drummond, HonsBSc (UCT) HED (PG) MEd (Wits), PhD (NWU)

Research and Innovation / *Navorsing en Innovasie*
Prof DM (David) Modise: BSc Hort. With Honours (University of Bath, UK); MSc Hort. (West Virginia University, USA) and PhD BioSciences (University of Nottingham, UK).

Community Engagement and Stakeholder Relations/ *Gemeenskapsbetrokkenheid en Belanghebbende Verhoudinge*
Prof TR (Thebe) Medupe: BSc (UCT); Hons (UCT); MSc (Astronomy, UCT); PhD (Astronomy, UCT).

SCHOOLS / *SKOLE*

SCHOOL DIRECTORS / *SKOOLDIREKTEURE*

School of Agricultural Sciences / *Skool vir Landbouwetenskappe*
Mafikeng: Acting Director/*Waarnemende Direkteur*: Dr LE (Lebo) Motsei, BSc Agric (UNW), MSc Agric, PhD Agric (NWU)

School of Biological Sciences / *Skool vir Biologiese Wetenskappe*
Potchefstroom: Acting Director/*Waarnemende Direkteur*: Prof S (Sarina) Claassens, BSc (PU for CHE), M.Env.Sci (PU for CHE), PhD (NWU)

Mafikeng: Deputy Director/*Adjunk Direkteur*: Prof O (Ozniel) Ruzvidzo, BScHons (National University of Science and Technology, Zimbabwe), MSc (University of Zimbabwe, Zimbabwe), PhD (University of the Western Cape, South Africa)

School of Mathematical and Statistical Sciences / *Skool vir Wiskundige en Statistiese Wetenskappe*
Potchefstroom: Director / *Direkteur*: Prof GJ (Gilbert) Groenewald, HonsBSc (UWC), MSc (Univ of Illinois at Urbana-Champaign) MSc (UK), PhD (Vrije Univ at Amsterdam)

Vaaltriangle: Deputy Director/ *Adjunk Direkteur*: Prof D (David) Kubayi, PhD (WITS)

School of Computer Science and Information Systems / *Skool vir Rekenaarwetenskap en Inligtingstelsels*
Potchefstroom: Director / *Direkteur*: Prof E (Estelle) Taylor, BA (PU vir CHO), HOD(N) (NWU), BAHons (NWU), MA (NWU), PhD (NWU)

Vaal Triangle: Acting Deputy Director/ *Waarnemende Adjunk Direkteur*: Dr C (Carin) Venter, BCom (Informatics & Accounting) PU for CHE, BCom Hons Computer Sci (PU for CHE), MCom Information Systems (WITS), PhD Information Technology (NWU)

School of Geo- and Spatial Sciences / *Skool vir Geo- en Ruimtelike Wetenskappe*
Potchefstroom: Director / *Direkteur*: Prof SJ (Stuart) Piketh, PhD (University of the Witwatersrand, Johannesburg)

Mafikeng: Deputy Director/*Adjunk Direk*teur: Prof LG (Lobina) Palamuleni: BEd (Geography) University of Malawi, MSc Environmental Sciences (University of Malawi), PhD Geography (University of Johannesburg)

School of Physical and Chemical Sciences / *Skool vir Fisiese en Chemiese Wetenskappe*
Mafikeng: Director: Prof L (Lebo) Katata-Seru, BSc, BSc Hons (UWC) MSc (Stellenbosch), PhD (Stellenbosch)

Potchefstroom: Deputy Director/ *Adjunk Direkteur*: Prof FH (Francois) Van der Westhuizen, BSc (NWU), MSc (NWU), PhD (NWU)

Phylosophy of Science and Technology / *Filosofie van Natuurwetenskappe en Tegnologie:*
Potchefstroom*:* Prof IJ (Kobus) Van der Walt, BSc Geology & Geography, BScHons, MSc Earth Sciences; PhD Environmental Management; HED (Post Graduate), PU for CHE

RESEARCH ENTITIES / *NAVORSINGSENTITEITE* / CENTRE / *SENTRUMS*

RESEARCH DIRECTORS / *NAVORSINGSDIREKTEURE* / CENTRE DIRECTORS / *SENTRUMDIREKTEURE*

Focus Area for Chemical Resource Beneficiation / *Fokusarea vir Chemiese Hulpbronveredeling*
Potchefstroom: Prof HCM (Manie) Vosloo, HonsBSc (UOVS), PhD (PU for CHE), HED (UOVS)

Focus Area: Human Metabolomics / *Fokusarea vir Menslike Metabolomika*
Potchefstroom: Prof DT (Du Toit) Loots, BSc (NWU - Biochemistry and Microbiology), BScHons (NWU - Biochemistry), MSc (NWU - Biochemistry), PhD (NWU - Biochemistry)

Focus Area for Material Science Innovation and Modelling / *Fokusarea vir Materiaalwetenskap Innovasie en Modellering*
Mafikeng: Prof EE (Eno) Ebenso, BScHons (Calabar), MSc (Ibadan), PhD (Calabar)

Niche area for Food Safety and Security / *Nisarea vir Voedselveiligheid en Sekuriteit*
Mafikeng: Prof OO (Olubukola) Babalola, BSc Hons (Ogun), MSc, PhD (Univ of Ibadan), PGD Middle Management (NWU)

School of Research and Postgraduate Studies/ *Skool vir Navorsing en Nagraadse Studie*

Mafikeng: Prof DA (David) Isabirye – BSc Hons (Makerere), PhD (Hong Kong)

Unit for Business Mathematics and Informatics / *Eenheid vir Bedryfswiskunde en Informatika*
Potchefstroom: Prof HM (Magda) Huisman, BSc (PU for CHE), Hons BSc (PU for CHE), MSc (PU for CHE),PhD (PU for CHE)

Unit for Environmental Sciences and Management / *Eenheid vir Omgewingswetenskappe en -bestuur*
Potchefstroom: Prof N (Nico) Smit, BSc Biology, BSc Hons (cum laude), MSc (cum laude), PhD (UOFS)

- **Africa Centre for Disaster Studies / *Afrika Sentrum vir Rampstudies***
  Potchefstroom: **Head/*Hoof*:** Prof D (Dewald) Van Niekerk,
  BA(RAU), Hons BA (RAU), MPM (UNISA), PhD (NWU).

Centre for Applied Radiation Science and Technology / *Sentrum vir Toegepaste Stralingswetenskap en –tegnologie*
Mafikeng: Prof V (Victor) Tshivhase, BSc Hons Physics (UCT), MSc Physics (UCT), MBA (NWU), PhD Physics (UCT)

Centre for Business Mathematics and Informatics / *Sentrum vir Bedryfswiskunde en Informatika*
Potchefstroom: Prof PJ (Riaan), De Jongh, BCom (US), MSc (UNISA), PhD (UCT)

Centre for Environmental Management / *Sentrum vir Omgewingsbestuur*
Potchefstroom: Prof JG (Johan) Nel, BA (Ed), Hons BA (UPE), MA (UPE)

Centre for Human Metabolomics / *Sentrum vir Menslike Metabolomika*
Potchefstroom: Prof BC (Chris) Vorster, MMed (Chem Paths) (UP), FCPath (SA) College of Medicine, MBA (UP)

Centre for Indigenous Knowledge Systems / *Sentrum vir Inheemse Kennissisteme*
Mafikeng: Prof SA (Simeon) Materechera, BSc Agric (Malawi), MSc Soil Sci (McGill,Canada), PhD (Adelaide, South Australia)

Centre for Space Research (Centre of Excellence) / *Sentrum vir Ruimtenavorsing (Sentrum van Uitnemendheid)*
Potchefstroom: Prof SES (Stefan) Ferreira, BSc, MSc, PhD (PU for CHE / NWU)

Centre for Water Science and Management / *Sentrum vir Waterwetenskappe en -bestuur*
Potchefstroom: Prof I (Ingrid) Dennis; BSc (Mathematics and Applied Mathematics) - UFS , BSc Hons (Geohydrology and Hydrology) - UFS, MSc (Geohydrology and Hydrology) UFS, PhD (Geohydrology) UFS.

ACADEMIC SUPPORT SERVICES / *AKADEMIESE ONDERSTEUNINGS-DIENSTE*
Instrument making / *Instrumentmakery*
Potchefstroom: **Head/*Hoof*:** Mr / *Mnr* PB Erasmus (Nas Dipl vir Tegnici)

SUBJECT GROUP CHAIRPERSONS/ *VAKGROEPVOORSITTERS*

Agricultural Economics and Extension / *Landbou-ekonomie en Voorligting*
Mafikeng: Prof SS (Simon) Letsoalo, BSc (Agric.Education) UN, B Inst Agric.Extension (Hons) UP, M Agric. Extension UL, M Education TUT, MBA Regenesys, PhD (Agricultural Extension) NWU

Agronomy and Horticulture / *Agronomie en Tuinbou*
Mafikeng: Ms Mercy Motaung, Bsc Hons (North West University), MSc (North West University)

Animal Health / *Dieregesondheid*
Mafikeng: Prof M (Mulunda) Mwanza, DVM (University of Lubumbashi) MSc ,(UJ) PhD (UJ)

Animal Science / *Dierewetenskap*
Mafikeng: Prof HK (Hilda Kwena) Mokoboki BSc. Agric, BSc. Agric (Hons), (University of the North), MSc Agric, PhD Agric (UL)

Biochemistry / *Biochemie*
Potchefstroom: Deputy/*Adjunk*: Dr Rencia van der Sluis, Hons BSc (UP), MSc (UP), PhD (NWU)
Mafikeng: Prof E Emmanuel Mukwevho, BSc (Univen), BSc Hons (UL), MSc (UCT), PhD (UCT), Cert in Financial Management (UCT), Cert in Project Management (UCT).

Botany / *Plantkunde*
Potchefstroom: Prof Sandra Barnard, BSc (UOFS), BSc Hons (UOFS), MSc Botany (UOFS), PhD Botany (UKZN Pietermaritzburg)

Mafikeng: Prof Pieter Malan, BSc Ed., Hons BSc, MSc, PhD (UFS)

Centre for Business Mathematics and Informatics: Professional Programmes / *Sentrum vir Bedryfswiskunde en Informatika: Professionele Programme*
Ms J (Janette) Larney, BSc, MCom, FASSA, FIA, CERA

- Actuarial Science / *Aktuariële Wetenskap*
- Quantitative Risk Management / *Kwantitatiewe Risikobestuur*
- Financial Mathematics / *Finansiële Wiskunde*
- Business Analytics / *Besigheidsanalise*

Vaal Triangle: Dr Isaac Takaidza, (responsible for BMI programmes/*verantwoordelik vir BWI-programme*) BScHons Mathematics (University of Zimbabwe), MSc Mathematics (University of Zimbabwe), Advanced Diploma in Higher Education (University of Free State), DTech (Cape Peninsula University of Technology), Postgraduate Diploma in Management (North West University)

MSc in Business Mathematics and Informatics with specialisation in above fields / *MSc in Bedryfswiskunde en Informatika met spesialisering in bogenoemde velde*
Prof H (Helgaard) Raubenheimer, BSc, MSc, PhD (NWU)

Chemistry / *Chemie*
Potchefstroom: Dr J (Justus) Röscher, PhD (NWU), HED (PU for CHE)

Mafikeng: Deputy Subject Leader-Chemistry: Dr Z (Zimbili) Mkhize, BSc, BScHons, MSc (University of Natal), PhD (UKZN)

Computer Science and Information Systems / *Rekenaarwetenskap en Inligtingstelsels*
Potchefstroom: Prof Lynette Drevin, BSc (PU for CHE), HED (PU for CHE), HonsBSc (PU for CHE), MSc (PU for CHE), DTE (PU for CHE), PhD (Middlesex University, London, UK)

Mafikeng: Dr Francis Lugayizi, BScHons, MSc, PhD (North West University)

Geography and Environmental Management / *Geografie en Omgewingsbestuur*
Potchefstroom: Dr DP (Dirk) Cilliers, PhD (NWU)

Mafikeng: Acting/*Waarnemend*: Prof LG (Lobina) Palamuleni: BEd (Geography) University of Malawi, MSc Environmental Sciences (University of Malawi), PhD Geography (University of Johannesburg)

Vaal Triangle: Prof. Dr. habil. Frank Winde (Diplom Geographer: MLU Halle, Germany; PhD: MLU Halle, Germany; Habilitation: FSU Jena, Germany)

Geology / *Geologie*
Potchefstroom: Dr DM (Danél) van Tonder, BSc Honns (PU for CHE), MSc Geology (University of Pretoria), DTech (Tswhane University of Technology)

Mathematics and Applied Mathematics / *Wiskunde en Toegepaste Wiskunde*
Potchefstroom: Dr DB (Dawie) Janse van Rensburg, Hons BSc (NWU), MSc (NWU), MTD (TU/eindhoven), PhD (NWU)

Mafikeng: Prof SC (Clovis) Oukouomi Noutchie, BScHons in Mathematics (University of Yaounde I), MSc in Applied Mathematics (UNISA), PhD in Applied Mathematics (UKZN)

Vaal Triangle: Dr I (Isaac) Takaidza, BScHons (University of Zimbabwe), MSc (University of Zimbabwe), DTech (CPUT)

Microbiology / *Mikrobiologie*
Potchefstroom: Dr JJ (Jaco) Bezuidenhout, BSc (PU for CHE); MSc (PU for CHE); PhD (NWU)

Mafikeng: Prof C (Collins) Ateba, BSc (UNIBU-CAM), BSc Hons (UNW), MSc (NWU), PhD (NWU)

Physics/ *Fisika*
Potchefstroom: Prof RD (Du Toit) Strauss, BSc (NWU), Hons BSc (NWU), MSc (NWU), PhD (NWU)

Mafikeng: Deputy Subject Group Leader: Prof AA (Amare Abebe) Gidelew, BSc (AAU), MSc, PhD (UCT)

Statistics and Operational Research / *Statistiek en Operasionele Navorsing*
Potchefstroom: Dr Charl Pretorius, BSc in Business Mathematics and Informatics (NWU), HonsBSc in Financial Mathematics (NWU), MSc in Business Mathematics and Informatics: Financial Mathematics (NWU), PhD in Statistics (NWU)

Vaal Triangle: Mr RP (Piet) Ntema, BSc Statistics & Chemistry (VISTA), HDE (NWU), BScHons Statistics (UFS), MSc (NWU)

Urban and Regional Planning / *Stads- en Streekbeplanning*
Potchefstroom: Prof EJ (Sarel) Cilliers, BSc, BScHons, Diploma in Terrain Evaluation, MSc, Pr Pln, PhD (NWU)

Zoology / *Dierkunde*
Prof Rialet Pieters, BSc (PU for CHE), HED (PU for CHE), MSc (PU for CHE), PhD (NWU)

Senior Faculty Administrator / *Senior Fakulteit Administrateur*

Heleen Swart

FACULTY BOARD / *FAKULTEITSRAAD*

The Faculty Board is comprised of the following members / *Die Fakulteitsraad word verteenwoordig deur die volgende lede*:

- The Executive Dean / *Uitvoerende Dekaan (*chairperson of the Faculty Board/ *voorsitter van die Fakulteitsraad)* (per appointment contract / per kontrakaanstelling)
- Deputy Deans / *Adjunk Dekane* (per appointment contract/ per kontrakaanstelling)
- Directors (School/Centre and Research Entity Directors) / *Direkteure (Skool-/Sentrum- en Navorsings- Entiteitdirekteure* (per appointment contract / *per kontrakaa*nstelling)
- Academic employees elected by the academic employees with due account to the geographic representation of the Faculty, the positions within the faculty as well as representation in terms of race, gender and disability. (Three-year term) /
  Akademiese werknemers verkies deur die akademiese werknemers, met inagneming van die geografiese verteenwoordiging van die Fakulteit, die posisies binne die fakulteit, sowel as verteenwoordiging in terme van ras, geslag en gestremdheid. (Drie-jaar termyn)
- Senior Faculty Administrator / Senior *Fakulteit Administrateur (*per appointment contract / *per kontrakaanstelling*)
- Student representation by means of a representative of formally constituted substructures of the Student Representative Council (SRC) and designated annually by the SRC. (One-year term)
  Studenteverteenwoordiging, deur middel van 'n verteenwoordiger van die formeel saamgestelde sub-strukture van die Verteenwoordigende Studenteraad (VSR) soos jaarliks deur die VSR aangewys word. (Eenjaar termyn)

The Faculty Management Committee is a standing subcommittee of the Faculty Board and serves as Executive Committee of the Faculty Board. It handles Faculty matters between meetings of the Faculty Board and reports all activities to the next meeting of the Faculty Board./

Die Fakulteit Bestuurskomitee is 'n staande subkomitee van die Fakulteitsraad en dien as die Uitvoerende Komitee van die Fakulteitsraad. Dit hanteer Fakulteitsaangeleenthede tussen die vergaderings van die Fakulteitsraad en rapporteer alle aktiwiteite aan die volgende Fakulteitsraadvergadering.

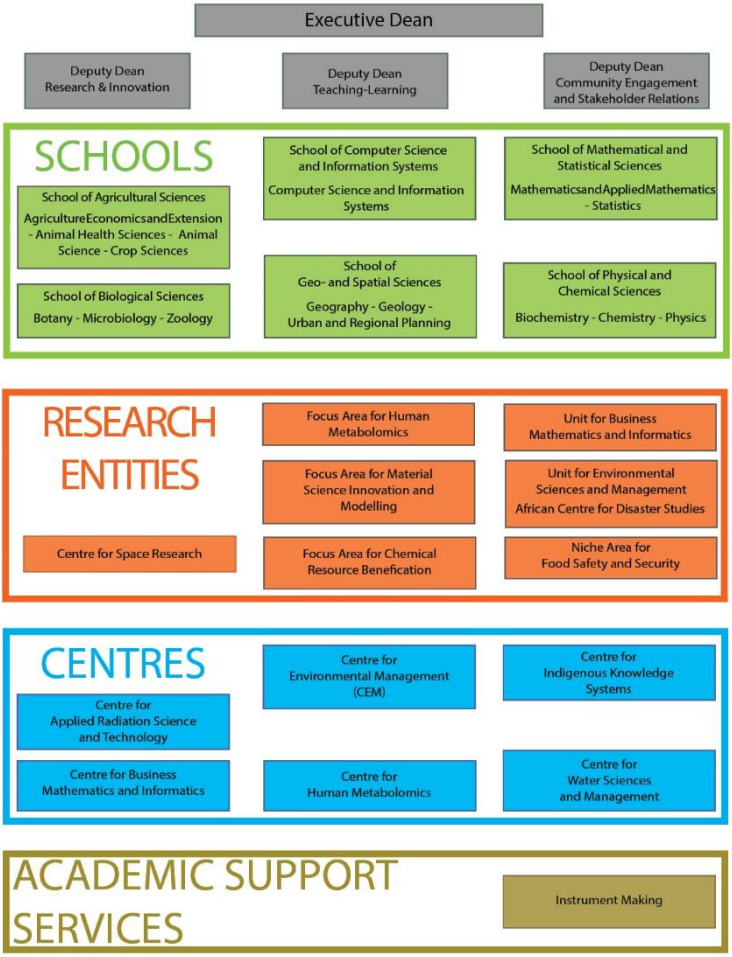
MEMBERSHIP / *LIDMAATSKAP*

The membership of the Faculty Management Committee is as follows / *Die lidmaatskap van die Fakulteit Bestuurskomitee is as volg:*

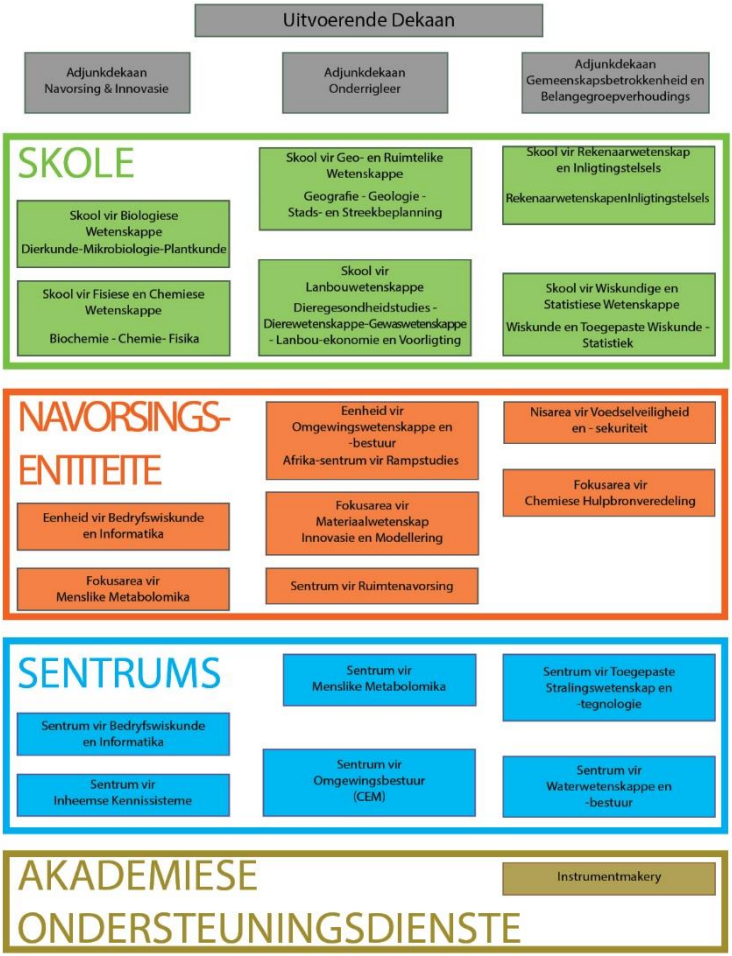
- The Executive Dean (Chair) / *Die Uitvoerende Dekaan (Voorsitter*).
- The Deputy Dean for Teaching and Learning / *Die Adjunk Dekaan vir Onderrig en Leer*.
- The Deputy Dean for Research and Innovation / *Die Adjunk Dekaan vir Navorsing en Innovasie.*
- The Deputy Dean for Community Engagement and Stakeholder Relations/ *Die Adjunk Dekaan vir Gemeenskapsbetrokkenheid en Belanghebbende Verhoudinge.*
- The directors of schools and research entities and directors of centres as determined by the Dean / *Die direkteure van skole en navorsingsentiteite en direkteure van sentrums soos deur die dekaan bepaal*.
- The Faculty Administrator(s) / *Die Fakulteit Administrateur(s)*.
- The Quality Coordinator / *Die Kwaliteitskoördineerder*.
- Representatives of the Academic Student Societies / *Verteenwoordigers van die Akademiese Studente Vereenigings*.
- Secretariat services are provided by Corporate Information and Governance Services / *Sekretariaatdienste soos voorsien deur die Korporatiewe en Inligtingsbestuursdienste*.

The Executive Dean and the deputy deans determine the final composition of the Faculty Management Committee / *Die Uitvoerende Dekaan en die adjunk dekane bepaal die finale samestelling van die Fakulteit Bestuurskomit*ee.

FACULTY OF NATURAL AND AGRICULTURAL SCIENCES



FAKULTEIT NATUUR- EN LANDBOUWETENSKAPPE



NAS.1 FACULTY RULES / *FAKULTEITSREËLS*

NAS.1.1 AUTHORITY OF THE GENERAL ACADEMIC RULES (A-RULES) / *GESAG VAN DIE ALGEMENE AKADEMIESE REËLS (A-REËLS)*

The faculty rules valid for the different qualifications, programmes and curricula of this faculty and contained in this faculty calendar are subject to the General Rules of the University, as determined from time to time by the Council of the University on recommendation by the Senate. The faculty rules should therefore be read in conjunction with the General Academic Rules.

The General Academic Rules (A-Rules) are available on the University's web page at: http://www.nwu.ac.za/content/policy_rules

Die Fakulteitsreëls, wat ten aansien van die verskillende kwalifikasies, programme en kurrikulums van hierdie Fakulteit geld en in hierdie Fakulteitsjaarboek opgeneem is, is onderhewig aan die Algemene Akademiese Reëls van die Universiteit, soos dit van tyd tot tyd deur die Raad van die Universiteit op aanbeveling van die Senaat vasgestel word, en moet dus met daardie Algemene Reëls saamgelees word.

Die Algemene Akademiese Reëls (A-Reëls) verskyn op die Universiteit se Tuisblad by: http://www.nwu.ac.za/content/policy_rules

NAS.1.1.1 RECOGNITION OF PRIOR LEARNING (A-RULE 1.6 & 1.7) / *ERKENNING VAN VORIGE LEER (A-REËL 1.6 & 1.7)*

The North-West University accepts the principle underlying outcomes-based, source-based and lifelong learning, in which considerations of articulation and mobility play a significant role, and subscribes to the view that recognition of prior learning, whether acquired by formal education programmes at this or another institution, or informally (from experience), is an indispensable element in deciding on admission to and awarding credits with a view to placement in an explicitly selected teaching-learning programme of the University. /

Die Noordwes-Universiteit aanvaar die beginsel onderliggend aan uitkomsgerigte, brongebaseerde en lewenslange leer, waarin artikulasie en mobiliteit 'n betekenisvolle rol speel, en onderskryf die siening dat erkenning van vorige leer, hetsy dit in formele onderrigprogramme by hierdie of 'n ander instelling, of informeel (deur ervaring) opgedoen is, 'n onontbeerlike element by die besluit oor toelating tot en kredietverlening met die oog op plasing binne 'n uitdruklik gekose onderrigleerprogram van die Universiteit uitmaak.

Recognition of prior learning concerns the provable knowledge and learning that an applicant has acquired, whether by having completed formal education programmes, or from experience. At all times the question will be what the level of the skills is, and skills will be assessed in the context of the exit level skills required by the intended teaching-learning programme or modules in the programme, or the status for which the applicant applies, and not merely by virtue of the experience recorded by the applicant. Recognition of prior learning will therefore take place in terms of applied competencies demonstrated by the applicant in his/her application, taking into consideration the exit level outcomes that have to be obtained by means of the selected teaching-learning programme. /

By die erkenning van vorige leer handel dit oor die bewysbare kennis en leer wat 'n aansoeker opgedoen het, hetsy deur formele onderrigprogramme, of deur ervaring. Ten alle tye sal die vraag wees watter vlak van vaardigheid,

beoordeel in die konteks van die uittreevlakvaardighede wat vereis word vir die beoogde onderrigleerprogram of modules daarbinne, of status waarvoor die aansoeker aansoek doen, en nie bloot om die ervaring wat 'n aansoeker kan boekstaaf nie. Erkenning van vorige leer geskied dus in terme van die toegepaste bevoegdhede wat die aansoeker in die aansoek gedemonstreer het, met inagneming van die uittreeuitkomste wat met die gekose onderrigleerprogram bereik moet word.

The North-West University accepts that recognition of prior learning can and must take place in a valid, trustworthy and fair way, within the normal existing policy on awarding credits to prospective and existing students, whether they are from this or another institution. /

Die Noordwes-Universiteit aanvaar dat die erkenning van vorige leer binne die normale, bestaande beleid oor die toelating van kredietverlening aan voornemende of bestaande studente – hetsy van hierdie of 'n ander instelling – op 'n geldige, betroubare en billike wyse kan en moet geskied.

NAS.1.1.2 REGISTRATION/ *REGISTRASIE*

Registration is the prescribed completed process a student has to follow to register as a student of the North-West University (see General Rule 1.10). /
Registrasie is die voorgeskrewe voltooide proses wat 'n student deurloop het om as student van die Universiteit te registreer (Kyk Algemene Reëls 1.10).

NAS.1.1.2.1 **Registration of additional modules / *Registrasie van bykomende modules***

Apart from the required modules of the relevant programme, a student may take additional modules in terms of the provision in the General Rule 2.3. This must be requested by means of a student request form and is subject to the approval of the Executive Dean. /
'n Student kan in enige studiejaar, benewens die vereiste modules van die betrokke kurrikulum, bykomende modules neem ooreenkomstig die bepalings in Algemene Reël 2.3. Dit moet aangevra word deur middel van 'n student versoek vorm en is onderworpe aan goedkeuring deur die Uitvoerende Dekaan.

NAS.1.1.3 DURATION OF STUDIES / *DUUR VAN STUDIES*

General Rule 1.14 set the maximum duration of study. / *Algemene Reël 1.14 stel die maksimum duur van studie:*

NAS.1.1.3.1 **For full-time contact students, the maximum duration of study is as follows: / *Vir voltydse studente is die maksimum duur van studie soos volg:***

- One-year qualifications: two years; / *Eenjaar-kwalifikasie: twee jaar*
- Two-year qualifications: four years; / *Tweejaar-kwalifikasie: vier jaar*
- Three-year qualifications: five years; / *Driejaar-kwalifikasie: vyf jaar*
- Four-year qualifications: six years; / *Vierjaar-kwalifikasie: ses jaar*
- Master's degrees: three years; / *Meestersgraad: drie jaar*
- Doctoral degrees: four years. / *Doktorsgraad : vier jaar*

NAS.1.1.3.2 **For part-time contact and distance students, the maximum duration of study is as follows: / *Vir deeltydse kontak- en afstandstudente, is die maksimum duur van studie soos volg:***

- One-year qualifications: three years; / *Eenjaar-kwalifikasie: drie jaar*
- Two-year qualifications: four years; / *Tweejaar-kwalifikasie: vier jaar*
- Three-year qualifications: six years; / *Driejaar-kwalifikasie: ses jaar*
- Four-year qualifications: eight years; / *Vierjaar-kwalifikasie: agt jaar*
- Master's degrees: Four years; / *Meestersgraad: vier jaar*
- Doctoral degrees: Five years. / *Doktorsgraad: vyf jaar*

NAS.1.1.3.3 **For contact students in extended programmes, the maximum duration of study is as follows: / *Vir voltydse student in verlengde programme, is die maksimum duur van studie soos volg:***

- Three-year qualifications: six years; / *Driejaar-kwalifikasie: ses jaar*
- Four-year qualifications: seven years. / *Vierjaar-kwalifikasie: sewe jaar*

NAS.1.2 FACULTY-SPECIFIC RULES / *FAKULTEITSPESIFIEKE REËLS*

Programme specific requirements, procedures and structures will be presented in the Yearbook and students are referred to the faculty rules where applicable. The structure, method of delivery and presentation mode of each programme in this Yearbook which are subject to the policy laid down by the Institutional Committee for Academic Standards (ICAS) of the NWU and consistent with the requirements of the Higher Education Act (101 of 1997), the Higher Education Qualifications Sub-framework (HEQSF), the Department of Higher Education and Training (DoHET) and the South African Qualifications Authority (SAQA) (A-Rules 1.1, 1.2 and 2.1). /

Programspesifieke vereistes, prosedures en strukture word elke jaar in die jaarboeke van die fakulteit opgeneem. Die struktuur, metode van aflewering en aanbiedingswyse van elke program is onderhewig aan die beleid wat deur die Institusionele Komitee vir Akademiese Standaarde (IKAS) van die NWU opgestel is en in ooreenstemming is met die vereistes van die Wet op Hoër Onderwys (101 van 1997), die Hoër Onderwys Kwalifikasies Sub-Raamwerk (HOKSR), die Departement van Hoër Onderwys en Opleiding (DHOO) en die Suid-Afrikaanse Kwalifikasies Owerheid (SAKO) (A-Reëls 1.1, 1.2 and 2.1).

NAS.1.2.1 AMENDMENT OF PROGRAMMES / *WYSIGING VAN PROGRAMME*

Converting from one programme to another (including amendment of qualification or programme) is by way of a student request form. The full transcript of the student along with the maximum period of the study, are hereby considered. Admission is subject to the approval of the Executive Dean. /

Omskakeling van een kurrikulum na 'n ander (insluitend wysiging van kwalifikasie of program) geskied by wyse van 'n studenteversoekvorm. Die volle akademiese rekord van die student tesame met die toegelate maksimum duur van die studie, word hierby in ag geneem. Toelating is onderhewig aan die goedkeuring van die Uitvoerende Dekaan.

NAS.1.2.2 2

NAS.1.2.3 EXAMINATIONS / *EKSAMINERING*

NAS.1.2.3.1 Examination opportunities / *Eksamengeleenthede*

Examination opportunities and relevant rules are in accordance with the General Rule 1.13.4 and 1.13.6

Die eksamengeleenthede en verbandhoudende reëls geskied in ooreenstemming met Algemene Reël 1.13.4 en 1.13.6

NAS.1.2.3.2 **Composition of the participation mark / *Samestelling van die deelnamepunt***

The participation mark for a module (General Rule 1.13.1) is compiled from tests, assignments and practical work. For every teaching-learning task (class tests, assignments, exercises etc.) that is carried out by means of formative assessment in a module, a mark is allocated. A student's participation mark is the weighed mean of all these marks.

The relationship between theory and practical work for the calculation of the participation mark for the modules, is stated in the relevant study guides. /

Die deelnamepunt vir 'n module (Kyk Algemene Reël 1.13.1) word saamgestel uit toetse, werkstukke en praktiese werk. Vir elke onderrigleeropdrag (klastoetse, werkstukke, opgawes, ensovoorts) wat uitgevoer word by wyse van formatiewe assessering in 'n module, word 'n punt toegeken. 'n Student se deelnamepunt is die geweegde gemiddelde van hierdie punte.

Die verhouding tussen teorie en praktiese werk vir die berekening van die deelnamepunt vir die modules, word in die betrokke studiegidse uiteengesit.

NAS.1.2.3.3 **Admission to examinations / *Toelating tot die eksamen***

- Admission to examinations in any module is granted by acquiring a proof of participation (see General Rule 1.13.2).
- In terms of the General Rule 1.13.2, a proof of participation will only be issued to a student in the Faculty of Natural and Agricultural Sciences if he-
  - has complied with the specific requirements of the module as set out in the relevant **study guide**;
  - where applicable, has completed the **practical work** required for a module; and
  - has obtained a participation mark of at least 35% for **first semester first year modules**- only applicable to bona fide first year students. Each successive module requires a participation mark of 40% (see also General Rule 2.5.2).
- Proof of participation obtained for a module for the first examination opportunity is transferred without any change to the second examination opportunity (see General Rule 1.13.2.2). /
- *Toelating tot die eksamen in enige module geskied deur die verwerwing van 'n deelnamebewys (Kyk Algemene Reël 1.13.2).*
- *In terme van Algemene Reël 1.13.2.3 sal 'n deelnamebewys in die Fakulteit Natuur- en Landbouwetenskappe slegs aan 'n student uitgereik word indien die student:*
  - *voldoen het aan die besondere vereistes daarvoor wat in die **studiegids** vir die betrokke module uiteengesit is;*
  - *waar van toepassing, die **praktiese werk** wat vir 'n module vereis word**,** voltooi het; en*

- *'n deelnamepunt van minstens 35% vir **eerstesemester, eerstejaar modules**, slegs van toepassing op 'n bona-fide eerstejaar student. Vir elke opeenvolgende module moet 'n deelnamepunt van 40% behaal word. (Kyk ook Algemene Reël 2.5.2).*

- *Die deelnamebewys wat vir 'n module verwerf is vir die eerste eksamen-geleentheid, word net so oorgedra na die tweede eksamengeleentheid (Kyk Algemene Reël* 1.13.2.2*).*

NAS.1.2.3.4 **Relation between credits and examination papers / *Verhouding tussen kredietpunte en eksamenvraestelle***

The duration of an examination paper of a 8 and 12-credit module, is usually two hours and the duration of examination papers that count for 16, 24 or 32 credits is usually three hours. /
Die eksamenvraestel vir 'n 8 en 12 kredietpunt module duur gewoonlik twee uur en die eksamenvraestelle van modules wat 16, 24 of 32 kredietpunte tel, duur gewoonlik drie uur.

NAS.1.2.3.5 **Relation between credits and teaching periods / *Verhouding tussen krediete en onderrigperiodes***

With regard to practical work (for example Chemistry, Physics, Zoology, Urban and Regional Planning, etc.): four continuous periods every second week are allocated for practical work at the first year level and four continuous periods per week at the second and third year level. Depending on the nature of the different subjects, deviations from this guideline might be found. /

Met betrekking tot praktiese werk (byvoorbeeld Chemie, Fisika, Dierkunde, Stads- en Streekbeplanning, ens): vier aaneenlopende periodes elke tweede week word toegeken vir praktiese werk by die eerstejaarvlak en vier aaneenlopende periodes per week aan die tweede en derde jaarvlak. Afhangende van die aard van die verskillende vakke, kan afwykings van hierdie riglyn gevind word.

NAS.1.2.3.6 **Number of examination opportunities / *Aantal eksamengeleenthede***

The General Rule 2.8.3 regulates the number of examination opportunities. An implication of these rules is that a student who has not passed a module with the second examination opportunity will not be entitled to exemption from classes.

See General Rule 1.13.6: Dean's concession examination (third examination opportunity)

Students in Actuarial Science, who would like to be considered for actuarial exemption, must write their examinations during the first examination opportunity. Complete requirements for students in Actuarial Science may be obtained from the Director of the Centre for Business Mathematics and Informatics. /

Die aantal eksamengeleenthede word bepaal deur Algemene Reël 2.5.3 'n Implikasie van hierdie reëls is dat 'n student wat 'n module na die tweede eksamengeleentheid nog nie geslaag het nie, nie op klasvrystelling geregtig sal wees nie.

Sien Algemene Reël 1.13.6: Dekaans finale konsessiegeleentheid (3de eksamengeleentheid)

Studente in Aktuariële Wetenskap, wat in aanmerking wil kom vir aktuariële vrystelling, moet hulle eksamen tydens die eerste eksamengeleentheid skryf. Volledige voorskrifte vir studente in Aktuariële Wetenskap is by die direkteur van die Sentrum vir Bedryfswiskunde en Informatika beskikbaar.

NAS.1.2.3.7 **Module mark / *Modulepunt***

Applies only to full-time study: The module mark for every module is calculated (see General Rule 1.13.1) from the participation mark and the examination mark at a 1:1 ratio. Calculation of final module marks for distance students are indicated in the study guide. The weight of the participation mark may be between 30% and 70% of the final module mark.

Slegs van toepassing op voltydse studie: Die modulepunt (Kyk Algemene Reël 1.13.1) word bereken uit die deelnamepunt en die eksamenpunt in die verhouding 1:1. Berekening van finale modulepunte vir afstandstudente word in die studiegids aangedui. Die gewig van die deelnamepunt kan tussen 30% en 70% van die finale modulepunt wees.

NAS.1.2.3.8 **Pass requirements of a module / *Slaagvereistes van 'n module***

The terms and conditions for passing modules are set out in the General Rule 1.13.3. The subminimum for all modules in the examination is 40%./

Die bepalings ten opsigte van die slaag van modules is in die Algemene Reël 1.13.3 uiteengesit. Die subminimum in die eksamen vir alle modules is 40%.

NAS.1.2.3.9 **Access to and review of marked examination work / *Toegang tot en hersiening van gemerkte eksamenwerk* (Rule 1.13.7)**

- All students have the right to view their examination scripts and associated memoranda in accordance with faculty rules.
- To view a marked script, the student must submit an application on the relevant form to the Faculty Administrator. The distance students may apply via the UODL call centre. The students apply officially to the relevant School Director.
- In the case of contact programmes, the application to view the examination script must be submitted **within five working days** after the module examination results have been published in the case of the **first** examination opportunity, and **within two working days** in the case of the **second** examination opportunity. In the case of **distance** programmes, the application must be lodged within **ten working days**.
- Faculty rules must provide procedures for, and the management of the manner in which students may be given access to their examination work.
  - If approved the student may view the answer paper and memorandum in the presence of the lecturer and subject group chairperson concerned. Any bona fide errors can be corrected.
- On the basis of the review of the examination script, a student may request that administrative errors in the calculation of the examination mark be corrected, or that the examination script be remarked on payment of an additional examination fee as per the provisions of Rule 1.13.7.7.
- Where the remarking of the examination work leads to a change in the assessment result, **the original mark is replaced by the changed mark**.

- Scripts and the associated memoranda must be viewed and/or remarked after each examination period and before the date as indicated in the annual University calendar for finalising the examination results. /

- *Alle student het die reg om insae in hul eksamenskrifte en geassosieerde memoranda te kry in ooreenstemming met fakulteitstreëls. Die student moet betyds daarvoor op die relevante vorm by die bepaalde Fakuteit Administrateur, aansoek doen. Die afstandstudente moet deur die EOAL inbelsentrum, die versoek rig. Die versoek word aan die betrokke Skooldirekteur gerig.*
- *In die geval van kontak programme, moet aansoek om insae in eksamenskrifte te hê **binne vyf dae** ingedien word nadat die eksamenresultate bekend gemaak is in die geval van die **eerste** eksamengeleentheid en **binne twee dae** in geval van **tweede** eksamengeleentheid. In die geval van **afstandsprogramme** moet aansoek binne **tien werksdae** gedoen word.*
- *Fakulteitsreëls moet prosedures voorsien vir, en bestuur van die wyse hoe studente insae kan kry in hulle eksamenwerk.*
  - *Indien goedgekeur, kan die student die antwoordskrif en memorandum in die teenwoordigheid van die betrokke dosent en vakgroepvoorsitter besigtig. Enige bona fide foute kan reggestel word.*
- *Op die basis van hersiening van eksamenskrifte kan die student versoek dat administratiewe foute reggemaak word, maar indien 'n hermerk versoek word, kan dit teen 'n betaling gedoen word. Reël A.1.13.7.7*

- *Indien die hermerk van die eksamenskrif 'n wysiging van die uitslag tot gevolg het, **word die oorspronklike punt vervang deur die gewysigde punt**.*

- *Skrifte en geasosieerde memoranda moet hersien word na elke eksamen en binne die datums soos aangedui op die Universiteit se jaarkalender vir finalisering van eksamenpunte.*

NAS.1.2.3.10 **Exemption from practical work or class attendance in a module: (General Rule 1.12) /** ***Vrystelling van praktiese werk of klasbywoning van 'n module: (Algemene Reël 1.12)***

NAS.1.2.4 REGISTRATION FOR FINAL YEAR MODULES: (GENERAL RULE 2.4) / ***REGISTRASIE VAN FINALE JAAR MODULE:* (*ALGEMENE REËL 2.4*)**

NAS.1.2.5 **PROGRESS IN A PROGRAMME BASED ON PREREQUISITES /** ***VORDERING IN 'N PROGRAM GEBASEER OP VOORVEREISTES***

In compiling each programme care has been taken that assumed learning, i.e. the necessary prior knowledge and the general level of insight and experience needed to complete the modules prescribed with ease in a specific semester of a programme, has been acquired in the preceding semesters. A student having failed one or more modules in a preceding semester will therefore probably not be adequately equipped to take the modules of the following semester. Such students are URGENTLY advised to consult the director of the relevant school BEFOREHAND to find out which modules of the semester concerned they may take with a reasonable expectancy of success.

The aim of the rules is to make sure that a student in any semester will only take those modules of which he has the minimum prior knowledge.

A module in any subject may only be taken if it conforms to the requirements regarding the assumed learning, as indicated in the list of modules of the relevant subject. (A-Rule 1.8)

When students change from one programme to another, the entrance level in the new programme will have to be determined in consultation with the director of the school under which the relevant programme falls. /

By die saamstel van elke program, is sorg gedra dat die veronderstelde leer, dit wil sê die nodige voorkennis en algemene vlak van insig en ervaring, wat nodig is om die modules wat in 'n bepaalde semester van 'n program voorgeskryf is, met gemak te kan volg, reeds in die voorafgaande semesters verwerf is. 'n Student wat een of meer modules in die voorafgaande semesters gesak het, sal dus waarskynlik nie voldoende toegerus wees om die modules van die volgende semester te neem nie. Sulke studente word DRINGEND aangeraai om VOORAF die direkteur van die betrokke skool te raadpleeg om vas te stel watter modules van die betrokke semester hulle wel met 'n redelike verwagting op sukses sal kan loop.

Die reëls het ten doel om te verseker dat 'n student in enige semester slegs daardie modules neem waarvoor die student wel oor die minimum voorkennis beskik.

'n Module van enige vak kan slegs geneem word indien aan die eise ten opsigte van veronderstelde leer, soos in die modulelys van die betrokke vak aangedui is, voldoen is. (A-Reël 1.8)

Studente wat van een program na 'n ander program omskakel se intreevlak in die nuwe program sal in oorleg met die direkteur van die skool waaronder die betrokke program resorteer, bepaal word.

NAS.1.2.5.1 Linked and concurrent modules (A-Rule 1.8)

1.8.1 Linked modules, being modules identified as assumed learning for a subsequent module or modules, must be specified in faculty rules (see NAS1.14.1).
1.8.2 Linked modules must have been passed, before a student may register for a successive module.
1.8.3 The passing of modules may be specified in faculty rules as a concurrent requirement for the recognition of the passing of another module, in which case such modules may be taken in a semester prior to, or in the same semester as the module for which it is a concurrent requirement.

In terms of the General Rule 1.8.3 apply in the Faculty of Natural Sciences (see also 1.14.11[contact students) and 1.14.1.2 [distance students])

NAS.1.2.6 TERMINATION OF STUDIES: (GENERAL RULE 1.18) / *BEËINDIGING VAN STUDIES: (ALGEMENE REËL 1.18)*

NAS.1.2.7* ATTAINMENT OF QUALIFICATION: (GENERAL RULE 2.6) / *VERWERWING VAN KWALIFIKASIE: (ALGEMENE REËL 2.6)

A degree is obtained when a student has passed in the examination of all the modules prescribed in the curriculum concerned. /
'n Graad word verwerf wanneer 'n student in die eksamen van al die voorgeskrewe modules wat in die betrokke kurrikulum voorgeskryf word, geslaag het.

NAS.1.2.7.1* Qualification with distinction / *Kwalifikasie met onderskeiding

With reference to General Rule 2.6.2, a B-degree is conferred with distinction
and has achieved a weighted average of at least 75% in the modules of the major subjects, designated by H, in each curriculum (core modules) and-

- Where a full-time student enrolled in a contact programme, completes the programme in the minimum period of study, except if failure to comply with the minimum time requirements is due to the interruption of the study on medical grounds, in which case the executive dean concerned, may approve the award of the degree with distinction (A-Rule 2.6.2.2).
- A part-time student or a student enrolled in a distance programme, must complete the programme within the maximum time specified in the faculty rules in order to qualify for the award of the qualification with distinction (A-Rule 2.6.2.3).
- For purposes of calculating the average, modules completed at other institutions and that are recognised as such by the NWU, must be taken into account (A-Rule 2.6.2.4).

NAS.1.3 PROFESSIONAL STATUS / *PROFESSIONELE STATUS*

Any person who has obtained one of the following qualifications in a natural science field at a university in South Africa and has acquired experience as indicated below, may register as a Professional Natural Scientist (Pr.Sci.Nat.) with the South African Council for Natural Scientific Professions:

- 4-year BSc or Hons BSc (that preferentially includes a research module), plus three years of experience in a natural science profession;
- MSc and two years of experience in a natural science profession;
- DSc or PhD plus one year of experience in a natural science profession.

First year of study: 70% of the modules passed, should be in natural sciences, namely Biology I (Botany I and Zoology I), Chemistry I, Mathematics I, Physics I or another natural science subject such as Geology I.

Second and third year **of study:** 80% of the modules passed should be in the natural sciences of which 50% should be in the respective discipline or directly supportive of the discipline. (Exit level for registration as a Certified Natural Scientist).

Fourth year of study (Honours level): Preferably, 100% of the modules passed should be in the natural sciences of which 80% should be in the respective discipline or directly supportive to nthe discipline. (Exit level for registration as Candidate and Professional Natural Scientist)

Students who have obtained an honours qualification or higher, in Biochemistry may apply to the Health Professions Council of South Africa for registration as an intern medical scientist through an institution that offers such internships. Upon completion of the internship the candidate will be eligible for registration as a medical scientist.

Students who have **registered for** the BSc in Urban and Regional Planning qualification may apply for registration as a Candidate Planner, according to the regulations (Planning Professions Act, 36 of 2002) of the South African Council for Planners (SACPLAN). After a minimum of two years in practice and completion of the instructions for registration, such a student will be able to register as a Professional Planner [Pr.Pln]. /

Enige persoon wat 'n toepaslike vierjarige kwalifikasie in 'n natuurwetenskaplike rigting aan 'n universiteit in Suid-Afrika verwerf het en oor die dienooreenkomstige jare ervaring beskik, kan as Professionele Natuurwetenskaplikes (PrSciNat) by die Suid-Afrikaanse Raad vir Natuurwetenskaplike Professies registreer:

- *'n 4-jarige BSc of 'n HonsBSc (wat verkieslik 'n navorsingsmodule insluit), plus drie jaar ervaring in 'n natuurwetenskaplike professie;*
- *'n MSc en twee jaar ervaring in 'n natuurwetenskaplike professie;*
- *'n DSc of PhD plus een jaar ervaring in 'n natuurwetenskaplike professie;*

Eerstejaar van studie: *70% van die modules wat geslaag word, moet in die natuurwetenskappe wees, naamlik Biologie I (Plantkunde I en Dierkunde I), Chemie I, Fisika I, Wiskunde I, of 'n ander natuurwetenskapvak, bv. Geologie I.*

Tweede- en derdejaar van studie: *80% van die modules wat geslaag word moet in die natuurwetenskappe wees, waarvan 50% in die onderskeie dissipline is of direk ondersteunend tot die dissipline. (Uittreevlak vir registrasie as Gesertifiseerde Natuurwetenskaplike).*

Vierdejaar van studie (honneursvlak): *Verkieslik 100% van die modules wat geslaag word, moet in die natuurwetenskappe wees, waarvan 80% in die onderskeie dissipline is of direk ondersteunend tot die dissipline. (Uittreevlak vir registrasie as Kandidaat en Professionele Natuurwetenskaplike).*

Studente wat 'n honneurskwalifikasie of hoër in Biochemie verwerf het, kan aansoek doen by die Raad vir Gesondheidsberoepe van Suid-Afrika om geregistreer te word as 'n intern mediese wetenskaplike deur 'n instansie wat so 'n internskap aanbied. Na voltooiing van die internskap sal die kandidaat in aanmerking kom vir registrasie as 'n mediese wetenskaplike.

Studente wat vir die BSc in Stads- en Streekbeplanning graad ***geregistreer is****, kan ingevolge die voorskrifte van die Suid Afrikaanse Raad vir Beplanners in terme van die 'Planning Professions Act (36 of 2002)' aansoek doen vir registrasie as n Kandidaat Beplanner. Na verloop van 'n minimum van twee jaar in die praktyk en nadat aan die voorskrifte vir Registrasie voldoen is, kan sodanige persoon as n Professionele Beplanner registreer word [Pr.Pln].*

NAS.1.4 MODULES LACKING TO COMPLETE DEGREE */ UITSTAANDE MODULES OM GRAAD TE VOLTOOI*

If a student lacks **five** modules **at the most** to complete his/her degree, these modules may be completed at UNISA, subject to the following conditions:

- The degree must be completed within **five years**. If it takes longer, a written application must be made for extension of the studies.

- At least **one** core module on third year level must be completed at NWU.
- The student must register at both NWU and UNISA. /

*Indien 'n student **hoogstens vyf** modules kort om sy/haar graad te voltooi, kan hierdie modules by UNISA geneem word, onderhewig aan die volgende voorwaardes:*

- *Die graad moet binne **vyf jaar** voltooi word. Indien dit langer neem moet skriftelik aansoek gedoen word vir verlenging van studie.*
- *Minstens **een** kernmodule moet op derdejaarvlak by die NWU voltooi word.*
- *Die student moet by beide instellings, die NWU en UNISA* registreer.

NAS.1.5 WARNING AGAINST PLAGIARISM / *WAARSKUWING TEEN PLAGIAAT*

Assignments are individual tasks and not group activities (unless explicitly indicated as group activities). For further details see:

http://www.nwu.ac.za/content/policy_rules /

Werkstukke is individuele take en nie groepsaktiwiteite nie (tensy dit uitdruklik aangedui word as 'n groepsaktiwiteit). Vir meer besonderhede gaan na:

http://www.nwu.ac.za/af/content/beleide-en-reels

NAS.1.6 CAPACITY STIPULATION / *KAPASITEITSBEPERKINGS*

Please take note of the fact that, owing to specific capacity constraints, the University reserves the right to select candidates for admission to certain fields of study. This means that prospective students who comply with the minimum requirements may not necessarily be admitted to the relevant courses.. As a result of capacity restrictions and the oversupply of students in certain disciplines, students will be selected for these fields on grounds of their scholastic achievements. (Refer to A-Rule 1.5.2.1) /

Neem asb. kennis dat die Universiteit a.g.v. spesifieke kapasiteitsbeperkings hom die reg voorbehou om kandidate vir toelating tot bepaalde studierigtings te keur. Dit beteken dat voornemende studente wat aan die minimum toelatingsvereistes voldoen, nie noodwendig tot die betrokke kursusse toegelaat sal word nie. A.g.v. kapasiteitsbeperkinge en die ooraanbod van studente in bepaalde studierigtings, sal studente o.g.v. hulle skolastiese prestasie gekeur word vir toelating tot hierdie rigtings (Verwys na A-Reël 1.5.2.1).

NAS.1.7 LANGUAGE MEDIUM / *TAALMEDIUM*

Mafikeng: The language of instruction in all undergraduate contact sessions is English. / *Die onderrigtaal in alle voorgraadse kontaksessies is Engels.*

Vaal Triangle / *Vaaldriehoek*: The language of instruction in all undergraduate contact sessions is English, but some modules are presented in both English and Afrikaans. / *Die onderrigtaal in alle voorgraadse kontaksessies is Engels, maar sommige modules word in Engels en Afrikaans aangebied.*

Potchefstroom: The language of instruction in all undergraduate contact sessions is Afrikaans, unless otherwise indicated. Educational interpreting to English will be available in all modules (where requested). All study guides, tests and examination papers are made available to students in both Afrikaans and English. Students may answer any written or oral test or examination in either Afrikaans or English.

Distance Learning IT programme: The language of instruction is English. /

Potchefstroom: *Die onderrigtaal in alle voorgraadse kontaksessies is Afrikaans, tensy anders aangedui . Opvoedkundige tolking na Engels is in alle modules beskikbaar (waar versoek). Alle studiegidse, toetse en eksamenvraestelle word egter in beide Afrikaans en Engels aan studente beskikbaar gestel. Dit staan studente in alle modules vry om enige skriftelike of mondelinge toets of eksamen in Afrikaans of Engels af te lê.*

Afstandsleer IT program: *Die onderrigtaal is in Engels.*

NAS.1.8 PROTECTION OF PERSONAL AND EDUCATION-RELATED INFORMATION / *BESKERMING VAN PERSOONLIKE EN OPVOEDKUNDIG-VERWANTE INLIGTING*

A-Rule 1.11 stipulates the following:
In the course of the registration process, the extent to which the student's personal or education-related information may be disclosed to a third party is determined, but the student may withdraw or amend permission granted to disclose such information by means of a request in writing submitted to the registrar. The university may disclose personal or education-related information regarding a student to a third party only after the law applicable to the protection of and access to information has duly been complied with.

A-Reël 1.11 bepaal die volgende:
In die loop van die registrasieproses word die mate waarin die student se persoonlike of opvoedingsverwante inligting aan 'n derde party openbaar gemaak mag word bepaal, maar die student mag toestemming onttrek of wysig om sodanige inligting bekend te maak deur middel van 'n skriftelike versoek aan die registrateur. Die universiteit kan slegs persoonlike of opvoedingsverwante inligting rakende 'n student aan 'n derde party bekend maak nadat die wet wat op die beskerming van en toegang tot inligting van toepassing is, behoorlik nagekom is.

NAS.1.9 ACADEMIC LITERACY / *AKADEMIESE GELETTERDHEID*

All undergraduate students who register at the North-West University for the first time, are required to register for a module / modules in academic literacy. They have to pass this module / modules before they can graduate. /

Alle voorgraadse studente wat vir die eerste keer aan die Noordwes Universiteit registreer, is verplig om vir 'n module / modules in akademiese geletterdheid te registreer. Hulle moet dit slaag, alvorens hulle kan gradueer.

NAS.1.9.1 TESTING / *TOETSING*

Students have to write a compulsory proficiency test (TALL or TAG) in academic literacy, at a time and place determined by the University, in order to determine their ability to function within the academic environment. The purpose of this test is to identify students who, due to inadequate academic literacy skills, may not complete their study programme within the stipulated period in order to empower them with the necessary knowledge and skills. /

Studente moet 'n verpligte vaardigheidstoets (TAG of TALL) in akademiese geletterdheid skryf op 'n gegewe tyd en plek, soos deur die Universiteit bepaal. Die doel van die toets is om studente te identifiseer wat, a.g.v. onvoldoende akademiesegeletterdheidsvaardighede die risiko loop om hulle studieprogram nie suksesvol binne die toegelate tydperk te voltooi nie, sodat hulle met die nodige kennis en vaardighede bemagtig kan word.

Students have the option of writing the compulsory skills test in either English or Afrikaans. With the exception of students who are identified as borderline cases by the test, each student has only one opportunity to write the test. Students who are regarded as borderline cases, will be granted a second opportunity to write the test. It is the student's responsibility to check and verify his/her result within 14 days of writing the test and to register for the correct module in the correct semester (see below). /

Studente besluit self of hulle die verpligte vaardigheidstoets in Afrikaans of in Engels wil aflê. Met die uitsondering van studente wat deur die toets as grensgevalle uitgewys word, kry elke student slegs een geleentheid om die toets af te lê. Studente wat as grensgevalle beskou word, kry 'n tweede geleentheid. Dit is die student se verantwoordelikheid om hom-/haarself binne 14 dae na aflegging van die toets van sy/haar uitslag te vergewis en vir die korrekte module in die korrekte semester te registreer (sien hieronder).

NAS.1.9.2 **MODULE(S): ACADEMIC LITERACY DEVELOPMENT (ALDE111) / *ONTWIKKELING VAN AKADEMIESE GELETTERDHEID (ALDA111)***

All students in the Faculty of Natural and Agricultural Sciences are required to register for the module ALDE111 [English] or ALDA111 [Afrikaans], depending on the language of the compulsory proficiency test. The only exception is students who are enrolled for the following programmes: Quantitative Risk Management, Financial Mathematics, Business Analytics, Actuarial Science, Information Technology, Urban and Regional Planning. This exception is not applicable if a student has been identified as being at risk by the aforementioned test. He/she is then also required to take ALDE111 or ALDA111. /

Alle studente in die Fakulteit Natuur- en Landbouwetenskappe is verplig om vir die module ALDA111 [Afrikaans] óf ALDE111 [Engels] te registreer, afhangend van die taal waarin hulle die verpligte vaardigheidstoets afgelê het. Die enigste uitsondering is studente wat ingeskryf is vir die volgende programme: Kwantitatiewe Risikobestuur, Finansiële Wiskunde, Bedryfsanalise, Aktuariële Wetenskap, Inligtingstegnologie, Stads- en Streeksbeplanning. Hierdie uitsondering is egter nie van toepassing op bogenoemde programme nie, indien die student as 'n risikokandidaat aangemerk word deur bogenoemde toets en hy/sy dan verplig word om ook ALDA111 óf ALDE111 te volg.

i. Level and credits / *Vlak van krediete*

This module is on NQF level 5 and worth 12 credits (additional credits). In exceptional cases it will be calculated in terms of curriculum credits. It therefore carries a weight of 12 credits in the first-year curriculum in these cases. /

Hierdie module is op NKR-vlak 5 en het 'n waarde van 12 krediete (addisionele krediete). In uitsonderlike gevalle word dit wel vir kredietdoeleindes van die kurrikulum in berekening gebring. Krediete hiermee verdien, kan dus 'n gewig dra van 12 krediete in die eerstejaarskurrikulum.

ii. Composition of module and calculation of module marks / *Samestelling van module en punteberekening*

- ALDE111 / ALDA111 comprises one component only, which includes two periods per week. Class attendance is compulsory. The module is only presented in Semester 1. /

ALDA111 / ALDE111 bestaan uit slegs een komponent wat minstens twee periodes per week behels en klasbywoning is verpligtend. Die module word slegs in Semester 1 aangebied.

- A system of continuous assessment is followed. The final module mark is calculated as follows: Exam mark = 40% and Participation mark = 60%. For admission to the exam in ALDE111 / ALDA111, a participation mark of 40% is required. /

  'n Stelsel van deurlopende assessering word gebruik. Die finale modulepunt word soos volg bereken: Eksamenpunt = 40% en Deelnamepunt = 60%. Vir toelating tot die eksamen in ALDA111 / ALDE111 word 'n deelnamepunt van 40% vereis.

- Note that for conditional admission to ALDE122 / ALDA122, a student who is required to follow ALDE111 / ALDA111 should obtain a module mark of 40% minimum for ALDE111 / ALDA111. /

  Let daarop dat vir voorwaardelike toelating tot die module ALDA122 / ALDE122, moet 'n student wat verplig is om eers ALDA111 / ALDE111 te volg, 'n modulepunt van minstens 40% in ALDA111 / ALDE111 verwerf.

- A final module mark of 50% is required to pass the module. /

  'n Finale modulepunt van 50% is nodig om die module te slaag.

iii. Important additional information / *Belangrike addisionele inligting*

Specific faculty rules in terms of termination of studies might apply if a student fails ALDE111 / ALDA111. /

Spesifieke fakulteitsreëls i.t.v. terminering van studies kan van toepassing wees indien 'n student ALDA111 / ALDE111 nie slaag nie.

Students who have already successfully completed a module similar to ALDE111 / ALDA111 at another tertiary institution and can provide proof of this, may apply in writing on the prescribed form for formal recognition for the module. This application should be submitted to the subject chair responsible for Academic Literacy. Recognition is only granted in cases where the modules are on the same NQF level (NQF5), where the credit values are of the same value (12), and where content is comparable. /

Studente wat reeds 'n module soortgelyk aan ALDA111 / ALDE111 suksesvol aan 'n ander tersiêre instelling voltooi het en bewys daarvan kan lewer, kan skriftelik op die voorgeskrewe vorm by die betrokke entiteit verantwoordelik vir Akademiese Geletterdheid om erkenning aansoek doen. Erkenning word slegs toegestaan in gevalle waar die modules op dieselfde NKR-vlak is (NKR5), die kredietwaarde minstens dieselfde is (12) en die inhoude vergelykbaar is.

iv. Language and mode of delivery / *Taal en modus van aanbieding*

ALDE111 is presented in English and ALDA111 in Afrikaans. The module is presented in both contact and open distance learning mode. Note that only students who are formally registered for open distance learning may follow the module in this mode. Moreover, open distance learning is presented in English only. /

ALDA111 word in Afrikaans aangebied en ALDE111 in Engels. Die module word in beide kontak- en afstandsmodusse aangebied, maar let daarop dat

slegs studente wat formeel vir afstandsonderrig geregistreer is, dit in die afstandsmodus mag volg. Afstandsmodules word verder slegs in Engels aangebied.

v. Outcomes / *Uitkomste*

On completion of this module students should be able to:

- bridge the gap between secondary school and university education;
- access academic information effectively in order to understand academic texts;
- process academic information successfully; and
- produce academic information responsibly and appropriately. /

By afhandeling van hierdie module behoort die student in staat te wees om:

- *die gaping tussen hoërskool en universiteit te oorbrug;*
- *op effektiewe wyse toegang tot akademiese inligting te verkry met die doel om akademiese tekste te verstaan;*
- *akademiese inligting suksesvol te prosesseer; en*
- *akademiese inligting gepas en verantwoordelik te produseer.*

NAS.1.9.2.1 **Academic Literacy Development (ALDE122) / *Ontwikkeling van Akademiese Geletterdheid* (ALDA112 or 122)**

All students in the Faculty of Natural and Agricultural Sciences, regardless of the result obtained for the compulsory proficiency test in academic literacy, must register for the module ALDE122 [English] / ALDA112 or ALDA122 [both in Afrikaans]. /

Alle studente in die Fakulteit Natuur- en Landbouwetenskappe, ongeag die uitslag van die verpligte vaardigheidstoets in akademiese geletterdheid, moet die module ALDA112 of ALDA122 [beide in Afrikaans] / ALDE122 [Engels] neem.

Students whose preffered teaching and learning language is Afrikaans, and who do not need to complete ALDA111, register for ALDA112 in Semester 1. This arrangement is only applicable to students registered for the following programmes:

- Quantitative Risk Management
- Financial Mathematics
- Business Analytics
- Actuarial Science
- Information Technology
- Urban and Regional Planning

Students who are required to enrol for ALDA111, register for ALDA122 in Semester 2, regardless of the programme they are registered for. All other students with Afrikaans as language of teaching and learning, register for ALDA122 in Semester 2.

Note that ALDA112 and ALDA122 are exactly the same module presented in both semesters. The module codes, however, differ in order to distinguish between the semesters. /

Studente met Afrikaans as onderrigtaal en wat nie ALDA111 hoef te volg nie, registreer vir ALDA112 in Semester 1. Hierdie reëling is slegs van toepassing op studente wat in die volgende programme geregistreer is:

- *Kwantitatiewe Risikobestuur*
- *Finansiële Wiskunde*
- *Besigheidsanalise*
- *Aktuariële Wetenskap*
- *Inligtingstegnologie*
- *Stads- en Streeksbeplanning*

Studente wat ALDA111 moes volg, registreer vir ALDA122 in Semester 2, ongeag die program waarvoor hulle geregistreer is. Alle ander studente met Afrikaans as onderrigtaal, registreer vir ALDA122 in Semester 2.

Let daarop dat ALDA112 of ALDA122 dieselfde module is wat in beide semesters aangebied word, maar waarvan die modulekode verskil om die onderskeid in semester te tref.

Students with English as language of teaching and learning, regardless of the programme they are registered for, register in all cases for ALDE122 in Semester 2. /

Studente met Engels as onderrigtaal, ongeag die program waarvoor hulle geregistreer is, registreer in alle gevalle vir ALDE122 in Semester 2.

i. Level and credits / V*lak en krediete*

This module is on NQF level 5 and worth 12 credits. Note that it is calculated in terms of curriculum credits. It therefore carries a weight of 12 credits in the first-year curriculum. /

Hierdie module is op NKR-vlak 5 en het 'n waarde van 12 krediete. Let daarop dat dit wel vir kredietdoeleindes van die kurrikulum in berekening gebring word. Krediete hiermee verdien, dra dus 'n gewig van 12 krediete in die eerstejaarskurrikulum.

ii. Composition of module and calculation of module marks / *Samestelling van module en punteberekening*

For admission to the module ALDE122 / ALDA122, a student must first pass ALDE111 / ALDA111. In all other cases students have immediate access to ALDE122 [Semester 2] / ALDA112 [Semester 1] or ALDA122 [Semester 2]. /

Vir toelating tot die module ALDA112 of ALDA122 / ALDE122 moet 'n student wat verplig is om ALDA111 / ALDE111 te neem, eers laasgenoemde slaag. In alle ander gevalle het studente onmiddellik toegang tot ALDA112 [Semester 1] of ALDA122 [Semester 2] / ALDE122 [Semester 2].

A final mark of at least 40% in ALDE111 / ALDA111 only grants students conditional entry to ALDE122 or ALDA122. Students who were allowed to continue with ALDE122 / ALDA122 and who passed the examination in this module, may have the result for ALDE111 / ALDA111 condoned to a pass by the entity concerned with Academic Literacy./

'n Finale punt van ten minste 40% in die module ALDA111 / ALDE111 verleen voorwaardelik toelating tot ALDA122 / ALDE122. Indien die eksamen daarin geslaag word, kan die uitslag van ALDA111 / ALDE111 deur die betrokke entiteit verantwoordelik vir Akademiese Geletterdheid tot 'n slaagpunt gekondoneer word.

The module ALDE122 / ALDA112 or ALDA122 comprises three compulsory components: an Academic Literacy component, a Computer

and Information Literacy component and a Reading component. For the academic literacy component, class attendance of two periods per week is compulsory. Computer and Information Literacy requires that students learn autonomously, but they will have access to contact sessions should they wish to make use thereof. Students are also required to attend a number of sessions in the Reading laboratory. Depending on a student's reading speed and comprehension, he/she could be required to attend more sessions. A student must pass all three components to pass the module. /

Die module ALDA112 of ALDA122 / ALDE122 bestaan uit drie verpligte komponente: Akademiese Geletterdheid, Rekenaar- en Inligtingsvaardighede en 'n Leeskomponent. Akademiese Geletterdheid behels twee lesings per week en klasbywoning is verpligtend. Rekenaar- en Inligtingsvaardighede word op outonome wyse bemeester, maar daar is ook verskeie geleenthede tot kontaksessies tot studente se beskikking indien hul daarvan gebruik wil maak. Studente word ook verplig om vir 'n aantal sessies die dienste van die Leeslaboratorium te gebruik. Afhangend van die student se leesspoed en –begrip kan hy/sy verplig word om meer of minder sessies by te woon. Al drie komponente moet geslaag word om die module te kan slaag.

A system of continuous assessment is followed. The final module mark is calculated as follows: Exam mark = 40% and Participation mark = 60%. For admission to the exam in ALDE122 / ALDA112 / ALDA122, a participation mark of 40% is required. /

'n Stelsel van deurlopende assessering word gebruik. Die finale modulepunt word soos volg bereken: Eksamenpunt = 40% en Deelnamepunt = 60%. Vir toelating tot die eksamen in ALDA112 of ALDA122 / ALDE122 word 'n deelnamepunt van 40% vereis.

The exam consists of two papers, namely Academic Literacy and Computer and Information Literacy. The subminimum required to pass the Academic Literacy component, is 40%. The subminimum required to pass the Computer and Information Literacy component, is 50%. These components are dealt with in a 80:20 ratio when calculating the final mark (80% for the academic literacy and 20% for the computer and information literacy component). For the Reading component, a code for sufficient or insufficient is issued. A final module mark of 50% is required to pass the module./

Die eksamen bestaan uit twee vraestelle, naamlik Akademiese Geletterdheid en Rekenaar- en Inligtingsvaardighede. Die subminimum wat vir eersgenoemde komponent behaal moet word om die module te kan slaag, is 40%. Die subminimum wat vir laasgenoemde komponent behaal moet word om die module te kan slaag, is 50%. Hierdie twee komponente word in 'n 80:20-verhouding hanteer vir die berekening van die finale punt – 80% vir die eerste komponent (Akademiese Geletterdheid) en 20% vir die tweede komponent (Rekenaar- en Inligtingsvaardighede). Vir die Leeslaboratorium word slegs 'n kode vir voldoende of onvoldoende uitgereik. 'n Finale modulepunt van 50% is nodig om die module te slaag.

iii. Important additional information / *Belangrike addisionele inligting*

Specific faculty rules in terms of termination of studies might apply if a student fails ALDE122 / ALDA112 / 122.

Students who have already successfully completed a similar module to ALDE122 / ALDA112 or ALDA122 at another institution and can provide proof of this, may apply in writing on the prescribed form for formal recognition of the module. This application should be submitted to the subject chair responsible for Academic Literacy. Recognition is only granted in cases where the modules are on the same NQF level (NQF5), where the credit values are the same value (12), and where content is comparable./

Spesifieke fakulteitsreëls i.t.v. terminering van studies kan van toepassing wees indien 'n student ALDA112 OF ALDA122 / ALDE122 nie slaag nie.

Studente wat reeds 'n module soortgelyk aan ALDA112 of ALDA122 / ALDE122 suksesvol aan 'n ander tersiêre instelling voltooi het en bewys daarvan kan lewer, kan skriftelik op die voorgeskrewe vorm by die betrokke entiteit verantwoordelik vir Akademiese Geletterdheid om erkenning aansoek doen. Erkenning word slegs toegestaan in gevalle waar die modules op dieselfde NKR-vlak is (NKR5), die kredietwaarde minstens dieselfde is (12) en die inhoude vergelykbaar is.

iv. Language and mode of delivery / *Taal en modus van aanbieding*

ALDE122 is presented in English and ALDA112 or ALDA122 in Afrikaans. The module is presented in both contact and open distance learning mode. Note that only students who are formally registered for open distance learning may follow the module in this mode. Moreover, open distance learning is presented in English only. /

ALDA112 of ALDA122 word in Afrikaans aangebied en ALDE122 in Engels. Die module word in beide kontak- en afstandsmodusse aangebied, maar let daarop dat slegs studente wat formeel vir afstandsonderrig geregistreer is, dit in die afstandsmodus mag volg. Afstandsmodules word verder slegs in Engels aangebied.

v. Outcomes / *Uitkomste*

On completion of this module students should be able to:

- successfully become part of the academic learning community and participate in this community;
- access information in a responsible and ethical way in order to write an academic text;
- process information strategically in order to write an academic text;
- produce an academic text;
- read at an acceptable speed accompanied by acceptable level of comprehension; and
- demonstrate a fundamental level of computer and information literacy./

By afhandeling van hierdie module behoort die student in staat te wees om:

- *suksesvol in te skakel by die akademiese leeromgewing en daaraan deel te neem;*
- *op eties-verantwoordelike wyse te soek vir inligting wat nodig is vir die skryf van 'n akademiese teks;*
- *inligting op 'n strategiese manier te verwerk met die doel om 'n akademiese teks te kan skryf;*

- *'n akademiese teks te produseer;*
- *teen 'n aanvaarbare spoed en begripsvlak te lees; en*
- *'n fundamentele vlak van rekenaar- en inligtingsgeletterdheid te demonstreer.*

NAS.1.10 PROVISIONAL ADMISSION REQUIREMENTS FOR UNDER-GRADUATE STUDIES */ VOORLOPIGE TOELATINGSVEREISTES VIR VOORGRAADSE STUDIE*

NAS.1.10.1 GENERAL ADMISSION REQUIREMENTS */ ALGEMENE TOELATINGSVEREISTES*

Taking due cognizance of the General Rules and Faculty rules as contained in the relevant yearbooks and with specific reference to the A-rule that determines a National Senior Certificate has been obtained and that the minimum statutory requirements for admission to Diploma and/or B-degree studies at a university in the RSA have been complied with, the University reserves the right to consider candidates' applications on the basis or their results./

Met inagneming van die Algemene Reëls en Fakulteitsreëls soos vervat in die betrokke jaarboeke en met spesifieke verwysing na die A-Reël wat bepaal dat 'n Nasionale Seniorsertifikaat verwerf is en dat daar voldoen is aan die minimum statutêre vereistes vir toelating tot Diploma en/of B-graadstudie aan 'n universiteit in die RSA, behou die Universiteit hom die reg voor om aan die hand van resultate oorweging aan kandidate se aansoeke te verleen.

NAS.1.10.2 APPLICANT SCORE (AS) SYSTEM

For refinement of the application process, the Applicant Score (AS) system that assigns points to performance is utilised.

The purpose of the AS is to determine a base score in regard to calculating the three compulsory 20-credit NSC subjects and the performance in the next best three 20-credit NCS subjects.

(With reference to the Admissions Policy of the NWU) http://www.nwu.ac.za/sites/www.nwu.ac.za/files/files/i-governance-management/policy/7P-7.1_Admissions%20Policy_e2019.pdf

NAS.1.10.2.1 Applicant Score (AS) and National Senior Certificate (NSC) Requirements

***Table 1*: Calculating the Applicant Score (AS)**

NSC rating	*AS Score*
8 (90-100%)	AS= sum of the decimal of the three compulsory 20-credit NSC subjects PLUS the next best three 20-credit NSC subjects. Decimal of the actual performance in the relevant subject, e.g. 77% performance to be indicated as 7.7 for purposes of the AS
7 (80-89%)	
6 (70-79%)	
5 (60-69%)	
4 (50-59%)	

3 (40-49%)	Total=60
2 (30-39%)	
1 (0-29%)	

The calculation of the Applicant Score takes place in the following way:

- The results of six (6) 20-credit NSC subjects are used to determine the AS.
- While achievement in Life Orientation (LO) – a 10- credit NSC subject - is not utilised in calculating the ASS, a minimum achievement at Level 3 in LO is required to obtain an NSC. An achievement at level 5 and higher in LO will be regarded as a recommendation for admission in boundary cases and to certain programmes.
- A prospective student who achieves two AS points less than required for admission to a specific qualification may, at the discretion of Senate and in line with Paragraph 31 of GG 31674 (2008), be admitted conditionally to study at the NWU.
- A prospective student who obtains discretionary exemption may be admitted to certain qualifications or related programmes on certain conditions.

Table 2: Minimum admission requirements as per NSC requirements

NSC requirements An achievement of "3" (40-49%) in three subjects (one of which is an official language at Home Language level) and a "2" (30-39%) in three other subjects, provided that a portfolio of evidence in the school-based assessment (CASS) component is submitted in the (seventh) subject failed.
Higher Certificate requirements An NSC certified by Umalusi with an achievement of at least "2" (30-39%) in the language of learning and teaching of the HEI concerned, in addition to requirements particular to the specific programme.
Diploma requirements: An NSC certified by Umalusi with an achievement of at least "3" (40-49%) in at least four recognised 20-credit subjects.
B degree requirements: A National Senior Certificate (NSC) certified by Umalusi with an achievement of "4" (50-59%) or better in at least four 20-credit subjects.

NAS.1.10.3 LANGUAGE REQUIREMENT / *TAALVEREISTE*

A pass at level 4 (50-59%) in two languages, including the language of instruction on either the Home or First additional Language level. /

'n Slaagsyfer van 50-59% (vlak 4) in twee tale, insluitend die taal van leer en onderrig op Huistaal- of Eerste Addisionele taalvlak.

NAS.1.10.4 FACULTY SPECIFIC ADMISSION REQUIREMENTS / *FAKULTEITSPESIFIEKE TOELATINGSVEREISTES*

The rules of the Faculty must be read in conjunction with the general academic rules of the University. A student wishing to enrol for any module offered in the Faculty must meet all the requirements stipulated for that module.To be admitted to a degree or a diploma programme in the Faculty an applicant must comply with the requirements of the general academic rule 1.1 and any additional requirements stipulated for that programme. /

Die reëls van die Fakulteit moet tesame met die algemene akademiese reëls van die Universiteit gelees word. 'n Student wat wil inskryf vir enige module wat in die Fakulteit aangebied word, moet voldoen aan al die vereistes wat vir die betrokke module gestel word.Om tot 'n graad- of 'n diplomaprogram in die Fakulteit toegelaat te word, moet 'n aansoeker voldoen aan die vereistes van die algemene akademiese reël 1.1 en enige bykomende vereistes wat vir daardie program gestel word.

NAS.1.10.4.1 Mathematics requirement / Wiskunde-vereiste

A student who wishes to follow any module in Mathematics, with the exception of Mathematical Techniques (MTHS112, MTHS113 or MTHS123) and Applied Calculus I (MTHS114), must have obtained a mark of at least 60% (level 5) in the grade 12 Mathematics exam or at least 70% (level 6) in another Mathematics exam considered by the Senate as equivalent to the above. /

'n Student wat enige module in Wiskunde wil volg, uitgesonderd Wiskundige Tegnieke (MTHS112, MTHS113 of MTHS123) en Toegepaste Calculus I (MTHS114), moet in die graad 12 eksamen in Wiskunde 'n punt van minstens 60% (vlak 5) of minstens 70% (vlak 6) in 'n ander eksamen in Wiskunde wat die Senaat as gelykwaardig aan bogenoemde ag, behaal het.

NAS.1.10.4.1.1 Comments / *Opmerkings*

- Students who do not meet these requirements, but who managed to obtain a Mathematics mark of at least 50% (level 4) or at least 60% (level 5) in another Mathematics exam considered by the Senate as equivalent to the above, are admitted to a Mathematics refresher course presented in January by the School of Mathematical and Statistical Sciences, on the Potchefstroom and Mafikeng Campuses. If such students perform satisfactorily in the tests taken during this course, they may be considered for admission to Mathematics modules. /
  Studente wat nie aan hierdie vereistes voldoen nie, maar in Wiskunde wel 'n punt van minstens 50% (vlak 4) of minstens 60% (vlak 5) in 'n ander eksamen in Wiskunde wat die Senaat as gelykwaardig aan bogenoemde ag, behaal het, word toegelaat tot 'n Wiskunde opknappingskursus wat in Januarie deur die Skool vir Wiskundige en Statistiese Wetenskappe aangebied word, op die Potchefstroom- en Mafikengkampus. Indien sodanige studente voldoende presteer in die toetse wat tydens hierdie kursus afgeneem word, kan hulle in aanmerking kom vir toelating tot Wiskundemodules.

- All bona fide first year students enrolled for programs/curriculums which include the module(s) MTHS111/114 must attend the refresher course. /

  Alle bona fide eerstejaars wat vir programme/kurrikulums registreer wat die module(s) MTHS111/114 bevat, moet die Wiskunde opknappingskursus doen.

- A student who wishes to follow any module in Mathematics, with the exception of Mathematical Techniques (MTHS112, MTHS113 or MTHS123) and Applied Calculus I (MTHS114), must have obtained a mark of at least 60% (level 5) in the grade 12 Mathematics exam or at least 70% (level 6) in another Mathematics exam considered by the Senate as equivalent to the above. /

  'n Student wat enige module in Wiskunde wil volg, uitgesonderd Wiskundige Tegnieke (MTHS112, MTHS113 of MTHS123) en Toegepaste Calculus I (MTHS114), moet in die graad 12 eksamen in Wiskunde 'n punt van minstens 60% (vlak 5) of minstens 70% (vlak 6) in 'n ander eksamen in Wiskunde wat die Senaat as gelykwaardig aan bogenoemde ag, behaal het.

- Prospective students who do not meet the grade 12 requirement for enrolling in MTHS111, can gain admission to MTHS111 in the second year of study, by passing the module Mathematical Techniques (MTHS112, MTHS113 or MTHS123) with at least 60% or Applied Calculus I (MTHS114) with at least 50% in the first year of study, provided that persons seeking to follow this route to obtain admission to programmes that would otherwise have been inaccessible to them, should take into consideration that they may not be able to complete their studies in the minimum period./

  Voornemende studente wat nie aan die graad 12-vereiste voldoen om vir MTHS111 in te skryf nie, en ook nie die opknappingskursus bygewoon het nie, kan in die tweede studiejaar toelating tot MTHS111 verkry deur in die eerste studiejaar die module in Wiskundige Tegnieke (MTHS112, MTHS113 of MTHS123) met ten minste 60% of Toegepaste Calculus I (MTHS114) met ten minste 50% te slaag, met dien verstande dat persone wat langs hierdie weg toelating wil kry tot programme wat andersins vir hulle ontoeganklik sou wees, in ag moet neem dat hulle moontlik nie hulle studie in die minimum tydperk sal kan afhandel nie.

- A student who wishes to follow Mathematical Techniques (MTHS112, MTHS113 or MTHS123) has to comply with prerequisites of the programme the student intends to study. If a student wishes to take Mathematical Techniques (MTHS112, MTHS113 or MTHS123) in order to qualify for MTHS111 in the next year, or for non-degree purposes, the student must have obtained a mark of at least 40% (level 3) in the grade 12 Mathematics exam, or at least 50% (level 4) in another Mathematics exam considered by the Senate as equivalent to the above. /

  'n Student wat Wiskundige Tegnieke (MTHS112, MTHS113 of MTHS123) wil neem, moet aan die programvereistes van die program waarvoor die student wil inskryf, voldoen. Indien 'n student Wiskundige Tegnieke (MTHS112, MTHS113 of MTHS123) wil neem

om toelating tot MTHS111 in die volgende jaar te verkry, of vir nie-graaddoeleindes, moet die student óf in die graad 12-eksamen in Wiskunde 'n punt van minstens 40% (vlak 3), óf minstens 50% (vlak 4) in 'n ander eksamen in Wiskunde behaal het, wat die Senaat as gelykwaardig aan voorgenoemde ag.

- A student who wishes to follow Applied Calculus I (MTHS114) has to comply with prerequisites of the program the student intends to study. If a student wishes to take Applied Calculus I (MTHS114) in order to qualify for MTHS111 in the next year, or for non-degree purposes, the student must have obtained a mark of at least 50% (level 4) in the grade 12 Mathematics exam, or at least 60% (level 5) in another Mathematics exam considered by the Senate as equivalent to the above. /
  'n Student wat Toegepaste Calculus I (MTHS114) wil neem, moet aan die programvereistes van die program waarvoor die student wil inskryf, voldoen. Indien 'n student Toegepaste Calculus I (MTHS114) wil neem om toelating tot MTHS111 in die volgende jaar te verkry, of vir nie-graaddoeleindes, moet die student óf in die graad 12-eksamen in Wiskunde 'n punt van minstens 50% (vlak 4), óf minstens 60% (vlak 5) in 'n ander eksamen in Wiskunde behaal het, wat die Senaat as gelykwaardig aan voorgenoemde ag.

NAS.1.10.4.2 Admission Requirements for Programmes / Toelatingsvereistes vir Programme

NAS.1.10.4.2.1 Diplomas

Students who have not achieved the required points for entry into BSc Agric may be admitted into any of the three Agriculture Diploma Programmes (Students need a "Diploma" matric pass).

Diploma in Animal Health Dip (3 yr) MC				
WITH Specialisation In / *MET Spesialisering In*	**Programme and Curriculum code / *Program- en Kurrikulumkode***	**Required NSC Subjects Plus Selection Criteria / *Vereiste NSS- vakke Plus Keuringsvereistes***	**APS**	**Selection Test / *Keurings-toets***
	2DY B01 N302M **2DY B01 N301M** (Old programme phasing out) **266100-N102M** Pipeline/*pyplyn*	*English Level 3 *Mathematics Level 3 *Physical Science Level 3 **OR** Life Sciences Level 3 (40-49%)	19	No
Diploma in Animal Science (3 yr) MC				
WITH Specialisation In / *MET Spesialisering In*	**Programme and Curriculum code / *Program- en Kurrikulumkode***	**Required NSC Subjects Plus Selection Criteria / *Vereiste NSS- vakke Plus Keuringsvereistes***	**APS**	**Selection Test / *Keurings-toets***
	2FH B01 **N301M** (Old programme phasing out) **279100-N101M** Pipeline only	*English Level 3 *Mathematics Level 3 (40-49%) **OR** Mathematical Literacy Level 5 (60-69%) *Physical Science Level 3 **OR** Life Sciences Level 3 **OR** Agricultural Sciences Level 4 (50-59%)	19	No

Diploma in Plant Science Dip (3 yr) MC				
WITH Specialisation In / ***MET Spesialisering In***	**Programme and Curriculum code /** ***Program- en Kurrikulumkode***	**Required NSC Subjects Plus Selection Criteria /** ***Vereiste NSS- vakke Plus Keuringsvereistes***	**APS**	**Selection Test /** ***Keurings-toets***
Crop Production	**2FJ B01 N301M**	*English Level 3 *Mathematics Level 3 (40-49%) **OR** Mathematical Literacy Level 5 (60-69%) *Physical Sciences Level 3 **OR** Life Sciences Level 3 **OR** Agricultural Sciences Level 4 (50-59%)	19	No
Univ Diploma in Plant Science (Crop Science)	**279101 N103M**	**Phasing out from 2018 . No new intake. Pipeline only**		

Farm Practical

A student studying agriculture will be required to gain farm practical experience of a minimum duration, as prescribed for a particular study programme, at an approved institution under the guidance of an approved supervisor. A mark will be awarded for each completed period of farm practical experience.

A student studying agriculture will be required to carry out practical Farm/Laboratory work at various times during semesters.

NAS.1.10.4.2.2 Extended: Bachelor of Science Degree

Students who have not achieved the required points for entry into BSc may be admitted into the, BSc (Extended (BSc-e)) Programme. (Students need a "Bachelors" matric pass.)

Extended: Bachelor of Science: Mafikeng Campus (MC) BSc (4 yr) (See NAS1.13 list of extended programmes)				
WITH Specialisation In / ***MET Spesialisering In***	**Programme and Curriculum code /** ***Program- en Kurrikulumkode***	**Required NSC Subjects Plus Selection Criteria /** ***Vereiste NSS- vakke Plus Keuringsvereistes***	**APS**	**Selection Test /** ***Keurings-toets***
See list of programmes **NAS1.13**	See list NAS1.13. (Old programmes) **2791501 N101 M**	*English Level 4 (50-59%) *Mathematics Level 3 (40-49%) *Physical Science Level 3 (40-49%)	22	No

Extended: Bachelor of Science in Information Technology *Verlengde: Baccalaureus Scientiae in Inligtingstegnologie* BSc (4 yr / *jr*) VTC				
WITH Specialisation In / ***MET Spesialisering In***	**Programme and Curriculum code /** ***Program- en Kurrikulumkode***	**Required NSC Subjects Plus Selection Criteria /** ***Vereiste NSS- vakke Plus Keuringsvereistes***	**APS**	**Selection Test /** ***Keurings-toets***
	2XX H01 N301V (1st - 4th yrs) (Old/ *Oud)* **264102-302V** Pipeline only	Mathematics level 3 (40-49%) / *Wiskunde vlak 3* (40-49%)	24	No/ *Nee*
Extended: Bachelor of Science in *Financial Mathematics* / *Verlengde: Baccalaureus Scientiae in Finansiële Wiskunde* **BSc (4 yr / *jr*) VTC**				
	2XS H01 N301V (1st - 4th yrs) (Old/ *Oud)* **200 208 N301V** Pipeline only	Mathematics level 4 (50-59%) *Wiskunde vlak 4* (50-59%)	28	No / *Nee*
Extended: Bachelor of Science in Quantitative Risk Management / *Verlengde: Baccalaureus Scientiae in Kwantitatiewe Risikobestuur* **BSc (4 yr / *jr*) VTC**				
	2XT H01 N301V (1st - 4th yr) (Old/ *Oud)* **200 207 N301V** Pipeline only	Mathematics level 4 (50-59%)/ *Wiskunde vlak 4* (50-59%)	28	No / *Nee*
Extended: Bachelor of Science in Business Analytics / *Verlengde: Baccalaureus Scientiae in Besigheidsanalise* **BSc (4 yr / *jr*)VTC**				
	2XR H01 N301V (1st - 4th yr) (Old/ Oud) **200 198 N302V** Pipeline only	Mathematics level 4 (50-59%)/ *Wiskunde vlak 4* (50-59%)	28	No / *Nee*

NAS.1.10.4.2.3 Bachelor of Science Degree / *Baccalaureus Scientiae Graad*

Bachelor of Science / *Baccalaureus Scientiae* BSc (3 yr / *jr*)				
WITH Specialisation In / *MET Spesialisering In*	**Programme & Curriculum code / *Program- en Kurrikulumkode***	**Required NSC Subjects Plus Selection Criteria / *Vereiste NSS- vakke Plus Keuringsvereistes***	**APS**	**Selection Test / *Keurings-toets***
Chemistry and Physics/ *Chemie en Fisika*	**2FF H05 N301P** (Old/ *Oud)* **200190 N151P** Pipeline only	Mathematics level 5 (60-69%) and Physical Science at level 4 (50-59%) / *Wiskunde vlak 5 (60-69%) en Fisiese Wetenskap vlak 4 (50-59%)*	26	No/ *Nee*
Chemistry and Physics	**2FF H05 N301M** (Old) **200129-308M** Pipeline only	Mathematics level 5 (60-69%) and Physical Science at level 4 (50-59%)	26	No
Chemistry, Mathematics and Applied Mathematics/ *Chemie, Wiskunde en Toegepaste Wiskunde*	**2FF H22-N301P** (Old/ *Oud)* **200190 N152P** Pipeline only	Mathematics level 5 (60-69%) and Physical Science at level 4 (50-59%) / *Wiskunde vlak 5 (60-69%) en Fisiese Wetenskap vlak 4 (50-59%)*	26	No/ *Nee*
Applied Mathematics and Chemistry	**2FF H13 N301M** (Old) **200169 N302M** Pipeline only	Mathematics level 5 (60-69%) and Physical Science at level 4 (50-59%) /	26	No
Chemistry and Mathematics	**2FF H11 N301M** (Old) **200140 N307M** Pipeline only	Mathematics level 5 (60-69%) and Physical Science at level 4 (50-59%) /	26	No

Bachelor of Science / *Baccalaureus Scientiae* BSc (3 yr / *jr*)				
WITH Specialisation In / ***MET Spesialisering In***	**Programme & Curriculum code /** ***Program- en Kurrikulumkode***	**Required NSC Subjects Plus Selection Criteria /** ***Vereiste NSS- vakke Plus Keuringsvereistes***	**APS**	**Selection Test /** ***Keurings-toets***
Biochemistry and Chemistry / *Biochemie en Chemie*	**2FF H06** **N301P** **N301M** (Old/ *Oud)* **200190** **N174P;** **N174M** Pipeline only	Mathematics level 4 (50-59%) and Physical Science at level 4 (50-59%) / *Wiskunde vlak 4 (50-59%) en Fisiese Wetenskap vlak 4 (50-59%)*	26	No/ *Nee*
Physics and Mathematics / *Fisika en Wiskunde*	**2FF H23** **N301P** (Old/ *Oud)* **200190** **N154P** Pipeline only	Mathematics level 5 (60-69%) and Physical Science at level 4 (50-59%) / *Wiskunde vlak 5 (60-69%) en Fisiese Wetenskap vlak 4 (50-59%)*	26	No/ *Nee*
Physics and Mathematics	**2FF H23** **N301M** (Old) **200134 N311M** Pipeline only	Mathematics level 5 (60-69%) and Physical Science at level 4 (50-59%)	26	No
Physics and Applied Mathematics / *Fisika en Toegepaste Wiskunde*	**2FF H24** **N301P** (Old/ *Oud)* **200190** **N155P** Pipeline only	Mathematics level 5 (60-69%) and Physical Science at level 4 (50-59%) / *Wiskunde vlak 5 (60-69%) en Fisiese Wetenskap vlak 4 (50-59%)*	26	No/ *Nee*
Physics and Applied Mathematics	**2FF H24** **N301M** (Old) **200152-304M** Pipeline only	Mathematics level 5 (60-69%) and Physical Science at level 4 (50-59%)	26	No

Bachelor of Science / *Baccalaureus Scientiae* BSc (3 yr / *jr*)				
WITH Specialisation In / ***MET Spesialisering In***	**Programme and Curriculum code /** ***Program- en Kurrikulumkode***	**Required NSC Subjects Plus Selection Criteria /** ***Vereiste NSS- vakke Plus Keuringsvereistes***	**APS**	**Selection Test /** ***Keurings-toets***
Applied Mathematics and Electronics	**2FF H14** **N301M**	Mathematics level 5 (60-69%) and Physical Science at level 4 (50-59%)	26	No
Electronics and Mathematics	**2FF H19** **N301M** (Old) **200179** **N309M** Pipeline only	Mathematics level 5 (60-69%) and Physical Science at level 4 (50-59%)	26	No
Electronics and Physics	**2FF H20** **N301M** (Old) **200180** **N310M** Pipeline only	Mathematics level 5 (60-69%) and Physical Science at level 4 (50-59%)	26	No
Physics and Computer Science / *Fisika en Rekenaarwetenskap*	**2FF H25** **N301P** (Old/ *Oud)* **200191** **N153P** Pipeline only	Mathematics level 5 (60-69%) and Physical Science at level 4 (50-59%) / *Wiskunde vlak 5 (60-69%) en Fisiese Wetenskap vlak 4 (50-59%)*	26	No/ *Nee*
Physics and Computer Science	**2FF H25** **N301M**	Mathematics level 5 (60-69%) and Physical Science at level 4 (50-59%)	26	No
Chemistry and Computer Science	**2FF H31** **N301M** (Old) **200130** **N120M** Pipeline only	Mathematics level 5 (60-69%) and Physical Science at level 4 (50-59%)	26	No
Computer Science and Electronics	**2FF H17** **N301M** (Old/*Oud)* **200177** **N125M** Pipeline only	Mathematics level 5 (60-69%) and Physical Science at level 4 (50-59%)	26	No/ *Nee*

Bachelor of Science / *Baccalaureus Scientiae* BSc (3 yr / *jr*)				
WITH Specialisation In / ***MET Spesialisering In***	**Programme and Curriculum code /** ***Program- en Kurrikulumkode***	**Required NSC Subjects Plus Selection Criteria /** ***Vereiste NSS- vakke Plus Keuringsvereistes***	**APS**	**Selection Test /** ***Keurings-toets***
Computer Science and Statistics / *Rekenaarwetenskap en Statistiek*	**2FF H26** **N301P** **N301V** (Old/ *Oud)* **200191** **N156P;** **N156V** Pipeline only	Mathematics level 5 (60-69%) and Physical Science at level 4 (50-59%) / *Wiskunde vlak 5 (60-69%) en Fisiese Wetenskap vlak 4 (50-59%)*	26	No/ *Nee*
Computer Science and Mathematics / *Rekenaarwetenskap en Wiskunde*	**2FF H09** **N301P** (Old/ *Oud)* **200191** **N157P** Pipeline onl)	Mathematics level 5 (60-69%) and Physical Science at level 4 (50-59%) / *Wiskunde vlak 5 (60-69%) en Fisiese Wetenskap vlak 4 (50-59%)*	26	No/ *Nee*
Computer Science and Mathematics	**2FF H09** **N301M** (Old) **200137** **N127M** Pipeline only	Mathematics level 5 (60-69%) and Physical Science at level 4 (50-59%)	26	No
Computer Science and Economics / *Rekenaarwetenskap en Ekonomie*	**2FF H28** **N301P** **N301V** (Old/ *Oud)* **200191** **N175P;** **N175V** Pipeline only	Mathematics level 5 (60-69%) / *Wiskunde vlak 5 (60-69%)*	26	No/ *Nee*
Mathematics and Economy / *Wiskunde en Ekonomie*	**2FF H29** **N301P** (Old/ *Oud)* **200191** **N176P** Pipeline only	Mathematics level 5 (60-69%) / *Wiskunde vlak 5 (60-69%)*	26	No/ *Nee*

Bachelor of Science / *Baccalaureus Scientiae* BSc (3 yr / *jr*)				
WITH Specialisation In / *MET Spesialisering In*	**Programme and Curriculum code / *Program- en Kurrikulumkode***	**Required NSC Subjects Plus Selection Criteria / *Vereiste NSS- vakke Plus Keuringsvereistes***	**APS**	**Selection Test / *Keurings-toets***
Geography and Applied Mathematics/ Geografie *en Toegepaste Wiskunde*	**2FF H30 N301P** New programme/ *Nuwe program* Offered from 2018 / *aangebied vanaf 2018*	Mathematics level 5 (60-69%) and Physical Science at level 4 (50-59%) / *Wiskunde vlak 5 (60-69%) en Fisiese Wetenskap vlak 4 (50-59%)*	26	No/ *Nee*
Tourism-Geography-Zoology/ *Toerisme-Geografie-Dierkunde*	**200119 N173P** See new programme p38	**Phasing out from 2018- only pipeline students./ *Faseer uit slegs pyplynstudente***	26	No/ *Nee*
Tourism-Geography- Botany / *Toerisme-Geografie-Plantkunde*	**200119 N172P** See new programme p38	**Phasing out from 2018- only pipeline students. / *Faseer uit slegs pyplynstudente***	26	No/ *Nee*
Tourism-Zoology-Botany / *Toerisme-Dierkunde-Plantkunde*	**200119 N171P** See new programme p38	**Phasing out from 2018- only pipeline students. / *Faseer uit slegs pyplynstudente***	26	No/ *Nee*
Biology and Chemistry	**200173 N301M**	**2018: Phase out: No new intake, pipeline students only.**		
Biology and Geography	**200174 N301M**	**2018: Phase out: No new intake, pipeline students only.**		

Bachelor of Science in Mathematical Sciences / *Baccalaureus Scientiae in Wiskundige Wetenskappe* BSc (3 yr / *jr*)				
WITH Specialisation In / *MET Spesialisering In*	**Programme and Curriculum code / Program- en Kurrikulumkode**	**Required NSC Subjects Plus Selection Criteria / *Vereiste NSS- vakke Plus Keuringsvereistes***	**APS**	**Selection Test / Keurings-*toets***
Statistics and Mathematics	**200138 N306M 2nd & 3rd yrs**	**Phasing out from 2018. Mafikeng: no new intake.**		
Statistics and Mathematics / *Statistiek en Wiskunde*	**2FG H02 N301P** (Old/ *Oud)* **200191 N158P** Pipeline only	Mathematics level 5 (60-69%) and Physical Science at level 4 (50-59%) / *Wiskunde vlak 5 (60-69%) en Fisiese Wetenskap vlak 4 (50-59%)*	26	No/ *Nee*
Mathematics / *Wiskunde*	**2FG H01 N301P** (Old/ *Oud)* **200191 N159P** Pipeline only	Mathematics level 5 (60-69%) and Physical Science at level 4 (50-59%) / *Wiskunde vlak 5 (60-69%) en Fisiese Wetenskap vlak 4 (50-59%)*	26	No/ *Nee*
Applied Mathematics and Mathematics	**2FG H03 N301M** (Old) **200172 N305M** Pipeline only	Mathematics level 5 (60-69%) and Physical Science at level 4 (50-59%)	26	No

Bachelor of Science in Information Technology / *Baccalaureus Scientiae in Inligtingstegnologie* BSc (3 yr / *jr*)				
WITH Specialisation In / *MET Spesialisering In*	**Programme and Curriculum code / Program- en Kurrikulumkode**	**Required NSC Subjects Plus Selection Criteria / *Vereiste NSS- vakke Plus Keuringsvereistes***	**APS**	**Selection Test / Keurings- *toets***
	Contact/ *Kontak* **2DX H01** **N302P;** **N302V** (Old/ *Oud*) **2DX H01** **N301P;** **N301V** Pipeline only (Old/ *Oud*) **264100** **N150P;** **N150V** Pipeline only Distance/ *Afstand* **2HA H01** **N301P**	Mathematics level 4 (50-59%) / *Wiskunde vlak 4* (50-59%)	26	No/ *Nee*
Bachelor of Science in Biological Sciences / *Baccalaureus Scientiae in Biologiese Wetenskappe* BSc (3 yr / *jr*)				
Microbiology and Biochemistry / *Mikrobiologie en Biochemie*	**2DK H11** **N301P** (Old/ *Oud*) **200118** **N167P** Pipeline only	Mathematics level 4 (50-59%)and Physical Science at level 4 (50-59%) / *Wiskunde vlak 4 (50-59%) en Fisiese Wetenskap vlak 4 (50-59%)*	26	No/ *Nee*
Microbiology and Biochemistry /	**2DK H11** **N301M** (Old) **200118** **N167M** Pipeline only	Mathematics level 4 (50-59%) and Physical Science at level 4 (50-59%)	26	No
Zoology and Biochemistry / *Dierkunde en Biochemie*	**2DK H07** **N302P** **2DK H07** **N301P** Pipeline only	Mathematics level 4 (50-59%)and Physical Science at level 4 (50-59%) / *Wiskunde vlak 4 (50-59%) en Fisiese Wetenskap vlak 4 (50-59%)*	26	No/ Nee

Bachelor of Science in Biological Sciences / *Baccalaureus Scientiae in Biologiese Wetenskappe* BSc (3 yr / *jr*)				
WITH Specialisation In / *MET Spesialisering In*	**Programme and Curriculum code / *Program- en Kurrikulumkode***	**Required NSC Subjects Plus Selection Criteria / *Vereiste NSS- vakke Plus Keuringsvereistes***	**APS**	**Selection Test / *Keurings-toets***
Chemistry and Physiology / *Chemie en Fisiologie*	**2DK H06 N302P** **2DK H06 N301P** Pipeline only (Old/ *Oud)* **200190 N177P** Pipeline only	Mathematics level 4 (50-59%)and Physical Science at level 4 (50-59%) / *Wiskunde vlak 4 (50-59%) en Fisiese Wetenskap vlak 4 (50-59%)*	26	No/ *Nee*
Botany and Biochemistry / *Plantkunde en Biochemie*	**2DK H02 N301M N302P** **2DK H02 N301P** Pipeline only (Old/ *Oud)* **200118 N170P** Pipeline only	Mathematics level 4 (50-59%)and Physical Science at level 4 (50-59%) / *Wiskunde vlak 4 (50-59%) en Fisiese Wetenskap op vlak 4 (50-59%)*	26	No/ *Nee*
Microbiology and Botany / *Mikrobiologie en Plantkunde*	**2DK H10 N302P N301M** **2DK H10 N301P** Pipeline only (Old/ Oud) **200118 N169P** Pipeline only	Mathematics level 4 (50-59%) and Physical Science at level 4 (50-59%) / *Wiskunde vlak 4 (50-59%) en Fisiese Wetenskap op vlak 4 (50-59%)*	26	No/ Nee
Zoology and Botany/ *Dierkunde en Plantkunde*	**2DK H09 N301P** (Old/ Oud) **200118 N164P** Pipeline only	Mathematics level 4 (50-59%) and Physical Science at level 4 (50-59%) / *Wiskunde vlak 4 (50-59%) en Fisiese Wetenskap op vlak 4 (50-59%)*	26	No/ Nee

Bachelor of Science in Biological Sciences / *Baccalaureus Scientiae in Biologiese Wetenskappe* BSc (3 yr / *jr*)				
WITH Specialisation In / *MET Spesialisering In*	**Programme and Curriculum code / *Program- en Kurrikulumkode***	**Required NSC Subjects Plus Selection Criteria / *Vereiste NSS- vakke Plus Keuringsvereistes***	**APS**	**Selection Test / *Keurings-toets***
Zoology and Microbiology / *Dierkunde en Mikrobiologie*	**2DK H08 N301P** (Old/ Oud) **200118 N163P** Pipeline only	Mathematics level 4 (50-59%) and Physical Science at level 4 (50-59%) / *Wiskunde vlak 4 (50-59%) en Fisiese Wetenskap op vlak 4 (50-59%)*	26	No/ Nee
Microbiology and Physiology / *Mikrobiologie en Fisiologie*	**2DK H04 N302P** **2DK H04 N301P** Pipeline only (Old/ Oud) **200118 N186P** Pipeline only	Mathematics level 4 (50-59%) and Physical Science at level 4 (50-59%) / *Wiskunde vlak 4 (50-59%) en Fisiese Wetenskap op vlak 4 (50-59%)*	26	No/ Nee
Zoology and Physiology / *Dierkunde en Fisiologie*	**2DK H03 N302P** **2DK H03 N301P** Pipeline only (Old/ Oud) **200118 N185P** Pipeline only	Mathematics level 4 (50-59%) and Physical Science at level 4 (50-59%) / *Wiskunde vlak 4 (50-59%) en Fisiese Wetenskap op vlak 4 (50-59%)*	26	No/ Nee

Bachelor of Science in Environmental Sciences / *Baccalaureus Scientiae in Omgewingswetenskappe* BSc (3 yr / *jr*)				
WITH Specialisation In / *MET Spesialisering In*	**Programme and Curriculum code / *Program- en Kurrikulumkode***	**Required NSC Subjects Plus Selection Criteria / *Vereiste NSS- vakke Plus Keuringsvereistes***	**APS**	**Selection Test / *Keurings-toets***
Botany and Chemistry/ *Plantkunde en Chemie*	**2DJ H03 N302P N301M** **2DJ H03 N301P** (Old/ Oud) **200118 N149P** Pipeline only	Mathematics level 4 (50-59%) and Physical Science at level 4 (50-59%) / *Wiskunde vlak 4 (50-59%) en Fisiese Wetenskap vlak 4 (50-59%)*	26	No/ Nee
Biology and Chemistry	**200173 N301M**	**2018: Phase out: No new intake, only pipeline students.**		
Microbiology and Chemistry/ *Mikrobiologie en Chemie*	**2DJ H10 N301P** (Old/ *Oud)* **200118 N168P** Pipeline only	Mathematics level 4 (50-59%) and Physical Science at level 4 (50-59%) / *Wiskunde vlak 4 (*50-59%) *en Fisiese Wetenskap vlak 4 (50-59%)*	26	No/ *Nee*
Microbiology and Chemistry	**2DJ H10 N301M** (Old) **200118 N168M** Pipeline only	Mathematics level 4 (50-59%) and Physical Science at level 4 (50-59%)	26	No
Zoology and Chemistry / *Dierkunde en Chemie*	**2DJ H04 N302P (N301P =old)**	Mathematics level 4 (50-59%) and Physical Science at level 4 (50-59%) / *Wiskunde vlak 4 (50-59%) en Fisiese Wetenskap vlak 4 (50-59%)*	26	No/ Nee

Bachelor of Science in Environmental Sciences / *Baccalaureus Scientiae in Omgewingswetenskappe* BSc (3 yr / *jr*)				
WITH Specialisation In / *MET Spesialisering In*	**Programme and Curriculum code / *Program- en Kurrikulumkode***	**Required NSC Subjects Plus Selection Criteria / *Vereiste NSS- vakke Plus Keuringsvereistes***	**APS**	**Selection Test / *Keurings-toets***
Geology and Chemistry / *Geologie en Chemie*	**2DJ H07 N302P** **2DJ H07 N301P** Pipeline only (Old/ *Oud)* **200118 N180P** Pipeline only	Mathematics level 4 (50-59%) and Physical Science at level 4 (50-59%) / *Wiskunde vlak 4 (50-59%) en Fisiese Wetenskap vlak 4 (50-59%)*	26	No/ *Nee*
Geology and Geography / *Geologie en Geografie*	**2DJ H01 N302P** **2DJ H01 N301P** Pipeline only (Old/ *Oud)* **200118 N147P** Pipeline only	Mathematics level 4 (50-59%) and Physical Science at level 4 (50-59%) / Wiskunde vlak 4 (50-59%) en Fisiese Wetenskap op vlak 4 (50-59%)	26	No/ *Nee*
Geology and Botany/ *Geologie en Plantkunde*	**2DJ H02 N301P** (Old/ Oud) **200118 N148P** Pipeline only	Mathematics level 4 (50-59%) and Physical Science at level 4 (50-59%) / *Wiskunde vlak 4 (50-59%) en Fisiese Wetenskap op vlak 4 (50-59%)*	26	No/ Nee
Zoology and Geography / *Dierkunde en Geografie*	**2DJ H05 N302P** **2DJ H05 N301P** Pipeline only (Old/ Oud) **200118 N162P** Pipeline only	Mathematics level 4 (50-59%) and Physical Science at level 4 (50-59%) / *Wiskunde vlak 4 (50-59%) en Fisiese Wetenskap op vlak 4 (50-59%)*	26	No/ Nee

Bachelor of Science in Environmental Sciences / *Baccalaureus Scientiae in Omgewingswetenskappe* BSc (3 yr / *jr*)				
WITH Specialisation In / *MET Spesialisering In*	**Programme and Curriculum code / *Program- en Kurrikulumkode***	**Required NSC Subjects Plus Selection Criteria / *Vereiste NSS- vakke Plus Keuringsvereistes***	**APS**	**Selection Test / *Keurings-toets***
Geography and Botany / *Geografie en Plantkunde*	**2DJ H06 N302P N301M** Pipeline only (Old/ *Oud)* **200118 N165P** Pipeline only	Mathematics level 4 (50-59%) and Physical Science at level 4 (50-59%) / *Wiskunde vlak 4 (50-59%) en Fisiese Wetenskap op vlak 4 (50-59%)*	26	No/ *Nee*
Biology and Geography	**200174 N301M**	**Phasing out from 2018. Only pipeline students.**		
Zoology and Geology / *Dierkunde en Geologie*	**2DJ H08 N301P**	Mathematics level 4 (50-59%) and Physical Science at level 4 (50-59%) / *Wiskunde vlak 4 (50-59%) en Fisiese Wetenskap op vlak 4 (50-59%)*	26	No/ *Nee*
Geology and Microbiology / *Geologie en Mikrobiologie*	**2DJ H09 N301P** (Old/ *Oud)* **200118 N181P** Pipeline only	Mathematics level 4 (50-59%) and Physical Science at level 4 (50-59%) / *Wiskunde vlak 4 (50-59%) en Fisiese Wetenskap op vlak 4 (50-59%)*	26	No/ *Nee*
Chemistry and Geography	**2DJ H18 N301M** (Old) **200150 N301M** Pipeline only	Mathematics level 5 (60-69%) and Physical Science at level 4 (50-59%)	26	No

Bachelor of Science in Environmental Sciences / *Baccalaureus Scientiae in Omgewingswetenskappe* BSc (3 yr / *jr*)				
WITH Specialisation In / *MET Spesialisering In*	**Programme and Curriculum code / *Program- en Kurrikulumkode***	**Required NSC Subjects Plus Selection Criteria / *Vereiste NSS- vakke Plus Keuringsvereistes***	**APS**	**Selection Test / *Keurings-toets***
Geography and Computer Science / *Geografie en Rekenaarwetenskap*	**2DJ H14 N301P** (Old/ *Oud)* **200118 N166P** Pipeline only	Mathematics level 4 (50-59%) and Physical Science at level 4 (50-59%) / *Wiskunde vlak 4 (50-59%) en Fisiese Wetenskap op vlak 4 (50-59%)*	26	No/ *Nee*
Geography and Computer Science	**2DJ H14 N301M** (Old) **200178-301M** Pipeline only	Mathematics level 4 (50-59%) and Physical Science at level 4 (50-59%)	26	No
Tourism and Zoology / *Toerisme en Dierkunde*	**2DJ H15 N301P** (See BSc Generic for old programmes)	Mathematics level 4 (50-59%) and Physical Science at level 4 (50-59%) / *Wiskunde vlak 4 (50-59%) en Fisiese Wetenskap op vlak 4 (50-59%)*	26	No/ *Nee*
Tourism and Geography / *Toerisme en Geografie*	**2DJ H16 N301P** (See BSc Generic for old programmes)	Mathematics level 4 (50-59%) and Physical Science at level 4 (50-59%) / *Wiskunde vlak 4 (50-59%) en Fisiese Wetenskap op vlak 4 (50-59%)*	26	No/ *Nee*
Tourism and Botany/ *Toerisme en Plantkunde*	**2DJ H17 N301P** (See BSc Generic for old programmes)	Mathematics level 4 (50-59%) and Physical Science at level 4 (50-59%) / *Wiskunde vlak 4 (50-59%) en Fisiese Wetenskap op vlak 4 (50-59%)*	26	No/ *Nee*

Bachelor of Science in *Financial Mathematics* / *Baccalaureus Scientiae in Finansiële Wiskunde* BSc (3 yr / *jr*)				
WITH Specialisation In / *MET Spesialisering In*	**Programme and Curriculum code / *Program- en Kurrikulumkode***	**Required NSC Subjects Plus Selection Criteria / *Vereiste NSS- vakke Plus Keuringsvereistes***	**APS**	**Selection Test / *Keurings-toets***
	2FS H01 **N301P** **N301V** (Old/ *Oud)* **200167** **N135P; N135V** Pipeline only	Mathematics level 6 (70% and higher) *Wiskunde vlak 6 (70% en hoër)*	32	No/ *Nee*
Bachelor of Science in Quantitative Risk Management / *Baccalaureus Scientiae in Kwantitatiewe Risikobestuur* BSc (3 yr / *jr*)				
	2FT H01 **N301P** **N301V** (Old/ *Oud)* **200166** **N134P; N134V** Pipeline only	Mathematics level 6 (70% and higher) *Wiskunde vlak 6 (70% en hoër)*	32	No/ *Nee*
Bachelor of Science in Business Analytics / *Baccalaureus Scientiae in Besigheidsanalise* BSc (3 yr / *jr*)				
	2FR H01 **N301P** **N301V** (Old/ *Oud)* **200168** **N136P; N136V** Pipeline only	Mathematics level 6 (70% and higher) *Wiskunde vlak 6 (70% en hoër)*	32	No/ *Nee*
Bachelor of Science in *Actuarial Science* / *Baccalaureus Scientiae in Aktuariële Wetenskap* BSc (3 yr / *jr*)				
	2FQ H01 **N301P** (Old/ *Oud)* **200123** **N137P** Pipeline only	Mathematics level 6 (70% and higher) *Wiskunde vlak 6 (70% en hoër)*	32	No/ *Nee*

Bachelor of Science in Urban and Regional Planning / *Baccalaureus Scientiae in Stads- en Streekbeplanning* BSc (4 yr / *jr*)				
Big Bang process: 1st – 4th yr students will register for this programme (no pipeline students on old programme) / *1ste – 4de jaar studente sal vir hierdie program registreer (geen pyplynstudente op die ou program).*				
WITH Specialisation In / *MET Spesialisering In*	**Programme and Curriculum code / *Program- en Kurrikulumkode***	**Required NSC Subjects Plus Selection Criteria / *Vereiste NSS- vakke Plus Keuringsvereistes***	**APS**	**Selection Test / *Keurings-toets***
	2FE K01 N401P	Selection: The deadline for applications is 30 June. Late applications will be considered on merit. Mathematics level 5 (60-69%) / *Keuring: Aansoeke sluit 30 Junie, laat aansoeke sal op meriete oorweeg word. Wiskunde vlak 5 (60-69%)*	28	Yes/ *Ja*
Bachelor of Science in Agriculture BSc (4 yr / *jr*)				
WITH Specialisation In / *MET Spesialisering In*	**Programme and Curriculum code / *Program- en Kurrikulumkode***	**Required NSC Subjects Plus Selection Criteria / *Vereiste NSS- vakke Plus Keuringsvereistes***	**APS**	**Selection Test / *Keurings-toets***
Agricultural Economics	**2FD K01 N401M** (1st -3rd yrs) (Old) **267100 N401M** 4th yrs only	*English Level 4 *Mathematics Level 4 (50-59%) *Physical Science Level **OR** Life Sciences Level 4	22	No
Animal Health	**267101 N402M** (1st - 3rd yrs) (Old) **267101 N401M** 4th yrs only	*English Level 4 *Mathematics Level 4 *Physical Science Level **OR** Life Science Level 4 (50-59%)	22	No

Bachelor of Science in Agriculture BSc (4 yr / *jr*)				
WITH Specialisation In / ***MET Spesialisering In***	**Programme and Curriculum code /** ***Program- en Kurrikulumkode***	**Required NSC Subjects Plus Selection Criteria /** ***Vereiste NSS- vakke Plus Keuringsvereistes***	**APS**	**Selection Test /** ***Keurings-toets***
Animal Science	**2FD K03** **N401M** (1st - 3rd yrs) (Old) **267102** **N401M** 4th yrs only	*English Level 4 *Mathematics Level 4 *Physical Science Level 4 **OR** Life Sciences Level 4 (50-59%)	22	No
Agronomy and Horticulture	**2FD K04** **N401M** (1st - 3rd yrs)	*English Level 4 *Mathematics Level 4 *Physical Science Level 4 **OR** Life Sciences Level 4 (50-59%)	22	No
Agricultural Economics and Agronomy/ *Landbou-Ekonomie en Agronomie*	**2FD K05** **N401P** New/*nuut* 1st & 2nd yrs only/ *slegs 1ste & 2de jrs*	English Level 4 Mathematics level 4 (50-59%) **and** Physical Science at level 4 (50-59%) / *Engels vlak 4 Wiskunde vlak 4 (50-59%) **en** Fisiese Wetenskap op vlak 4 (50-59%)*	22	No/ Nee
Soil Science and Agronomy/ *Grondkunde en Agronomie*	**2FD K06** **N401P** New/*nuut* (1st & 2nd yrs only/ *slegs 1ste & 2de jrs)*	English Level 4 Mathematics level 4 (50-59%) **and** Physical Science at level 4 (50-59%) / *Engels vlak 4 Wiskunde vlak 4 (50-59%) **en** Fisiese Wetenskap op vlak 4 (50-59%)*	22	No/ Nee
Crop Science	**267103** **N401M**	**Phasing out** **No new intake as from 2018**	20	No

Bachelor of Indigenous Knowledge Systems BSc (4yr / *jr*)				
WITH Specialisation In / *MET Spesialisering In*	**Programme and Curriculum code / *Program- en Kurrikulumkode***	**Required NSC Subjects Plus Selection Criteria / *Vereiste NSS- vakke Plus Keuringsvereistes***	**APS**	**Selection Test / *Keurings-toets***
Indigenous Knowledge Systems	**2HB K01 N401M** (1st and 2nd yrs) **(**Old **287 100 N402M** 3rd – 4th yrs Only**)**	*English level 4 *Matriculation with exemption **OR** *Recognition of Prior Learning (RPL) **OR** *GCE certification and an application for conditional exemption with HESA (www.he-enrol.ac.za)	20	No

NAS.1.10.5 **TRAINING OF TEACHERS: POSTGRADUATE CERTIFICATE IN EDUCATION (PGCE) / *ONDERWYSEROPLEIDING: NAGRAADSE ONDERWYSSERTIFIKAAT IN ONDERWYS (NGOS)***

The Faculty of Natural and Agricultural Sciences regards the training of teachers to be of such importance that information regarding the Postgraduate Certificate in Education (PGCE) is summarised below for the convenience of prospective teachers. However, students should not neglect consulting the PGCE calendar of the Faculty of Education for complete information.

Students must first complete their BSc degree, before they can be admitted to the PGCE programme.

Die Fakulteit Natuur- en Landbouwetenskappe beskou onderwysersopleiding so belangrik, dat inligting in verband met die Nagraadse Onderwyssertifikaat (NGOS) hieronder kortliks vir die gerief van voornemende onderwysstudente opgesom word. Studente moet egter nie nalaat om die NGOS jaarboek van die Fakulteit Opvoedkunde vir volledige inligting te raadpleeg nie.

Studente moet hulle BSc graad eers voltooi, voordat hulle toegelaat kan word tot die NGOS program.

****Please note that if a student wants to do a Postgraduate Certificate in Education (PGCE) with Mathematics as a school subject, MTHS111 and MTHS121 must be taken for further admission to Mathematics at 2nd year level.

****Neem kennis dat indien 'n student 'n Nagraadse Onderwyssertifikaat (NGOS) wil doen met Wiskunde as 'n skoolvak, moet MTHS111 en MTHS121 geneem word, vir verdere toelating tot Wiskunde op 2de jaarsvlak.*

NAS.1.10.5.1 The following curricula comply with the entry requirements of the PGCE: /

Die volgende kurrikulums voldoen aan die vereistes vir toelating tot die NGOS:

Qualification and Curriculum code / ***Kwalifikasie- en Kurrikulumkode***	**BSc WITH Specialisation In /** ***MET Spesialisering In***	**PGCE Field of specialisation/** ***NGOS Spesialiteitsvakrigting***
2DJ H04 N302P* **	Zoology and Chemistry/ *Dierkunde en Chemie*	Physical Science/ *Fisiese wetenskappe* (Provided Physics is chosen and then Botany and Physiology at 1st year level for the 2nd Life Sciences subject. / *Fisika moet gekies word en dan Plantkunde en Fisiologie op 1ste jaarsvlak vir die 2de skoolvak van Lewenswetenskappe.)*
2DJ H05 N301P/ N302P *	Zoology and Geography/ *Dierkunde en Geografie*	Life Sciences Geography/ *Lewenswetenskappe Geografie* (Subject to Botany and Physiology to the 1st year level. 1 module History together with Geography, to qualify for the Social sciences part of the subject. / *Mits Plantkunde en Fisiologie tot die 1ste jaarsvlak is. 1 module Geskiedenis saam met die Geografie om vir die Sosiale wetenskap deel van vak te kwalifiseer.)*
2DK H08 N301P *	Zoology and Microbiology/ *Dierkunde en Mikrobiologie*	Life Sciences*/ *Lewenswetenskappe** ((LS) Subject to Botany and Physiology to the 1st year level. Short 2nd school subject [PS: chemistry 2 and physics 1]) / *(LW) Mits Plantkunde en Fisiologie tot 1ste jaarsvlak is. Kort nog 2de skoolvak [FW: chemie 2 en fisika 1])*
2DK H09 N301P	Zoology and Botany / *Dierkunde en Plantkunde*	Life Sciences/ *Lewenswetenskappe* (Only 1 school subject (LS) short. 2nd school subject [Chemistry 2 and Physics 1]) *Slegs 1 skoolvak (LW) kort nog 2de skoolvak [Chemie 2 en Fisika 1])*

2DJ H06 **N302P ****	Geography and Botany / *Geografie en Plantkunde*	Life Sciences, Geography/ *Lewenswetenskappe, Geografie* (LS) Subject to Zoology and Physiology to the 1st year level. Geography, provided that 1 module is history. (LW) mits Dierkunde en Fisiologie tot die 1ste jaarsvlak is. Geografie, mits 1 module geskiedenis is.)
2DJ H14 **N301P/ N301M**	Geography and Computer Sciences / *Geografie en Rekenaarwetenskap*	Geography Information Technology/ *Geografie* *Inligtingstegnologie* (IT and Geography, provided that 1 module history is passed for school subject. / *IT en Geografie, mits 1 module geskiedenis geslaag word vir skoolvak.)*
2DK H10 **N301P/ N302P/** **N301M ****	Microbiology and Botany/ *Mikrobiologie en Plantkunde*	Life Sciences/ *Lewenswetenskappe* ((LS) If Zoology and Physiology are taken to 1st year level. (PS) Chemistry 2 and Physics 1 for 2nd school subject. / *(LW) Mits Dierkunde en Fisiologie tot 1ste jaarsvlak geneem word. (FW) Chemie 2 en Fisika 1 vir 2de skoolvak.)*
2DJ H03 **N302P/** **N301M *****	Botany and Chemistry / *Plantkunde en Chemie*	Physical Science *Fisiese Wetenskappe* (PS) Provided Physics 1 (LS) with Zoology and Physiology until the 1st year. (FW) Mits Fisika 1 en (LS) Dierkunde en Fisiologie tot 1ste jaar.
2FF H05 **N301P/ N301M**	Chemistry and Physics/ *Chemie en Fisika*	Physical Science Mathematics/ *Fisiese Wetenskappe* *Wiskunde* (Maths and Physics / *Wiskunde en Fisika)*
2FF H22 **N301P**	Chemistry, Mathematics and Applied Mathematics/ *Chemie, Wiskunde en Toegepaste Wiskunde*	Physical Science Mathematics/ *Fisiese Wetenskappe* *Wiskunde* (Maths and Physics / *Wiskunde en Fisika)*

2FF H23 **N301P/ N301M**	Physics and Mathematics/ *Fisika en Wiskunde*	Mathematics Physical Science/ *Wiskunde Fisiese Wetenskappe* (provided Chemistry at level 1 / *mits Chemie op vlak 1)*
2FF H24 **N301P/ N301M**	Physics and Applied Mathematics / *Fisika en Toegepaste Wiskunde*	Mathematics Physical Science / *Wiskunde Fisiese Wetenskappe* (provided Chemistry 1 / *mits Chemie 1)*
2FF H06 **N301P/ N301M**	Chemistry and Biochemistry / *Chemie en Biochemie*	Physical Science/ *Fisiese wetenskappe* (PS: provided physics 1. No 2nd school subject, so will not qualify for PGCE FW: mits fisika 1. Geen 2de skoolvak dus sal nie kwalifiseer vir NGOS)
2FF H25 **N301P/ N301M**	Physic and Computer Science / *Fisika en Rekenaarwetenskap*	Information Technology Mathematics/ *Inligtingstegnologie Wiskunde* (In order for IT and Math. PS-provided Chemistry 1/ *Korrek vir IT en Wiskunde.* *FW, mits Chemie 1)*
2FF H26 **N301P/ N301V**	Computer Science and Statistics/ *Rekenaarwetenskap en Statistiek*	Information Technology Mathematics/ *Inligtingstegnologie Wiskunde* (In order for IT and Math. / *Korrek vir IT en Wiskunde).*
2FF H09 **N301P/ N301M**	Computer Science and Mathematics/ *Rekenaarwetenskap en Wiskunde*	Information Technology Mathematics/ *Inligtingstegnologie Wiskunde* (Maths and IT / *Wiskunde en IT)*
2FG H02 **N301P**	Statistics and Mathematics/ *Statistiek en Wiskunde*	Mathematics/ *Wiskunde* (Maths and IT / *Wiskunde en IT)*
2FG H01 **N301P**	Mathematics/ *Wiskunde*	Mathematics/ *Wiskunde* (No - short school subject to level 2/ *Nee- Kort skoolvak tot vlak 2).*

2FF H28 **N301P/ N301V**	Computer Science and Economics/ *Rekenaarwetenskap en Ekonomie*	Information Technology Economics/ *Inligtingstegnologie Ekonomie* (IT and Mathematics. Economics, provided BMAN111 and ACCS111 / *IT en Wiskunde. Ekonomie, mits BMAN111 en ACCS111)*
2FF H29 **N301P**	Mathematics and Economics / *Wiskunde en Ekonomie*	Mathematics, Economics/ *Wiskunde, Ekonomie* (Mathematics and IT. Economics with BMAN111 and ACCS111/ *Wiskunde en IT. Ekonomie mits BMAN111 en ACCS111)*

* Only if Botany II is selected. / *Slegs indien Plantkunde II gekies word.*
** Only if Zoology II is selected. / *Slegs indien Dierkunde II gekies word.*
*** Only if Physics I is selected. / *Slegs indien Fisika I gekies word.*

NAS.1.10.5.2 Nature and aims of the PGCE / *Die aard en doel van die NGOS*

The PGCE serves as a professional 'capping' qualification for candidates who have completed an appropriate 360 or 480 credits Bachelor's degree and would like to join the education profession. With this certificate an educator can teach from Grade 7 to Grade 12./

Die NGOS dien as 'n verdere professionele kwalifikasie vir kandidate wat 'n 360- of 480 krediet Baccalaureus graad voltooi het en tot die onderwys professie wil toetree. Met hierdie sertifikaat mag 'n onderwyser vanaf Graad 7 tot 12 onderrig.

NAS.1.10.5.3* Duration of studies / *Duur van studie

The minimum duration of the study for full time students is one (1) year and the maximum duration is two (2) years/

Die minimum duur van die studie vir voltydse studente is een (1) jaar en 'n maksimum van twee (2) jaar.

The minimum duration of the study for distance students is one (1) year and the maximum duration is three (3) years.

Die minimum duur van die studie vir afstand studente is een (1) jaar en 'n maksimum van drie (3) jaar.

NAS.1.10.5.4 Method of delivery / *Metode van aflewering*

This qualification can be taken only full time. Contact the Faculty of Education for more information. /

Hierdie kwalifikasie kan slegs voltyds geneem word. Kontak die Fakulteit Opvoedkunde vir meer inligting.

NAS.1.10.5.5 **Admission requirements / *Toelatingsvereistes***

A first university degree or relevant qualification of at least 360 credits with **two** recognised school subjects in that qualification./

*'n Eerste universiteitsgraad met **twee** erkende skoolvakke of 'n erkende kwalifikasie wat in totaal 360 krediete optel.*

Students must also be able to take **two (2)** methodologies in order to obtain the PGCE qualification. The curriculum of the certificate must be structured as follows: /

*Studente moet ook in staat wees om **twee (2)** metodieke te kan neem ten einde die kwalifikasie te verwerf. Die samestelling in die graadkursus moet die volgende wees:*

- Recognised school subject at level 3 + recognised school subject at level 2./
- *Erkende skoolvak op vlak 3 + erkende skoolvak op vlak 2.*

Students must enrol for the methodologies of the subject in which he/she obtained the highest qualification./

In geval van 'n keuse tussen metodiek van akademiese vakke reeds geslaag vir 'n vorige kwalifikasie moet die student die twee neem waarin die hoogste gekwalifiseer is.

NAS.1.10.5.6 **Exceptions / *Uitsonderings***

A student who wants to take **Life Sciences** as methodology needs to present one of the subjects Botany, Zoology or Physiology at level 3 and the other 2 on level1./

*'n Student wat **Lewenswetenskappe** as metodiek wil neem moet een van die volgende vakke Plantkunde, Dierkunde of Fisiologie op vlak 3 en die ander 2 tot op vlak 1.*

A student who wants to take **Physical Sciences** as methodology needs to present 1 of the subjects Chemistry or Physics on level 2 and the other at level 1./

*'n Student wat **Fisiese Wetenskappe** as metodiek wil neem moet 1 van Chemie of Fisika op graadvlak 2 vir toelating tot die NGOS aanbied en die ander ten minste op graadvlak 1.*

A student who wants to take the Methodology of **Mathematics** must have completed Mathematics on level 2 or otherwise Mathematics on level 1 with one of the following on level 2: Statistics, Mathematical Statistics, Applied Mathematics and Financial Mathematics. (****see also note NAS1.10.5)/

*'n Student wat die metodiek van **Wiskunde** wil neem, moet Wiskunde op vlak 2 geslaag het, andersins kan Wiskunde op vlak 1 saam met een van die volgende op vlak 2 aangebied word: Statistiek, Toegepaste Wiskunde, Finansiële Wiskunde. (**** sien ook nota NAS1.10.5)*

A student who wants to take the Methodology of **Life Orientation** must have **Psychology** and one of the following subjects on degree level: Sociology, Political Studies, Human Movement Science, Labour -and Industrial studies or,- Philosophy. The student must also have a second school subject on degree level for the second methodology./

*'n Student wat die Metodiek van **Lewensoriëntering** wil neem, moet **Sielkunde** en een van die volgende vakke op graadvlak geneem het: Sosiologie, Politieke Studies, Menslike Bewegingskunde, Arbeid– en*

Industriële studies en Filosofie. Die student moet dan steeds ook 'n tweede skoolvak op graadvlak geneem het vir die tweede metodiek.

A student who wants to take the Methodology of any **language** must have completed that language at level 3./

*'n Student wat die Metodiek van enige **taal** wil neem, moet die betrokke taal ten minste op graadvlak 3 geslaag het.*

NAS.1.11 SCHOOLS, CENTRES OF THE FACULTY / *SKOLE EN SENTRUMS IN DIE FAKULTEIT*

The Faculty of Natural and Agricultural Sciences consists of six schools and two centres, each of which is made up of different subject groups. At the head of each school/centre is a director and who is assisted by a subject chairperson from each subject group. The school/centre is responsible for teaching graduate, honours and lectured master's programmes. These schools/centres and subjects groups that make up each school are represented in the following table: /

Die Fakulteit Natuur- en Landbouwetenskappe het ses skole en twee sentrums wat elkeen saamgestel is uit verskillende vakgroepe. Aan die hoof van elke skool/sentrum staan 'n direkteur en hy/sy word uit elke vakgroep bygestaan deur 'n vakvoorsitter. Die skole/sentrums is veral verantwoordelik vir onderrig van voorgraadse, honneurs- en gedoseerde Magisterprogramme. Dié skole/sentrums en die vakgroepe waaruit elke skool/sentrum saamgestel is, word in die tabel weergegee:

School & Centre / ***Skool & Sentrum***	**Subject Group /** ***Vakgroep***
School of Agricultural Sciences / *Skool vir Landbouwetenskappe*	Agricultural Economics and Extension/ *Landbou-ekonomie en Voorligting* Animal Sciences / *Dierewetenskappe* Agronomy and Horticulture / *Agronomie en Tuinbou* Animal Health Science/ *Dieregesondheidstudies* Agriculture with Soil Science and Agronomy/ *Landbou met Landbou-ekonomie en Agronomie* Agriculture with Agricultural Economics and Agronomy/ *Landbou met Grondkunde en Agronomie*
School of Biological Sciences / *Skool vir Biologiese Wetenskappe*	Botany / *Plantkunde* Microbiology / *Mikrobiologie* Zoology / *Dierkunde*
School of Geo- and Spatial Sciences/ *Skool vir Geo- en Ruimtelike Wetenskappe*	Geography */ Geografie* Geology */ Geologie* Urban and Regional Planning */ Stads- en Streekbeplanning*
School of Computer Science and Information Systems / *Skool vir Rekenaarwetenskap en Inligtingstelsels*	Computer Science and Information Systems / *Rekenaarwetenskap en Inligtingstelsels*
School of Mathematical and Statistical Sciences / *Skool vir Wiskundige en Statistiese Wetenskappe*	Statistics / *Statistiek* Mathematics and Applied Mathematics / *Wiskunde en Toegepaste Wiskunde*

School of Physical and Chemical Sciences / *Skool vir Fisiese en Chemiese Wetenskappe*	Biochemistry / *Biochemie* Chemistry / *Chemie* Physics / *Fisika*
Centre for Business Mathematics and Informatics / *Sentrum vir Bedryfswiskunde en Informatika*	Actuarial Science / *Aktuariële Wetenskap* Business Analytics / *Besigheidsanalise* Financial Mathematics / *Finansiële Wiskunde* Quantitative Risk Management / *Kwantitatiewe Risikobestuur*

NAS.1.12 RE-CURRICULATION OF QUALIFICATIONS AND PROGRAMMES TO ADHERE TO HEQSF REQUIREMENTS / *HERKURRIKULERING VAN KWALIFIKASIES EN PROGRAMME OM TE VOLDOEN AAN HEQSF-VEREISTES*

Please note that the Faculty has re-curriculated its qualifications and re-linked it's programmes over, as managed by the institutional HEQSF-alignment project team. The programmes were HEQSF-aligned during 2016 and 2017 and are included in the 2020 yearbook. Only **pipeline students** will be phasing out on the old programmes, as was registered in 2017-2019. These programmes are also indicated in the yearbook. A table indicating the old qualification-programme, vs new qualification-programme codes is therefore included for purposes of elucidation (NAS.1.13.) /

*Neem asseblief kennis dat die Fakulteit sy kwalifikasies en gekoppelde programme hergekurrikuleer het, soos deur die institusionele HEQSF-belyningsprojekspan bestuur word. Die programme is in 2016 en 2017 deur die HEQSF belyn en is in die 2020 jaarboek ingesluit. Slegs **pyplynstudente** sal uitfaseer op die ou programme, soos in 2017-2019 geregistreer was. 'n Tabel wat die ou kwalifikasieprogram vs nuwe kwalifikasieprogramkodes bevat, word daarom ingesluit, met die oog op toeligting (NAS.1.13).*

NAS.1.13 QUALIFICATIONS, PROGRAMMES AND CURRICULA / *KWALIFIKASIES, PROGRAMME EN KURRIKULUMS*

Different qualifications can be obtained in the Faculty of Natural and Agricultural Sciences. A specific qualification may be obtained in one or more programmes (the term *programme* indicates a specific field of study), and in each programme one or more curricula are available. A prospective student must therefore first decide which qualification he/she wants to obtain. For example, after a student has decided he/she would like obtain a BSc degree, he has to select a programme, for instance the physical and chemical programme, the computer and mathematical programme or the environmental and biological programme etc. If the student decides on the environmental and biological programme for instance, he/she must then study the different curricula offered in this programme and finally decide on a curriculum. Information and the rules for the different qualifications, programmes and curricula are explained in this Calendar./

In die Fakulteit Natuur- en Landbouwetenskappe kan verskillende kwalifikasies verwerf word. 'n Bepaalde kwalifikasie kan in een of meer verskillende programme (die term program dui 'n bepaalde studierigting aan) verwerf word en in elke program kan daar weer een of meer kurrikulums beskikbaar wees. 'n Voornemende student moet dus eers 'n kwalifikasie kies om te verwerf. Nadat 'n student byvoorbeeld besluit het op 'n BSc-graad, moet 'n program gekies word, byvoorbeeld die Fisiese en Chemiese-; Rekenaar- en Wiskundige; die Omgewings- of Biologiese program, ensovoorts. As die student op byvoorbeeld die Fisiese en Chemiese program besluit het, is dit dan nodig om die

verskillende kurrikulums wat in hierdie program aangebied word, te bestudeer en ten slotte op 'n kurrikulum te besluit. Inligting oor en die reëls vir die verskillende kwalifikasies, programme en kurrikulums word in hierdie Jaarboek uiteengesit.

NAS.1.13.1 THE NORTH-WEST UNIVERSITY IS AUTHORISED TO AWARD THE FOLLOWING DIPLOMAS/DEGREES IN UNDERGRADUATE STUDIES IN THE FACULTY OF NATURAL AND AGRICULTURAL SCIENCES: /
DIE NOORDWES-UNIVERSITEIT IS BEVOEG OM IN DIE FAKULTEIT NATUUR- EN LANDBOUWETENSKAPPE DIE VOLGENDE VOORGRAADSE DIPLOMAS/GRADE TOE TE KEN:

DIPLOMAS (3 yr)					
Qualification / *Kwalifikasie*	**Specialisation / *Spesialisering***	**Program code / *Programkode***	**Mode of delivery/ *Metode van afle-wering***	**Campus/ Kampus**	**NQF level / NKR vlak**
DIPLOMA IN ANIMAL HEALTH					
Diploma in Animal Health (3 years)		**2DY B01** **N302M** (1st & 2nd yr) **N301M** (3rd yr) (Old) Phasing out **266100-N102M** Pipeline Only	Contact	MC	6
DIPLOMA IN ANIMAL SCIENCE					
Diploma in Animal Science (3 years)		**2FH B01-N301M** (Old) Phasing out **279100-N101M** Pipeline Only	Contact	MC	6
DIPLOMA IN PLANT SCIENCE (WITH)					
Diploma in Plant Science (3 years)	Crop production	**2FJ B01-N301M**	Contact	MC	6
Diploma in Plant Science (3 years)	Crop Science	Phasing Out (**279101-N103M** 3rd yrs)	Contact	MC	7

BSc Degrees					
Qualification / *Kwalifikasie* BSc (3yrs/*jre*)	**Specialisation WITH / *Spesialisering MET***	**Program code / *Programkode***	**Mode of delivery/ *Metode van afle-wering***	**Campus/ *Kampus***	**NQF level/ *NKR vlak***
Bachelor of Science WITH / Baccalaureus Scientiae MET BSc (3 yr / jr)					
Bachelor of Science/ *Baccalaureus Scientiae*	Chemistry and Physics / *Chemie en Fisika*	**2FF H05 N301P N301M** (Old/ *Oud)* **200190-N151P 200129-N308M** Pipeline only	Contact / *Kontak*	MC/PC MK/PK	7
Bachelor of Science/ *Baccalaureus Scientiae*	Chemistry, Mathematics and Applied Mathematics / *Chemie, Wiskunde en Toegepaste Wiskunde*	**2FF H22-N301P** (Old/ *Oud)* **200190-N152P** Pipeline Only	Contact / *Kontak*	PC PK	7
Bachelor of Science	Applied Mathematics and Chemistry	**2FF H13-N301M** (Old) **200169-N302M** Pipeline only	Contact	MC	7
Bachelor of Science	Chemistry and Mathematics	**2FF H11-N301M** (Old) **200140-N307M** Pipeline only	Contact	MC	7
Bachelor of Science	Applied Mathematics and Electronics	**2FF H14-N301M**	Contact	MC	7
Bachelor of Science	Electronics and Mathematics	**2FF H19 N301M** (Old) **200179-N309M** Pipeline Only	Contact	MC	7

Qualification / *Kwalifikasie* BSc (3yrs/*jre*)	**Specialisation WITH / *Spesialisering MET***	**Program code / *Programkode***	**Mode of delivery/ *Metode van afle-wering***	**Campus/ *Kampus***	**NQF level/ *NKR vlak***
Bachelor of Science	Electronics and Physics	**2FF H20 N301M** (Old) **200180-N310M** Pipeline Only	Contact	MC	7
Bachelor of Science/ *Baccalaureus Scientiae*	Physics and Mathematics / *Fisika en Wiskunde*	**2FF H23 N301P N301M** (Old/ *Oud)* **200190-N154P 200134-N311M** Pipeline Only	Contact / *Kontak*	MC/PC MK/PK	7
Bachelor of Science/ *Baccalaureus Scientiae*	Physics and Applied Mathematics / *Fisika en Toegepaste Wiskunde*	**2FF H24 N301P N301M** (Old/ *Oud)* **200190-N155P 200152-N304M** Pipeline Only	Contact / *Kontak*	MC/PC MK/PK	7
Bachelor of Science/ *Baccalaureus Scientiae*	Biochemistry and Chemistry / *Biochemie en Chemie*	**2FF H06 N301P N301M** (Old/ *Oud)* **200190-N174P; N174M** Pipeline Only	Contact / *Kontak*	MC/PC MK/PK	7
Phasing out from 2018. Only pipeline students.	Biology and Chemistry	**200173-N301M**	Contact	MC	7
Phasing out from 2018. Only pipeline students.	Biology and Geography	**200174-N301M**	Contact	MC	7
Bachelor of Science/ *Baccalaureus Scientiae*	Physics and Computer Science / *Fisika en Rekenaar-wetenskap*	**2FF H25 N301P N301M** (Old/ *Oud)* **200191-N153P** Pipeline Only	Contact / *Kontak*	MC/PC MK/PK	7

Qualification / *Kwalifikasie* BSc (3yrs/*jre*)	**Specialisation WITH / *Spesialisering MET***	**Program code / *Programkode***	**Mode of delivery/ *Metode van afle-wering***	**Campus/ *Kampus***	**NQF level/ *NKR vlak***
Bachelor of Science	Chemistry and Computer Science	**2FF H31 N301M** (Old) **200130-N120M** Pipeline Only	Contact	MC	7
Bachelor of Science	Computer Science and Electronics	**2FF H17 N301M** (Old/*Oud)* **200177-N125M** Pipeline Only	Contact	MC	7
Bachelor of Science/ *Baccalaureus Scientiae*	Computer Science and Statistics / *Rekenaar-wetenskap en Statistiek*	**2FF H26 N301P N301V** (Old/ *Oud)* **200191 N156P; N156V** Pipeline Only	Contact / *Kontak*	VTC/PC VDK/PK	7
Bachelor of Science/ *Baccalaureus Scientiae*	Computer Science and Mathematics / *Rekenaar-wetenskap en Wiskunde*	**2FF H09 N301P N301M** (Old/ *Oud)* **200191-N157P 200137-N127M** Pipeline Only	Contact / *Kontak*	MC/PC MK/PK	7
Bachelor of Science/ *Baccalaureus Scientiae*	Computer Science and Economics / *Rekenaar-wetenskap en Ekonomie*	**2FF H28 N301P N301V** (Old/ *Oud)* **200191 N175P; N175V** Pipeline Only	Contact / *Kontak*	VTC/PC VDK/PK	7
Bachelor of Science/ *Baccalaureus Scientiae*	Mathematics and Economy / *Wiskunde en Ekonomie*	**2FF H29 N301P** (Old/ *Oud)* **200191-N176P** Pipeline Only	Contact / *Kontak*	PC PK	7

Qualification / *Kwalifikasie* BSc (3yrs/*jre*)	**Specialisation WITH / *Spesialisering MET***	**Program code / *Programkode***	**Mode of delivery/ *Metode van afle-wering***	**Campus/ *Kampus***	**NQF level/ *NKR vlak***
Bachelor of Science/ *Baccalaureus Scientiae*	Geography and Applied Mathematics / *Geografie en Toegepaste Wiskunde*	**2FF H30 N301P**	Contact / *Kontak*	PC PK	7
See new programmes in Tourism under BSc Environmental Sciences. / *Sien nuwe progamme in Toerisme onder BSc Omgewingswetenskappe.*					
Bachelor of Science/ *Baccalaureus Scientiae*	Tourism - Geography- Zoology/ *Toerisme- Geografie- Dierkunde*	**200119 N173P** Phasing out from 2018- pipeline students only**.**	Contact / *Kontak*	PC PK	7
Bachelor of Science/ *Baccalaureus Scientiae*	Tourism- Geography- Botany / *Toerisme- Geografie- Plantkunde*	**200119 N172P** Phasing out from 2018- pipeline students only.	Contact / *Kontak*	PC PK	7
Bachelor of Science/ *Baccalaureus Scientiae*	Tourism- Zoology-Botany/ *Toerisme- Dierkunde- Plantkunde*	**200119 N171P** Phasing out from 2018- pipeline students only.	Contact / *Kontak*	PC PK	7
Bachelor of Science in Information Technology / *Baccalaureus Scientiae in Inligtingstegnologie* *BSc (*3 yr / *jr)*					
Senior students will register in 2019 for the same qualification code for which they were registered in 2018. / *Senior-studente moet in 2019 vir dieselfde kwalifikasiekode registreer waarvoor hulle in 2018 geregistreer was.*					
Bachelor of Science in Information Technology (3 year, BSc IT) / *Baccalaureus Scientiae in Inligtings- tegnologie* (3 jaar, BSc IT)		Contact/ *Kontak* **2DX H01 N302P; N302V** (Old/ *Oud)* **2DX H01 N301P; N301V** Pipeline Only (Old/ *Oud*) **264100 N150P;N150V** Pipeline Only Distance/*Afstand* **2HA H01 - N301P**	Contact / Kontak **or/*of*** Distance/ *Afstand* (2019 1st & 2nd yr only/ *slegs 1st & 2de jr*)	VTC/PC VDK/PK	7

Qualification / *Kwalifikasie* BSc (3yrs/*jre*)	Specialisation WITH / *Spesialisering MET*	Program code / *Programkode*	Mode of delivery/ *Metode van afle-wering*	Campus/ *Kampus*	NQF level/ *NKR vlak*
Bachelor of Science in Mathematical Sciences WITH / *Baccalaureus Scientiae in Wiskundige Wetenskappe MET* BSc (3 yr / *jr*)					
Bachelor of Science in Mathematical Sciences/ *Baccalaureus Scientiae in Wiskundige Wetenskappe*	Statistics and Mathematics / *Statistiek en Wiskunde*	**2FG H02 N301P** (Old/ *Oud*) **200191-N158P** Pipeline Only	Contact / *Kontak*	PC PK	7
Bachelor of Science in Mathematical Sciences	Statistics and Mathematics	**200138- N306M**	**Phasing out MC Pipeline Students**		
Bachelor of Science in Mathematical Sciences/ *Baccalaureus Scientiae in Wiskundige Wetenskappe*	Mathematics / *Wiskunde*	**2FG H01 N301P** (Old/ *Oud*) **200191-N 159P** Pipeline Only	Contact / *Kontak*	PC PK	7
Bachelor of Science in Applied Mathematics and Mathematics	Applied Mathematics and Mathematics	**2FG H03 N301M** (Old) **200172-N305M** Pipeline Only	Contact	MC	7
Bachelor of Science in Biological Sciences WITH / *Baccalaureus Scientiae in Wetenskappe MET* BSc (3 yr / *jr)*					
Bachelor of Science in Biological Sciences / *Baccalaureus Scientiae in Biologiese Wetenskappe*	Microbiology and Biochemistry / *Mikrobiologie en Biochemie*	**2DK H11 N301P N301M** (Old/ *Oud*) **200118 N167P; N167M** Pipeline Only	Contact / *Kontak*	MC/PC MK/PK	7

Qualification / *Kwalifikasie* BSc (3yrs/*jre*)	**Specialisation WITH / *Spesialisering MET***	**Program code / *Programkode***	**Mode of delivery/ *Metode van afle-wering***	**Campus/ *Kampus***	**NQF level/ *NKR vlak***
Bachelor of Science in Biological Sciences / *Baccalaureus Scientiae in Biologiese Wetenskappe*	Botany and Biochemistry / *Plantkunde en Biochemie*	**2DK H02 N302P N301M** **2DK H02 N301P** Pipeline Only (Old/ *Oud)* **200118-N170P** Pipeline Only	Contact / *Kontak*	PC/MC PK/MK	7
Bachelor of Science in Biological Sciences / *Baccalaureus Scientiae in Biologiese Wetenskappe*	Zoology and Biochemistry / *Dierkunde en Biochemie*	**2DK H07 N302P** **2DK H07 N301P** Pipeline Only	Contact / *Kontak*	PC PK	7
Bachelor of Science in Biological Sciences / *Baccalaureus Scientiae in Biologiese Wetenskappe*	Chemistry and Physiology / *Chemie en Fisiologie*	**2DK H06 N302P** **2DK H06 N301P** Pipeline Only (Old/ *Oud)* **200190-N177P** Pipeline Only	Contact / *Kontak*	PC PK	7
Bachelor of Science in Biological Sciences / *Baccalaureus Scientiae in Biologiese Wetenskappe*	Zoology and Physiology / *Dierkunde en Fisiologie*	**2DK H03 N302P** **2DK H03 N301P** Pipeline Only (Old/ *Oud)* **200118-N185P** Pipeline Only	Contact / *Kontak*	PC PK	7
Bachelor of Science in Biological Sciences / *Baccalaureus Scientiae in Biologiese Wetenskappe*	Microbiology and Physiology / *Mikrobiologie en Fisiologie*	**2DK H04 N302P** **2DK H04 N301P** Pipeline Only (Old/ *Oud)* **200118-N186P** Pipeline Only	Contact / *Kontak*	PC PK	7

Qualification / *Kwalifikasie* BSc (3yrs/*jre*)	Specialisation WITH / *Spesialisering MET*	Program code / *Programkode*	Mode of delivery/ *Metode van afle-wering*	Campus/ *Kampus*	NQF level/ *NKR vlak*
Bachelor of Science in Biological Sciences / *Baccalaureus Scientiae in Biologiese Wetenskappe*	Zoology and Microbiology / *Dierkunde en Mikrobiologie*	**2DK H08 N301P** (Old/ *Oud)* **200118-N163P** Pipeline Only	Contact / *Kontak*	PC PK	7
Bachelor of Science in Biological Sciences / *Baccalaureus Scientiae in Biologiese Wetenskappe*	Zoology and Botany / *Dierkunde en Plantkunde*	**2DK H09 N301P** (Old/ *Oud)* **200118-N164P** Pipeline Only	Contact / *Kontak*	PC PK	7
Bachelor of Science in Biological Sciences / *Baccalaureus Scientiae in Biologiese Wetenskappe*	Microbiology and Botany / *Mikrobiologie en Plantkunde*	**2DK H10 N302P N301M** **2DK H10 N301P** Pipeline Only (Old/ *Oud)* **200118-N169P** Pipeline Only	Contact / *Kontak*	MC/PC MK/PK	7
Bachelor of Science in Environmental Sciences WITH / *Baccalaureus Scientiae in Omgewingswetenskappe MET* BSc (3 yr / jr)					
Bachelor of Science in Environmental Sciences / *Baccalaureus Scientiae in Omgewingswetenskappe*	Microbiology and Chemistry / *Mikrobiologie en Chemie*	**2DJ H10 N301P N301M** (Old/ *Oud)* **200118 N168P; N168M** Pipeline Only	Contact / *Kontak*	MC/PC MK/PK	7
Bachelor of Science in Environmental Sciences / *Baccalaureus Scientiae in Omgewingswetenskappe*	Botany and Chemistry / *Plantkunde en Chemie*	**2DJ H03 N302P N301M** (Old/ *Oud)* **200118-N149P** Pipeline Only	Contact / *Kontak*	MC/PC MK/PK	7

Qualification / *Kwalifikasie* BSc (3yrs/*jre*)	**Specialisation WITH / *Spesialisering MET***	**Program code / *Programkode***	**Mode of delivery/ *Metode van afle-wering***	**Campus/ *Kampus***	**NQF level/ *NKR vlak***
Bachelor of Science in Environmental Sciences / *Baccalaureus Scientiae in Omgewingsweten-skappe*	Zoology and Chemistry / *Dierkunde en Chemie*	**2DJ H04 N302P (N301P=old)**	Contact / *Kontak*	PC PK	7
Bachelor of Science in Environmental Sciences / *Baccalaureus Scientiae in Omgewingsweten-skappe*	Geology and Chemistry / *Geologie en Chemie*	**2DJ H07 N302P** **2DJ H07 N301P** Pipeline only (Old/ *Oud)* **200118-N180P** Pipeline Only	Contact / *Kontak*	PC PK	7
Bachelor of Science in Environmental Sciences / *Baccalaureus Scientiae in Omgewingsweten-skappe*	Geology and Microbiology / *Geologie en Mikrobiologie*	**2DJ H09 N301P** (Old/ *Oud)* **200118-N181P** Pipeline Only	Contact / *Kontak*	PC PK	7
Bachelor of Science in Environmental Sciences / *Baccalaureus Scientiae in Omgewingsweten-skappe*	Geology and Botany / *Geologie en Plantkunde*	**2DJ H02 N301P** (Old/ *Oud)* **200118-N148P** Pipeline Only	Contact / *Kontak*	PC PK	7
Bachelor of Science in Environmental Sciences / *Baccalaureus Scientiae in Omgewingsweten-skappe*	Zoology and Geography / *Dierkunde en Geografie*	**2DJ H05 N302P** **2DJ H05 N301P** Pipeline only (Old/ *Oud)* **200118-N162P** Pipeline Only	Contact / *Kontak*	PC PK	7

Qualification / *Kwalifikasie* BSc (3yrs/*jre*)	**Specialisation WITH / *Spesialisering MET***	**Program code / *Programkode***	**Mode of delivery/ *Metode van afle-wering***	**Campus/ *Kampus***	**NQF level/ *NKR vlak***
Bachelor of Science in Environmental Sciences / *Baccalaureus Scientiae in Omgewingsweten-skappe*	Geology and Geography / *Geologie en Geografie*	**2DJ H01 N302P** **2DJ H01 N301P** Pipeline Only (Old/ *Oud)* **200118-N147P** Pipeline only	Contact / *Kontak*	PC PK	7
Bachelor of Science in Environmental Sciences / *Baccalaureus Scientiae in Omgewingsweten-skappe*	Geography and Botany / *Geografie en Plantkunde*	**2DJ H06 N302P N301M** Pipeline Only (Old/ *Oud)* **200118-N165P** Pipeline Only	Contact / *Kontak*	MC/PC MK/PK	7
Bachelor of Science in Environmental Sciences / *Baccalaureus Scientiae in Omgewingsweten-skappe*	Zoology and Geology / *Dierkunde en Geologie*	**2DJ H08 N301P**	Contact / *Kontak*	PC PK	7
Bachelor of Science in Environmental Sciences /	Chemistry and Geography	**2DJ H18 N301M** (Old) **200150-N301M** Pipeline Only	Contact	MC	7
Bachelor of Science in Environmental Sciences / *Baccalaureus Scientiae in Omgewingsweten-skappe*	Geography and Computer Sciences *Geografie en Rekenaar-wetenskap*	**2DJ H14 N301P N301M** (Old/ *Oud)* **200118-N166P 200178-N301M** Pipeline Only	Contact / *Kontak*	MC/PC MK/PK	7

Qualification / *Kwalifikasie* BSc (3yrs/*jre*)	**Specialisation WITH / *Spesialisering MET***	**Program code / *Programkode***	**Mode of delivery/ *Metode van afle-wering***	**Campus/ *Kampus***	**NQF level/ *NKR vlak***
Bachelor of Science in Environmental Sciences / *Baccalaureus Scientiae in Omgewingsweten-skappe*	Tourism and Zoology / *Toerisme en Dierkunde*	**2DJ H15 N301P**	Contact / *Kontak*	PC PK	7
Bachelor of Science in Environmental Sciences / *Baccalaureus Scientiae in Omgewingsweten-skappe*	Tourism and Geography / *Toerisme en Geografie*	**2DJH16 N301P (Pipeline see BSc old programmes/ *Pyplyn sien BSc ou program*)**	Contact / *Kontak*	PC PK	7
Bachelor of Science in Environmental Sciences / *Baccalaureus Scientiae in Omgewingsweten-skappe*	Tourism and Botany / *Toerisme en Plantkunde*	**2DJ H17 N301P (Pipeline see BSc old programmes/ *Pyplyn sien BSc ou program*)**	Contact / *Kontak*	PC PK	7
Bachelor of Science in Financial Mathematics / *Baccalaureus Scientiae in Finansiële Wiskunde* BSc (3 yr / *jr*)					
Bachelor of Science in Financial Mathematics / *Baccalaureus Scientiae in Finansiële Wiskunde*		**2FS H01 N301P N301V** (Old/ *Oud)* **200167 N135P; N135V** Pipeline Only	Contact / *Kontak*	VTC/PC VDK/PK	7
Bachelor of Science in Quantitative Risk Management / *Baccalaureus Scientiae in Kwantitatiewe Risikobestuur* BSc (3 yr / *jr*)					
Bachelor of Science in Quantitative Risk Management / *Baccalaureus Scientiae in Kwantitatiewe Risikobestuur*		**2FT H01 N301P N301V** (Old/ *Oud)* **200166 N134P; N134V** Pipeline Only	Contact / *Kontak*	VTC/PC VDK/PK	7

Qualification / *Kwalifikasie* BSc (3yrs/*jre*)	Specialisation WITH / *Spesialisering MET*	Program code / *Programkode*	Mode of delivery / *Metode van afle-wering*	Campus/ *Kampus*	NQF level/ *NKR vlak*
Bachelor of Science in Business Analytics / *Baccalaureus Scientiae in Besigheidsanalise* BSc (3 yr / *jr*)					
Bachelor of Science in Business Analytics / *Baccalaureus Scientiae in Besigheidsanalise*		**2FR H01** **N301P** **N301V** (Old/ *Oud)* **200168** **N136P; N136V** Pipeline only	Contact / *Kontak*	VTC/PC VDK/PK	7
Bachelor of Science in Actuarial Science / Baccalaureus Scientiae in Aktuariële Wetenskap BSc (3 yr / jr)					
Bachelor of Science in Actuarial Science / *Baccalaureus Scientiae in Aktuariële Wetenskap*		**2FQ H01** **N301P** (Old/ *Oud)* **200123** **N137P** Pipeline only	Contact / *Kontak*	PC PK	7
Bachelor of Science in Urban and Regional Planning / *Baccalaureus Scientiae in Stads- en Streekbeplanning* BSc (4 yr / *jr*)					
Big Bang process: 1st – 4th yr students will register on this programme (no pipeline students on old (2017) programme). / *1st- 4de jr studente sal op hierdie program registreer (geen pyplynstudente op die ou (2017) program)*					
Bachelor of Science in Urban and Regional Planning / *Baccalaureus Scientiae in Stads- en Streekbeplanning*		**2FE K01** **N401P**	Contact / *Kontak*	PC PK	8

Qualification / *Kwalifikasie* BSc (3yrs/*jre*)	Specialisation WITH / *Spesialisering MET*	Program code / *Programkode*	Mode of delivery / *Metode van afle-wering*	Campus/ *Kampus*	NQF level/ *NKR vlak*
Bachelor of Science in Agriculture WITH BSc (4 yr)					
Bachelor of Science in Agriculture	Agricultural Economics	**2FD K01 N401M** (1st -3rd yrs) (Old) **267100-N401M** 4th yrs only)	Contact	MC	8
Bachelor of Science in Agriculture with Animal Health		**267101 N402M** (1st - 3rd yrs) (Old) **267101-N401M** 4th yrs only)	Contact	MC	8
Bachelor of Science in Agriculture	Animal Science	**2FD K03 N401M** (1st – 3rd yrs) (Old) **267102-N401M** 4th yrs only)	Contact	MC	8
Bachelor of Science in Agriculture	Agronomy and Horticulture	**2FD K04 N401M** (1st – 3rd yrs)	Contact	MC	8
Bachelor of Science in Agriculture	Crop Science	(Old 267103-N401M) **PHASING OUT** Pipeline only	Contact	MC	8
This 2 new programmes will be offered from 2019. / Hierdie 2 n*uwe programme word vanaf 2019 aangebied.* (2FD K05 & 2FD K06)					
Bachelor of Science in Agriculture / *Baccalaureus Scientiae in Landbou*	Agricultural Economics and Agronomy / *Landbou-ekonomie en Agronomie*	**2FD K05 N401P** New/*nuut* (1st & 2nd yrs/ *1ste & 2de jrs)*	Contact / *Kontak*	PC PK	8
Bachelor of Science in Agriculture / *Baccalaureus Scientiae in Landbou*	Soil Science and Agronomy/ *Grondkunde en Agronomie*	**2FD K06 N401P** New/*nuut* (1st & 2nd yrs/ *1ste & 2de jrs)*	Contact / *Kontak*	PC PK	8

Qualification / *Kwalifikasie* BSc (3yrs/*jre*)	Specialisation WITH / *Spesialisering MET*	Program code / *Programkode*	Mode of delivery / *Metode van afle-wering*	Campus/ *Kampus*	NQF level/ *NKR vlak*
Bachelor of Indigenous Knowledge Systems BSc (4 yr)					
Bachelor of Science in Indigenous Knowledge Systems	Indigenous Knowledge Systems	**2HB K01-N401M** (1st and 2nd yrs) **(**Old **287 100 N402M** 3rd – 4th yrs Only**)**	Contact	MC	8
EXTENDED PROGRAMMES: BACHELOR OF SCIENCE DEGREES – 4 year / *Verlengde programme: Baccalaureus Scientiae Grade - 4 jaar VTC/VDK*					
Qualification / *Kwalifikasie* BSc	**Specialisation / *Spesialisering***	**Program code / *Programkode***	**Mode of delivery / *Metode van aflewering***	**Campus/ *Kampus***	**NQF level/ *NKR vlak***
Extended: Bachelor of Science in Information Technology / *Verlengde: Baccalaureus Scientiae in Inligtingstegnologie*					
Extended: Bachelor of Science in Information Technology / *Verlengde: Baccalaureus Scientiae in Inligtingstegnologie*		**2XX H01-N301V** (1st - 4th yrs) (Old/ *Oud)* **264102-N302V** Pipeline Only	Contact / *Kontak*	VTC VDK	7
Extended: Bachelor of Science in Financial Mathematics / *Verlengde: Baccalaureus Scientiae in Finansiële Wiskunde*					
Senior students will register in 2019 for the same qualification code for which they were registered in 2018. / Senior-*studente moet in 2019 vir dieselfde kwalifikasiekode registreer waarvoor hulle in 2018 geregistreer was.*					
Extended: Bachelor of Science in Financial Mathematics / *Verlengde: Baccalaureus Scientiae in Finansiële Wiskunde*		**2XS H01-N301V** (1st - 4th yrs) (Old/ *Oud)* **200208-N301V** Pipeline Only	Contact / *Kontak*	VTC VDK	7

Qualification / *Kwalifikasie* BSc (3yrs/*jre*)	Specialisation WITH / *Spesialisering MET*	Program code / *Programkode*	Mode of delivery / *Metode van afle-wering*	Campus/ *Kampus*	NQF level/ *NKR vlak*
Extended: Bachelor of Science in Quantitative Risk Management / *Verlengde: Baccalaureus Scientiae in Kwantitatiewe Risikobestuur*					
Extended: Bachelor of Science in Quantitative Risk Management / *Verlengde: Baccalaureus Scientiae in Kwantitatiewe Risikobestuur*		**2XT H01-N301V** (1st - 4th yrs) (Old/ *Oud)* **200207-N301V** Pipeline Only	Contact / *Kontak*	VTC VDK	7
Extended: Bachelor of Science in Business Analytics / *Verlengde: Baccalaureus Scientiae in Besigheidsanalise*					
Extended: Bachelor of Science in Business Analytics/ *Verlengde: Baccalaureus Scientiae in Besigheidsanalise*		**2XR H01-N301V** (1st - 4th yrs) (Old/ Oud) **200198-N302V** Pipeline Only	Contact / *Kontak*	VTC VDK	7
EXTENDED PROGRAMMES: BACHELOR OF SCIENCE DEGREES– 4 years / *Verlengde programme: Baccalaureus Scientiae Grade - 4 jaar* **MC/MK**					
Extended: Bachelor of Science WITH					
Extended: Bachelor of Science (Ext. BSc)	Applied Mathematics and Chemistry	**2XF H13-N301M** (Old) **200192-N302M** Pipeline Only	Contact	MC	7
Extended: Bachelor of Science (Ext. BSc)	Applied Mathematics and Electronics	**2XF H14-N301M** (Old) **200193-N302M** Pipeline Only	Contact	MC	7
Extended: Bachelor of Science (Ext. BSc)	Computer Science and Mathematics	**2XF H09-N301M** (Old) **200162-N303M** Pipeline Only	Contact	MC	7
Extended: Bachelor of Science (Ext. BSc)	Chemistry and Computer Science	**2XF H31-N301M** (1st – 4th yrs) (Old) **200197-N302M** Pipeline Only	Contact	MC	7

Qualification / *Kwalifikasie* BSc	Specialisation WITH / *Spesialisering MET*	Program code / *Programkode*	Mode of delivery / *Metode van aflewering*	Campus/ *Kampus*	NQF level/ *NKR vlak*
Extended: Bachelor of Science WITH					
Extended: Bachelor of Science (Ext. BSc)	Chemistry and Mathematics	**2XF H11-N301M** (Old) **200195-N302M** Pipeline Only	Contact	MC	7
Extended: Bachelor of Science (Ext. BSc)	Physics and Applied Mathematics	**2XF H24-N301M** (Old) **200194-N302M** Pipeline Only	Contact	MC	7
Extended: Bachelor of Science (Ext. BSc)	Physics and Mathematics	**2XF H23-N301M** (Old) **200164-N303M** Pipeline Only	Contact	MC	7
Extended: Bachelor of Science (Ext. BSc)	Biochemistry and Chemistry	**2XF H06-N301M** (Old) **200201-N301M** Pipeline Only	Contact	MC	7
Extended: Bachelor of Science (Ext. BSc	Chemistry and Physics	**2XF H05-N301M** (Old) **200160-N303M** Pipeline Only	Contact	MC	7
Extended: Bachelor of Science (Ext. BSc)	Physics and Computer Science	**2XF H25-N301M** (Old) **200200-N302M** Pipeline Only	Contact	MC	7
Extended: Bachelor of Science (Ext. BSc)	Computer Science and Electronics	**2XF H17-N301M** (Old) **200161-N303M** Pipeline Only	Contact	MC	7
Extended: Bachelor of Science (Ext. BSc)	Electronics and Physics	**2XF H20-N301M** (Old) **200196-N302M** Pipeline Only	Contact	MC	7
Extended: Bachelor of Science (Ext. BSc)	Electronics and Mathematics	**2XF H19-N301M** (Old) **200163-N303M** Pipeline Only	Contact	MC	7

Qualification / *Kwalifikasie* BSc (3yrs/*jre*)	Specialisation *WITH / Spesialisering MET*	Program code / *Programkode*	Mode of delivery / *Metode van afle-wering*	Campus/ *Kampus*	NQF level/ *NKR vlak*
Extended: Bachelor of Science in Mathematical Sciences WITH					
Extended: Bachelor of Science in Mathematical Sciences (Ext. BSc)	Applied Mathematics and Mathematics	**2XG H03-N301M** (Old) **200158-N303M** Pipeline Only	Contact	MC	7
Extended: Bachelor of Science in Mathematical Sciences (Ext. BSc)	Statistics and Mathematics	**200-165 N302M** **Only one pipeline student**	Contact	MC	7
Extended: Bachelor of Science in Environmental Sciences WITH					
Extended: Bachelor of Science in Environmental Sciences (Ext. BSc)	Botany and Chemistry	**2XJ H03-N301M** (Old) **200159-N303M** Pipeline Only	Contact	MC	7
Extended: Bachelor of Science (Ext. BSc)	Biology and Chemistry		**Phasing Out**		
Extended: Bachelor of Science (Ext. BSc)	Biology and Geography		**Phasing Out**		
Extended: Bachelor of Science in Environmental Sciences (Ext. BSc)	Geography and Botany	**2XJ H06-N301M** (Old) **200205-N301M** Pipeline Only	Contact	MC	7
Extended: Bachelor of Science in Environmental Sciences (Ext. BSc)	Computer Science and Geography	**2XJ H14-N301M** (Old) **200206-N301M** Pipeline Only	Contact	MC	7
Extended: Bachelor of Science in Environmental Sciences (Ext. BSc)	Microbiology and Chemistry	**2XJ H10-N301M** (Old) **200204-N301M** Pipeline Only	Contact	MC	7
Extended: Bachelor of Science in Environmental Sciences (Ext. BSc)	Chemistry and Geography	**2XJ H18-N301M** (Old) **200203-N301M** Pipeline Only	Contact	MC	7

Qualification / *Kwalifikasie* BSc (3yrs/*jre*)	Specialisation WITH / *Spesialisering MET*	Program code / *Programkode*	Mode of delivery / *Metode van afle-wering*	Campus/ *Kampus*	NQF level/ *NKR vlak*
Extended: Bachelor of Science in Environmental Sciences WITH					
Extended: Bachelor of Science in Environmental Sciences (Ext. BSc)	Botany and Biochemistry	**2XK H01 N301M New (1st & 2nd yr only)**	Contact	MC	7
Extended: Bachelor of Science in Environmental Sciences (Ext. BSc)	Botany and Microbiology	**2XK H02 N301M New (1st & 2nd yr only)**	Contact	MC	7
Extended: Bachelor of Science in Biological Sciences WITH					
Extended: Bachelor of Science in Biological Sciences (Ext. BSc)	Microbiology and Biochemistry	**2XKH11 N301M** (Old) **200202-N301M** Pipeline only	Contact	MC	7

NAS.1.14 LIST OF MODULES ALL CAMPUSES/ *LYS VAN MODULES ALLE KAMPUSSE*

NAS.1.14.1 LIST OF ALL MODULES WITH PREREQUISITES AT ALL CAMPUSES / *LYS VAN ALLE MODULES MET VOORVEREISTES OP ALLE KAMPUSSE*

NAS.1.14.1.1 Contact / campus students:

When a first semester module in a particular year level is set in the faculty rules as assumed learning for a second semester module, a module mark of at least 40% must be achieved in the first semester module concerned, before the student may continue with the second semester module, provided that they have at least qualify for admission to the examination.

NAS.1.14.1.2 BSC IT programme: Distance learning students:

When a first semester module in a particular year level is set in the faulty rules as assumed learning for a second semester module, students may continue with the second semester, provided that they have at least qualify for admission to the examination.

Programmes: Core modules are indicated with (H) and ancillary modules with (X)

LIST OF DIPLOMA, MAIN & EXTENDED MODULES – ALL CAMPUSES *LYS VAN DIPLOMA, HOOFSTROOM EN VERLENGDE MODULES – ALLE KAMPUSSE*							
MODULE CODE / *KODE* 2020	**2019 MODULE CODE / *KODE***	**DESCRIPTIVE NAME/ *BESKRYWENDE NAAM***	**PRE-REQUISITES/ *VOOR-VEREISTES***	**CR/ *KR***	**PC/ *PK***	**VTC/ *VDK***	**MC/ *MK***
Financial Accounting / *Finansiële Rekeningkunde*							
	ACCC111	Accounting: Frame-work, Foundations, Cycle and Financial Reporting/ *Rekeningkunde: Raamwerk, Grondslae, Siklus en Finansiële Verslagdoening*	Mathematics gr 12 level 5 (60-69%) / *Wiskunde gr 12 vlak* 5 (60-69%)	16	X	X	
	ACCC121	Accounting for Different Entity Forms/ *Rekeningkunde vir Verskillende Entiteitsvorme*	ACCC111 (50%) **or** ACCF111 (65%)	16	X	X	
ACCF111	ACCF111	Financial Accounting: Basic Concepts, Accounting Systems and Elementary Financial Reporting/ *Finansiële Rekeningkunde: Basiese Konsepte, Rekeningkundige Stelsels en Elementêre Finansiële Verslagdoening*	Mathematics gr 12 level 4 (50-59%)/ *Wiskunde gr 12 vlak* 4 (50-59%)	16	X	X	

MODULE CODE / *KODE* 2020	2019 MODULE CODE / *KODE*	DESCRIPTIVE NAME/ *BESKRYWENDE NAAM*	PRE-REQUISITES/ *VOOR-VEREISTES*	CR/ *KR*	PC/ *PK*	VTC/ *VDK*	MC/ *MK*
Financial Accounting / *Finansiële Rekeningkunde*							
ACCF121	ACCF121	Financial Accounting: Elementary Financial Reporting, Partnerships, and Companies / *Finansiële Rekeningkunde: Elementêre Finansiële Verslagdoening, Vennootskappe, en Maatskappye*	ACCF111 (40%) **or** ACCC111 (40%)	16	X	X	
Financial Accounting (Special) / *Finansiële Rekeningkunde (Spesiaal)*							
	ACCS111	Financial Accounting (Special) – Basic Concepts, Accounting Cycle and Accounting Systems/ *Finansiële Rekeningkunde (Spesiaal) – Basiese Konsepte, Rekeningkundige Siklus en Rekeningkundige Stelsels*	Mathematics Grade 12 level 3 (40-49%) *Wiskunde Graad 12 vlak 3 (40-49%)*	16	X	X	
ACCS121	ACCS121	Financial Accounting (Special) – Bank Reconciliation, Elementary Financial Reporting and Analysis and Interpretation of Elementary Financial Statements/ *Finansiële Rekeningkunde (Spesiaal) - Bankrekonsiliasies, Elementêre Finansiële Verslagdoening, Elementêre Ontleding en Vertolking van Finansiële State*	ACCS111 (40%)	16	X	X	
ACFS111	ACFS111	Financial Accounting *Special/ Finansiële Rekeningkunde Spesiaal*		16		X	
ACFS121	ACFS121	Financial Accounting Special/ *Finansiële Rekeningkunde Spesiaal*	ACFS111	16		X	

MODULE CODE / *KODE* 2020	2019 MODULE CODE / *KODE*	DESCRIPTIVE NAME/ *BESKRYWENDE NAAM*	PRE-REQUISITES/ *VOOR-VEREISTES*	CR/ *KR*	PC/ *PK*	VTC/ *VDK*	MC/ *MK*
Agricultural / *Landbou*							
AECM111	AECM111	Introduction to Agricultural Economics		12			X
AECM221	AECM221	Land Reform and Agricultural Development		8			X
AECM223	AECM223	Farm Accounting		8			X
AECM311	AECM311	Agricultural Micro-Economics	AECM111	16			X
AECM312	AECM312	International Agricultural Trade	AECM111	8			X
AECM313	AECM313	Agricultural Statistics for Research I	ANSM121	16			X
AECM314	AECM314	Farm Management and Accounting	AECM111	8			X
AECM315	AECM315	Food Security Analysis	AECM111	8			X
AECM316		Agricultural Production Economics		16			X
AECM321	AECM321	Land Resource and Environmental Economics	AECM111	16			X
AECM322	AECM322	Agricultural Production Economics	AECM111 **&** AECM311(40%)	16			X
AECM323	AECM323	Agricultural Marketing	AECM314(40%)	8			X
AECM325	AECM325	Agricultural Macro-Economics	AECM111 **&** AECM311 (40%)	8			X
AECM326	AECM326	Agricultural Finance	AECM314 (40%)	8			X
AECM327		International Agricultural Trade		8			X
AECM411	AECM411	Agricultural Project Appraisal and Management	AECM314	8			X
AECM412	AECM412	Research Project and Seminar I		16			X
AECM413	AECM413	Quantitative Methods in Agricultural Economics	AECM311 **&** AECM325	16			X
AECM414	AECM414	Agricultural Statistics for Research II	AECM313	16			X
AECM415	AECM415	Agribusiness Management	AECM314	16			X
AECM421	AECM421	Farm Planning and Linear Programming	AECM314	8			X
AECM422	AECM422	Agricultural Policy Analysis		16			X
AECM424	AECM424	Agriculture and Economic Development	AECM221 **&** AECM311	8			X
AECM425	AECM425	Research Project and Seminar II		16			X

MODULE CODE / *KODE* 2020	2019 MODULE CODE / *KODE*	DESCRIPTIVE NAME/ *BESKRYWENDE NAAM*	PRE-REQUISITES/ *VOOR-VEREISTES*	CR/ *KR*	PC/ *PK*	VTC/ *VDK*	MC/ *MK*
Agricultural / *Landbou*							
AECP121		Farm Record Keeping and Finance/ *Plaasrekordhouding en Finansies*		16	X		
AECP211		Farm management and Planning/ *Landboubestuur en Beplanning*		16	X		
AECP223		Agricultural Marketing/ *Landboubemarking*		16	X		
AECP311		Agribusiness Management/ *Agri-besigheidbestuur*		16	X 2021		
AECP321		Land resource and Environmental Economics/ *Hulpbron- en Omgewingsekonomie*		16	X 2021		
AECP322		Agricultural Production Economics/ *Landbou Produksie Ekonomie*		16	X 2021		
AEDM111	AEDM111	Introduction to Agricultural Economics		12			X
AEDM314	AEDM314	Farm Management and Accounting	AEDM111	8			X
AEXM211	AEXM211	Fundamentals of Agricultural Extension		16			X
AEXM212	AEXM212	Communication and Agricultural Technology Transfer	AEXM211	8			X
AEXM222	AEXM222	Agricultural Extension for Development		8			X
AEXM324	AEXM324	Agricultural Rural Sociology	AEXM211 **&** AEXM222	8			X
AXDM211	AXDM211	Fundamentals of Agricultural Extension		16			X
AXDM311		Agricultural Extension for Development		8			X
Academic Literacy / *Akademiese Geletterdheid*							
ALDE111/ ALDA111	AGLE111/ AGLA111	Introduction to Academic Literacy/ *Inleiding tot Akademiese Geletterdheid*		12	X	X	X
ALDE122/ ALDA122	AGLE122/ AGLA122	Academic Literacy/ *Akademiese Geletterdheid*	ALDE111/ ALDA111(40%) (=AGLA/E 111)	12	X	X	X

MODULE CODE / *KODE* 2020	2019 MODULE CODE / *KODE*	DESCRIPTIVE NAME/ *BESKRYWENDE NAAM*	PRE-REQUISITES/ *VOOR-VEREISTES*	CR/ *KR*	PC/ *PK*	VTC/ *VDK*	MC/ *MK*
Animal Health & Animal Science							
AHBM321	AHBM321	Research Methodology	AHPM 312(40%)	8			X
AHDM316		Meat Inspection I	AHVM111, 112, 122,121 213, 221, 212, 225	8			X
AHDM317		Veterinary Jurisprudence	AHVM111,122 121,213,221, 212,225	8			X
AHDM326		Meat Inspection II	AHVM111,112 122,121,213, 221,212,225	8			X
AHPM211		Microbiology for Animal Health		16			X
AHPM212	AHPM212	Anatomy and Physiology I		16			X
AHPM213	AHPM213	Veterinary Microbiology		16			X
AHPM214		Anatomy and Physiology: Animal Health T I		12			X
AHPM216	AHPM216	Animal Welfare, Handling and Equipment I		12			X
AHPM221	AHPM221	Anatomy and Physiology II		8			X
AHPM223	AHPM223	Animal Welfare, Handling and Equipment II	AHPM212 (40%)	12			X
AHPM224		Anatomy and Physiology: Animal Health II		12			X
AHPM225		Animal Welfare, Handling and Equipment II		12			X
AHPM311	AHPM311	Diseases I	AHPM211	16			X
AHPM312	AHPM312	Epidemiology	AHPM211	8			X
AHPM313	AHPM313	Obstetrics and Genital Diseases: Animal Health	AHPM212,221	16			X
AHPM315		Public Health for Animal Health I		8			X
AHPM317	AHPM317	Pathology I	AHPM211, 212, 221,222	8			X
AHPM318	AHPM318	Introduction to Game and Wildlife	AHPM222	12			X
AHPM319		Epidemiology for Animal Health Technicians		8			X
AHPM321	AHPM321	Diseases II	AHPM211(40%)	16			X
AHPM322	AHPM322	Parasitology: Animal Health	AHPM311	16			X
AHPM323	AHPM323	Pharmacology and Toxicology: Animal Health	AHPM212,221 AHPM311 (40%)	16			X

MODULE CODE / *KODE* 2020	2019 MODULE CODE / *KODE*	DESCRIPTIVE NAME/ *BESKRYWENDE NAAM*	PRE-REQUISITES/ *VOOR-VEREISTES*	CR/ *KR*	PC/ *PK*	VTC/ *VDK*	MC/ *MK*
Animal Health & Animal Science							
	AHPM324	Veterinary Public Health I	AHPM212,221 AHPM311 (40%)	8			X
AHPM325	AHPM325	Clinical Laboratory Techniques	AHPM 211	8			X
AHPM326	AHPM326	Livestock Diseases	AHPM211 (Animal Science)	8			X
AHPM327	AHPM327	Veterinary Jurisprudence	AHPM311(40%)	8			X
AHPM329	AHPM329	Pathology II	AHPM211,212, 221,222 AHPM313,317 314 (40%)	8			X
AHPM411	AHPM411	Companion Animal Clinical Care I	AHPM211,212, 221,222, 313,323,314, 325	16			X
AHPM412	AHPM412	Production Animal Clinical Care I	AHPM211,212, 221,222,313, 323,314,325	16			X
	AHPM414	Practical Learning and Experiential Learning I	AHPM211,212, 221,222, 313,323,314, 325	8			X
AHPM415	AHPM415	Research Project and Seminar		16			X
AHPM416 **(2021)**		Public Health for AHT II		8			X
AHPM417 **(2021)**		Work Integrated Learning		8			X
AHPM421	AHPM421	Companion Animal Clinical Care II	AHPM211,212, 221,222,313, 323,314,325, AHPM411(40%)	16			X
AHPM422	AHPM422	Production Animal Clinical Care II	AHPM211,212, 221,222,313, 323,314,325	16			X

MODULE CODE / *KODE* 2020	2019 MODULE CODE / *KODE*	DESCRIPTIVE NAME/ *BESKRYWENDE NAAM*	PRE-REQUISITES/ *VOOR-VEREISTES*	CR/ *KR*	PC/ *PK*	VTC/ *VDK*	MC/ *MK*
Animal Health & Animal Science							
AHPM424	AHPM424	Practical Learning and Experiential Learning II	AHPM211,212, 221,222, 313,323,314,325	8			X
AHPM425	AHPM425	Research Project and Seminar	AHPM415(40%)	16			X
AHPM426	AHPM426	Scheduled Diseases	AHPM311/ AHPM321	8			X
AHPM427 **(2021)**		Work Integrated Learning		8			X
AHVM111	AHVM111	Anatomy and Physiology : Animal Health I		12			X
AHVM112	AHVM112	Animal Handling and Equipment I		8			X
AHVM121	AHVM121	Basic Microbiology for Animal Health		12			X
AHVM122	AHVM122	Anatomy and Physiology : Animal Health II	AHVM111	12			X
AHVM123	AHVM123	Animal Handling and Equipment II	AHVM111,112 (40%)	8			X
AHVM211	AHVM211	Diseases I		16			X
AHVM212	AHVM212	Parasitology for Animal Health	AHVM111,122, 213	8			X
AHVM213	AHVM213	Diseases I	AHVM111,122, 121	12			X
AHVM214	AHVM214	Pathology I	AHVM111,122, 121	8			X
AHVM222	AHVM222	Obstetrics and Genital Diseases: Animal Health	AHVM111,122, 213 (40%)	16			X
AHVM223	AHVM223	Pharmacology and Toxicology: Animal Health	AHVM111,122, 213(40%)	16			X
AHVM224	AHVM224	Public Health for Animal Health		8			X
AHVM225	AHVM225	Clinical Laboratory Techniques	AHVM111,122, 121,213,212 (40%)	8			X
AHVM226	AHVM226	Basic Microbiology (Animal Science)	AHVM121	16			X
AHVM227	AHVM227	Diseases II		12			X

MODULE CODE / *KODE* 2020	2019 MODULE CODE / *KODE*	DESCRIPTIVE NAME/ *BESKRYWENDE NAAM*	PRE-REQUISITES/ *VOOR-VEREISTES*	CR/ *KR*	PC/ *PK*	VTC/ *VDK*	MC/ *MK*
Animal Health & Animal Science							
AHVM228	AHVM228	Pathology II	AHVM111,122, 121 213,214(40%)	8			X
AHVM316	AHVM316	Companion Animal Clinical Care for AHT I		12			X
AHVM317	AHVM317	Production Animal Clinical Care for AHT I		12			X
AHVM318	AHVM318	Epidemiology	AHVM111,122, 121,213, 221,212,225	8			X
AHVM319	AHVM319	Practical Experiential Learning I		12			X
AHVM324	AHVM324	Scheduled Diseases	AHVM111,122, 121,213, 221,212,225	8			X
AHVM326	AHVM328	Companion Animal Clinical Care for AHT II		12			X
AHVM327	AHVM328	Production Animal Clinical Care for AHT II		12			X
AHVM328	AHVM328	Practical Experiential Learning II		12			X
ANDM121	ANDM121	Introduction to Animal Science		12			X
ANDM122	ANDM122	Non–Ruminant Production		8			X
ANDM211	ANDM211	Animal Nutrition	ANDM121	16			X
ANDM212	ANDM212	Animal Genetics and Breeding		8			X
ANDM213	ANDM213	Ruminant Animal Production		8			X
ANDM221	ANDM221	Small Stock Production and Management	ANDM121	16			X
ANDM223	ANDM223	Beef Production and Management	ANDM121	16			X
ANDM225	ANDM225	Principles of Veld Management		16			X
ANDM312	ANDM312	Poultry Production and Management	ANDM121	16			X
ANDM313	ANDM313	Dairy Production and Management	ANDM121	16			X
ANDM314	ANDM314	Pig Production and Management	ANDM121	16			X

MODULE CODE / *KODE* 2020	2019 MODULE CODE / *KODE*	DESCRIPTIVE NAME/ *BESKRYWENDE NAAM*	PRE-REQUISITES/ *VOOR-VEREISTES*	CR/ *KR*	PC/ *PK*	VTC/ *VDK*	MC/ *MK*
Animal Health & Animal Science							
ANDM321	ANDM321	Practical Animal Production	ANDM121, 221,223, 312(40%), ANDM313 & ANDM314(40%)	56			X
ANSM121	ANSM121	Introduction to Agricultural Biometry		12			X
ANSM211	ANSM211	Introduction to Animal Science		16			X
ANSM214	ANSM214	Ruminant Production Science		8			X
ANSM223	ANSM223	Animal Nutrition		16			X
ANSM224	ANSM224	Non-Ruminant Production		8			X
ANSM226		Animal Breeding and Genetics		12			X
ANSM311	ANSM311	Principles of Veld Management		16			X
ANSM312	ANSM312	Applied Agricultural Biometry	ANSM121	16			X
ANSM313		Agricultural Biochemistry					
ANSM314	ANSM314	Physiology of Reproduction and Growth	AHPM212 **&** AHPM221	16			X
ANSM322	ANSM322	Planted Pastures and Fodder Crops		8			X
ANSM323	ANSM323	Quantitative Genetics		16			X
ANSM326		Small Ruminants Production Science	ANSM211(40%)	12			X
Phasing Out	ANSM411	Applied Monogastric Nutrition		16			X
Phasing Out	ANSM412	Applied Animal Breeding	ANSM323	16			X
Phasing Out	ANSM413	Research Project and Seminar I		16			X
Phasing Out	ANSM414	Large Stock Production and Science		8			X
ANSM415 **(2021)**		Beef Production Science	ANSM211	12			X
ANSM416 **(2021)**		Applied Non-Ruminant Nutrition	ANSM223	16			X
Phasing Out	ANSM422	Pig Science		16			X

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Animal Health & Animal Science							
Phasing Out	ANSM423	Practical Experience		8			X
Phasing Out	ANSM424	Poultry Science		16			X
Phasing Out	ANSM425	Dairy and Meat Sciences		16			X
ANSM426 **(2021)**		Pig Production Science	ANSM211	12			X
ANSM427 **(2021)**		Poultry Production Science	ANSM211	12			X
ANSM428 **(2021)**		Dairy Production Sciences	ANSM313 **&** ANSM314	12			X
ANSM479 **(2021)**		Research Project		32			X
Applied Mathematics / *Toegepaste Wiskunde*							
APPM111	APMM117	Introduction to Mechanics	Gr12 Mathematics Level 5	12			X
APPM121	TGWN121 (BEng)	Statics and Mathematical Modelling/ *Statika en Wiskundige Modellering*	WISN111**&** FSKS111/ **MTHS111(40%)& NPHY111(40%)**	12	X		
APPM122	TGWN122 (BSc)/ APMM127	Mathematical Modelling and Vector Algebra/ *Wiskundige Modellering en Vektoralgebra*	WISN111**&** FSKS111/ **MTHS111(40%)& NPHY111(40%)**	12	X		X
APPM171	APPM171	Introduction to Mechanics		12			X
APPM172	APPM172	Mathematical Modelling and Vector Algebra	APPM 171	12			X
APPM211	TGWN211	Dynamics I/ *Dinamika I*	WISN121 **&** TGWN121 **or** TGWN122/ **MTHS121 & APPM121 or APPM122**	8	X		
APPM212	TGWN213 / Part of APMM217	Differential Equations/ *Differensiaalvergelykings*	WISN121/ **MTHS121**	8	X		X
APPM213	Part of APMM227	Linear Programming	**MTHS121 & APPM111 or APPM122**	8			X

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Applied Mathematics / *Toegepaste Wiskunde*							
APPM221	TGWN221	Dynamics II/ *Dinamika II*	TGWN213 **&** TGWN121 **or** TGWN122/ **APPM212**(40%) **& APPM121 or APPM122**	8	X		
APPM222	TGWN223 / Part of APMM217	Numerical Methods/ *Numeriese Metodes*	WISN121/ **MTHS121**	8	X	X	X
APPM223	Part of APMM227	Mathematical Methods	MTHS211(40%) MTHS212(40%) **&** **one** of APPM212(40%) **or** APPM213(40%)	8			X
APPM311	TGWN311/ APMM318	Partial Differential Equations/ *Parsiële Differensiaalvergelykings*	WISN225 **or** WISN224/ **MTHS221 or MTHS223 and APPM212**	16	X		X
APPM312	TGWN312	Numerical Methods for Partial Differential Equations/ *Numeriese Metodes vir Parsiële Differensiaalvergelykings*	WISN225 **or** WISN224 (221)/ **MTHS221 or MTHS223**	16	X		
APPM313	APMM328	Numerical Analysis	APPM222, MTHS211 **&** MTHS212	16			X
APPM321	TGWN323	Dynamical Systems/ *Dinamiese Stelsels*	APPM212, MTHS211, MTHS222/4	16	X		
APPM322	TGWN322/ APMM317	Optimisation/ *Optimalisering*	WISN211/ **MTHS211** WISN212/ **MTHS212** And **one** of the following: APPM211 **or** 213 **or** MTHS224	16	X		X
APPM323	APMM327	Fluid Mechanics/ *Vloeimeganika*	**One** of APPM212 **or** 223, And **one** of MTHS221 **or** MTHS223, **& one** of MTHS222 **or** MTHS224	16	X		X

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Biochemistry / *Biochemie*							
BCHN213	BCHN213	Introductory Biochemistry/ *Inleidende Biochemie*	**NCHE**/CHEM**111** **NCHE**/CHEM**121**	16	X		X
BCHN222	BCHN222	Metabolism/ *Metabolisme*	**NCHE**/CHEM**111** **NCHE**/CHEM**121**	16	X		X
BCHS316	BCHS316	Enzymology/ Ensiemologie	BCHN213, BCHN222	16	X		X
BCHS317	BCHS317	Molecular Biology/ *Molekulêre Biologie*	BCHN213, BCHN222	16	X		X
BCHS321	BCHS321	Analytical Biochemistry/ *Analitiese Biochemie*	BCHN213, BCHN222	16	X		X
BCHS322	BCHS322	Biochemistry Research Project/ *Biochemie Navorsingsprojek*	BCHN213, BCHN222	16	X		X
MCBN111		Molecular and Cell Biology I/ *Molekulêre en Selbiologie I*	Mathematics	12	X		X
MCBN121		Mole Molecular and Cell Biology II/ *Molekulêre en Selbiologie II*	Mathematics	12	X		X
MCBN171	MCBN171	Introduction to Molecular & Cell Biology I		12			X
MCBN172	MCBN172	Introduction to Molecular & Cell Biology II	MCBN171	12			X
Business Management / *Ondernemingsbestuur*							
BMAN111	BMAN111	Introduction to Business Management / *Inleiding tot Ondernemingsbestuur*		12	X		
	BMAN222	Entrepreneurial Opportunities / *Entrepreneuriese Geleenthede*		16	X		
BMAN223		Problem Solving for Managers/ *Probleemoplossing vir Bestuurders*		16	X	X	

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Business Mathematics and Informatics / *Bedryfswiskunde en Informatika*							
BWIA111	BWIA111	Introduction to Financial Mathematics/ *Inleiding tot Finansiële Wiskunde*		12	X	X	
BWIA121	BWIA121	Introduction to Actuarial Science/ *Inleiding tot Aktuariële Wetenskap*	**BWIA111**(40%) WISN/ **MTHS111** (40%)	12	X	X	
BWIA272		Financial Mathematics/ *Finansiële Wiskunde*	**BWIA121** WISN/ **MTHS121**	24	X		
BWIA273	BWIA273	Basics of Financial Mathematics / *Basiese Finansiële Wiskunde*	**BWIA121** WISN/ **MTHS121**	16	X	X	
BWIA313	BWIA313	Actuarial Statistical Models/ *Aktuariële Statistiese Modelle*	BWIA271**or** 272 **or** 273	24	X	X	
BWIA314	BWIA314	Stochastic Processes/ *Stogastiese Prosesse*	BWIA271**or** 272	12	X		
BWIA324	BWIA324	Survival Models/ *Oorlewingsmodelle*	BWIA271 **or** 272	12	X		
BWIA371	BWIA371	Contingencies/ *Gebeurlikhede*	BWIA271 **or** 272	32	X		
BWIN321	BWIN321	BMI Project: Capital Markets Modelling and Analysis/ *Bedryfswiskunde Projek: Effektebeurs Modellering en Analise*	**BWIA111** WISN/ **MTHS111**	16	X	X	
Computer Science and Information Systems / *Rekenaarwetenskap en Inligtingstelsels*							
CMPG111	ITRW111	Introduction to Computing and Programming/ *Inleiding tot Rekenaarwese en Programmering*		12	X	X	X
CMPG112	ITRW112 CISM112	Introduction to End User Computing/ *Inleiding tot Rekenaareindgebruik*		12	X	X	

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Computer Science and Information Systems / *Rekenaarwetenskap en Inligtingstelsels*							
CMPG115	ITRW115	Programming for Engineers/ *Programmering vir Ingenieurs*		12	X		
CMPG121	ITRW124/ CISM122	Structured Programming/ *Gestruktureerde Programmering*	**CMPG111 or CMPG115** (40%) **or** ITRW112 **or** ITRW115	12	X	X	X
CMPG122	ITRW123	User Interface Programming/ *Gebruikerskoppelvlakpro-grammering*	**CMPG111 or CMPG115** (40%) **or** ITRW112 **or** ITRW115	12	X	X	
CMPG171	CMPG171	Introduction to Computing and Programming		12			X
CMPG172	CMPG172	Structured Programming	CMPG171	12			X
CMPG211	ITRW212/ CISM214	Object Oriented Programming/ *Objekgeoriënteerde Programmering*	**CMPG121 or** ITRW124	16	X	X	X
CMPG212	ITRW211	Apps and Advanced User Interface Programming / *Toepassings en Gevorderde Gebruikerkoppelvlak-programmering*	**CMPG122 or** ITRW123	8	X	X	
CMPG213	ITRW213	Systems Analysis and Design I/ *Stelselontleding en Ontwerp I*	**CMPG121 or CMPG122 or** ITRW123 **or** ITRW124	16	X	X	X
CMPG214	ITRW315	Communication Skills/ *Kommunikasievaardighede*	**CMPG121 or CMPG122 or** ITRW123 **or** ITRW124	8	X	X	

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Computer Science and Information Systems / *Rekenaarwetenskap en Inligtingstelsels*							
CMPG215		Information Security/ *Inligtingsekuriteit*	**CMPG121 or CMPG122 or** ITRW123 **or** ITRW124 **& MTHS113/ 123/ 111/ 112/ 114**	8	X	X	
CMPG221	ITRW222/ CISM213	Data Structures and Algorithms/ *Datastrukture en Algoritmes*	**CMPG211** (40%) **or** ITRW212	8	X	X	X
CMPG222		Data Analytics/ *Data Analise*	**MTHS111/112/ 113/114/123 or** WISN111/112/ 113/ 123 **& CMPG211/ 212** (40%) **or** ITRW211/ 212	8	X	X	
CMPG223	ITRW225	System Analysis and Design II/ *Stelselontleding en Ontwerp II*	**CMPG213** (40%) **or** ITRW213	16	X	X	X
CMPG224	CISM226 (CMPG224)	Introduction to Software Engineering	CISM122 **or** SFIM172 **or** **CMPG121**	8			X
CMPG311	ITRW311	Databases / *Databasisse*	**CMPG221 or CMPG223 or** ITRW222 **or** ITRW225	16	X	X	X
CMPG312	ITRW214	Decision Support Systems I/ *Besluitsteunstelsels I*	**MTHS111/ 113/ 123/112 or** WISN111/ 113/ 123/ 112	16	X	X	
CMPG313	ITRW317/ CISM326	Artificial Intelligence/ *Kunsmatige Intelligensie*	**CMPG221 or** ITRW222	16	X	X	X
CMPG315	ITRW322/ CISM327	Computer Networks/ *Rekenaarnetwerke*	**CMPG221 or** ITRW222	16	X	X	X
CMPG321	ITRW321	Advanced Databases/ *Gevorderde Databasisse*	**CMPG311** (40%) **or** ITRW311	16	X	X	X
CMPG322	ITRW325	Decision Support Systems II/ *Besluitsteunstelsels II*	**CMPG312** (40%) **or** ITRW214	16	X	X	

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Computer Science and Information Systems / *Rekenaarwetenskap en Inligtingstelsels*							
CMPG323	ITRW324	IT Developments/ *IT-Ontwikkelings*	**CMPG221 & CMPG311**(40%) **or** (ITRW222 **&** ITRW311)	16	X	X	
CMPG324	ITRW316	Operating Systems/ *Bedryfstelsels*	**CMPG221 or** ITRW222	16	X	X	X
CMPG325		Computer Networks/ *Rekenaarnetwerke*	**CMPG221 or** ITRW222	16			X
Extended programmes VTC IT codes / *Verlengde programme VDK IT kodes*							
ITSP111	ITSP111	Introduction to Problem Solving/ *Inleiding tot Probleemoplossing*		12		X	
ITSP113	ITSP113	Introduction to Graphical Interface Programming/ *Inleiding tot Grafiese Koppelvlak-programmering*		16		X	
ITSP114	ITSP114	Introduction to Object Oriented Programming/ *Inleiding tot Objekgeöriënteerde Programmering*		16		X	
ITSP121	ITSP121	Introductory Programming Principles/ *Inleidende Programmeringsbeginsels*		12		X	
Agricultural / *Landbou*							
CSDM111	CSDM111	Botany for Agriculture		12			X
CSDM121	CSDM121	Introduction to Crop Production		12			X
CSDM211	CSDM211	Introduction to Soil Science		16			X
CSDM212	CSDM212	Agricultural Climatology		12			X
CSDM213	CSDM213	Farm Machinery		8			X
CSDM215	CSDM215	Vegetable Production	CSDM121	8			X
CSDM221	CSDM221	Principles of Crop Improvement	CSDM111	16			X
CSDM222	CSDM222	Soil Fertility & Fertilizers		16			X
CSDM223	CSDM223	Soil Conservation		12			X

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Agricultural / *Landbou*							
CSDM224	CSDM224	Farm Practical II		8			X
CSDM225	CSDM225	Fruit Production	CSDM121	8			X
CSDM311	CSDM311	Agronomy of Summer Crops	CSDM211& 223	8			X
CSDM312	CSDM312	Plant Protection	CSDM215& 225	16			X
CSDM315	CSDM315	Pedology and Soil Classification	CSDM211& 222	8			X
CSDM321	CSDM321	Agronomy of Winter Crops	CSDM211& 223	8			X
CSDM322	CSDM322	Weeds & Weed Control	CSDM215& 225	16			X
CSDM323	CSDM323	Elements of Agricultural Microbiology	CSDM111	16			X
CSDM324	CSDM324	Elementary Irrigation	CSDM211& 223	16			X
CSDM371		Practical Crop Production	CSDM224	16			X
CSMP411	CSMP411	Advanced Plant Breeding	CSPM326 & ANSM312	16			X
CSMP412	CSMP412	Horticultural Science	CSPM313& 323	12			X
CSPM211	CSPM211	Introduction to Soil Science	MCHE114& 121	16			X
CSPM212	CSPM212	Agricultural Climatology		12	X		X
CSPM213	CSPM213	Farm Machinery		8			X
CSPM221	CSPM221	Introduction to Crop Production		16	X		X
CSPM222	CSPM222	Soil Fertility & Fertilizers	MCHE114& 121	16			X
CSPM223	CSPM223	Soil Conservation	MCBN111& 121	12			X
CSPM225	CSPM225	Agricultural Microbiology	MCBN111& 121	12			X
CSPM311	CSPM311	Agronomy of Summer Crops	CSPM211& 221	8	PC in 2021		X
CSPM313	CSPM313	Vegetable Production	CSPM221& 222	16	PC in 2021		X
CSPM315- only for 2020		Plant Physiology(only PC)		8	X		
CSPM317	CSPM317	Plant Pathology and Nematology	CSPM221	12			X
CSPM319	CSPM319	Agricultural Entomology	CSPM221	8			X
CSPM321	CSPM321	Agronomy of Winter Crops	CSPM211& 221	8	PC in 2021		X
CSPM322	CSPM322	Weed and Weed Control	CSPM221	16			X
CSPM323	CSPM323	Fruit Production	CSPM221	16			X
CSPM324	CSPM324	Principles of Irrigation	CSPM211& 221	16	PC in 2021		X
CSPM325	CSPM325	Plant Physiology(only MC)	CSPM221	8			X

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Agricultural / *Landbou*							
CSPM326	CSPM326	Principles of Genetics & Plant Breeding	CSPM221	8			X
CSPM327	CSSS423	Soil Survey and Land Use Planning	CSPM211**&** 221	8			X
CSPM411	CSPM411	Crop Production Systems	CSPM311**&** 321	8	PC in 2022		X
CSPM412	CSPM412	Horticultural Science	CSPM313**&** 323	12			
CSPM415	CSPM415	Pedology & Soil Classification	CSPM211	16			X
CSPM416		Soil Physics	CSPM211	8			X
CSPM419		Soil Chemistry & Mineralogy	CSPM211**&** 222	12			X
CSPM421	CSPM421	Crop Physiology	CSPM 325	16			X
CSPM425		Applied Crop Protection	CSPM317, 319 **&** 322	12			X
CSPM426		Soil Microbiology	CSPM 225	12			X
CSPM474		Research Project and Seminar	ANSM312	32			X
CSPM479		Practical Crop Production Training		12			X
Zoology / *Dierkunde* (PC)							
DRKN211	DRKN211	Developmental Biology/ *Ontwikkelingsbiologie*	DRKS111 DRKS121	16	X		
DRKN321	DRKN321	Animal Parasitology/ *Dier Parasitologie*	DRKN211 DRKS221 DRKS311(40%)	16	X		
DRKS111	DRKS111	Invertebrates/ *Invertebrate*		12	X		
DRKS121	DRKS121	Chordates/ *Chordata*	DRKS111(40%)	12	X		
DRKS221	DRKS221	Comparative Animal Physiology/ *Vergelykende Dierfisiologie*	DRKS111 DRKS121	16	X		
DRKS311	DRKS311	Ecology/ *Ekologie*	DRKN211 DRKS221	32	X		
DRKS322	DRKS322	Ethology/ *Etologie*	DRKN211 DRKS221 DRKS311(40%)	16	X		

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Economics / *Economics*							
ECON112	ECON111	Basic Micro-economics/ *Basiese Mikro-ekonomie*		12			
ECON122	ECON121	Introduction to Macro-economics/ *Inleiding tot Makro-ekonomie*		12			
ECON212	ECON211	Macro-economic Applications/ *Makro ekonomie*	**ECON112**& STFM111	16			
	ECON221 (change to ECON222)	Micro-economics/ *Mikro ekonomie*	**ECON111/112 &** WISN= **MTHS111/ 112/ 123** or **STTN111 & 122** or STFM111	16			
ECON222		Micro-economic Applications		16			
ECON313		Monetary Economics		16			
ECON314		Public Economics		16			
ECON322	ECON322	Development Economics/ *Ontwikkelingsekonomie*		16			
ECON325		Econometrics		16			
Risk Management / *Risikobestuur*							
EKRP211	EKRP211	Introduction to Risk Management/ *Inleiding tot Risikobestuur*		16			
EKRP221	EKRP221	Investment Management/ *Beleggingsbestuur*		16			
EKRP311	EKRP311	Bank Risk Management/ *Bankrisikobestuur*		16			
EKRP321	EKRP321	Financial Markets/ *Finansiële Markte*		16			
Electronics (MC)							
ELYM115	ELYM115	Electricity, Magnetism and Circuits	AP2 26, Maths Level 5, Phys Sc Level 4	12			X
ELYM127	ELYM127	Introduction to Electronics	APS 26, Maths Level 5, Phys Sc Level 4	12			X
ELYM215	ELYM215	Analogue Electronics and Systems	ELYM115 **&** ELYM127 **or** SFEM171 & SFEM172	16			X

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Electronics (MC)							
ELYM227	ELYM227	Digital Electronics and Systems	ELYM115 & ELYM127 **or** SFEM171 & SFEM172	16			X
ELYM315	ELYM315	Advanced Analogue Electronics	ELYM215 **&** ELYM227	16			X
ELYM316	ELYM316	Introduction to Signals and System	ELYM215 **&** ELYM227	16			X
ELYM325		Microprocessors and Computer Systems		16			X
ELYM327	ELYM327	Advanced Digital Techniques and Systems	ELYM215 **&** ELYM227	16			X
ELYM328	ELYM328	Introduction to Microcontroller Systems	ELYM215 & ELYM227	16			X
SFEM171	SFEM171	Electricity, Magnetism and Circuits	Admission into the faculty with Grade 12 Mathematics and Physical Science	12			X
SFEM172	SFEM172	Introduction to Electronics	SFEM171	12			X
Financial Management / *Finansiële Bestuur (PC & VTC)*							
FINM271	FINM221	Introduction to Applied Financial Management / *Inleiding tot Toegepaste Finansiële Bestuur*	**ACCF121 or ACCC121** (40%); WISN/ **MTHS112/123**	18	X	X	
Physioloy / *Fisiologie (PC)*							
FKLT331		Principles of Pharmacokinetics		8	X		
FLGX113	FLGX113	Introduction to Physiology/ *Inleiding tot Fisiologie*		12	X		
FLGX123	FLGX123	Membrane and Muscle Physiology/ *Membraan- en Spierfisiologie*	FLGX113	12	X		
FLGX213	FLGX213	Endocrine System and Digestion/ *Endokriene Stelsel en Spysvertering*	FLGX113	16	X		

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Physioloy / *Fisiologie (PC)*							
FLGX223	FLGX223	Physiological Defence Mechanisms/ *Fisiologiese Verdedigingsmeganismes*	FLGX113	8	X		
FLGX224	FLGX224	Metabolism/ *Metabolisme*	FLGX113 FLGX213	8	X		
FLGX312	FLGX312	Excretion/ *Uitskeiding*	FLGX113	8	X		
FLGX313	FLGX313	Respiration/ *Respirasie*	FLGX113	8	X		
FLGX317		Cardiovascular Physiology/ *Kardiovaskulêre Fisiologie*	FLGX113	8	X		
FLGX325	FLGX325	Neurophysiology/ *Neorofisiologie*	FLGX113	16	X		
FLGX328		Reproduction Physiology/ *Voortplantingsfisiologie*	FLGX113	8	X		
FLGX329		Cardiovascular Physiology Applications/ *Kardiovaskulêre Fisiologie Toepassings*	FLGX113	8	X		
Soil Science / *Grondkunde (PC)*							
GDKN121	GDKN121	Introduction to Soil Science/ *Inleidende Grondkunde*		12	X		
GDKN211	GDKN211	Advanced Soil Science/ *Gevorderde Grondkunde*	GDKN121	16	X		
GDKN221	GDKN221	Soil Degradation and Rehabilitation/ *Gronddegradasie en Rehabilitasie*	GDKN211 (40%)	16	X		
GDKN311 **(2021)**		Soil Genesis and Classification / *Grond Genese en Klassifikasie*		16	X		
GDKN322 **(2021)**		Soil Physics / *Grondfisika*		16	X		

***FIELD MAPPING DURING THE DECEMBER HOLIDAY OF THE 3RD YEAR IS A PREREQUISITE FOR 4TH YEAR REGISTRATION.**

The field mapping include fieldwork and soil mapping with regards to the application of basic field techniques, sampling, soil mapping techniques, application of the South African taxonomic classification system, certain laboratory analysis of field samples, fertiliser applications, data interpretation and report writing.

*GDKN421 **(2021)**		Precision Farming/ *Presisieboerdery*		24	X		
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Geography / *Geografie*							
GEOG111	GGFS112	Introduction to Physical Geography/ *Inleiding tot Fisiese Geografie*		12	X		X
GEOG171	GEOG171	Introduction to Physical Geography		12			X
GEOG121	GGFS121	Introduction to Human Geography/ *Inleiding tot Menslike Geografie*		12	X		X
GEOG172	GEOG172	Introduction to Human Geography	GEOG171	12			X
GEOG211	GGFS212	Physical Geography/ *Fisiese Geografie*	GGFS112 **&** GGFS121 **or GEOG111 & GEOG121**	16	X		X
GEOG212	GEOG212	Environmental Thermodynamics/ *Omgewingstermodinamika*	MTHS111/121	8	X		X
GEOG221	GGFS222	Human Geography/ *Menslike Geografie*	GGFS 112 **&** GGFS121 **or GEOG111 & GEOG121**	16	X		X
GEOG311	GGFS312	GIS and Remote Sensing/ *GIS en Afstandwaarneming*	GGFS 212 **&** GGFS222 **or GEOG211 & GEOG221**	32	X		X
GEOG321	GGFS322	Applied Geography/ *Toegepaste Geografie*	GGFS212,222 **&** GGFS312 (40%) **or GEOG211 GEOG221 & GEOG311**	32	X		X
Geology / *Geologie* (PC)							
GLGN112	GLGN112	Geology and the Environment/ *Geologie en die Omgewing*		12	X		
GLGN122	GLGN122	South African Geology/ *Suid-Afrikaanse Geologie*	GLGN112(40%)	12	X		
GLGN211	GLGN211	Mineralogy and Igneous Petrology/ *Mineralogie en Stollingspetrologie*	GLGN112 GLGN122	16	X		

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Geology / *Geologie* (PC)							
GLGN221	GLGN221	Sedimentology, Structural Geology and Neotechtonics/ *Sedimentologie, Struktuurgeologie en Neo-tektoniek*	GLGN112 GLGN122 GLGN211(40%)	16	X		
GLGN311	GLGN311	Metamorphic Petrology and Geochemistry/ *Metamorfe Petrologie en Geo-chemie*	GLGN211, 221	32	X		
GLGN321	GLGN321	Hydrogeology/ *Hidrogeologie*	GLGN211, 221 GLGN311(40%)	32	X		
Indigenous Knowledge Systems (MC)							
IKSA311 Note 2 MC	IKSA311 Note 2 MC	Impact of Climate Change on African Indigenous Food Security Systems	IKSM114	16			X
IKSA321 Note 3 MC	IKSA321 Note 3 MC	African Indigenous Agriculture and Sustainable Community Livelihood and Development in Southern Africa		16			X
IKSA322 Note 3 MC	IKSA322 Note 3 MC	Comparative African Indigenous Cultural, Bio-diversity and Heritage	IKSM224	16			X
IKSA323 Note 3 MC	IKSA323 Note 3 MC	Comparative African Indigenous and Western Food Security Systems	IKSM125	16			X
IKSA413 Note 4 MC	IKSA413 Note 4 MC	Indigenous Knowledge and Renewable Energy Sources for Sustainable Livelihood II		16			X
IKSC311 Note 2 MC	IKSC311 Note 2 MC	Comparative Western and African Indigenous Life Skills Education	ISKM115	16			X
IKSC312 Note 2 MC	IKSC312 Note 2 MC	Comparative African Indigenous and Western Peace and Conflict Resolution Approaches					X
IKSC321 Note 3 MC	IKSC321 Note 3 MC	African Traditional Governance and Democracy		16			X
IKSC322 Note 3 MC	IKSC322 Note 3 MC	African Indigenous Music and Dance		16			X

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Indigenous Knowledge Systems (MC)							
IKSC323 Note 3 MC	IKSC323 Note 3 MC	Gender in African Indigenous Arts and Culture		16			X
IKSC413 Note 4 MC	IKSC413 Note 4 MC	African Indigenous Music and Drama		16			X
IKSH311 Note 2 MC	IKSH311 Note 2 MC	Comparative Health Care Systems	IKSM111, IKSM121	16			X
IKSH312 Note 2 MC	IKSH312 Note 2 MC	African Indigenous Medicinal and Nutritional Significance of Living Organisms	IKSM111, IKSM121	16			X
IKSH313 Note 2 MC	IKSH313 Note 2 MC	Theories of African Indigenous Community Innovation Systems for Sustainable Livelihood		16			X
IKSH314 Note 2 MC	IKSH314 Note 2 MC	Gender in African Indigenous Health Care Systems	IKSM111, IKSM121	8			X
IKSH321 Note 3 MC	IKSH321 Note 3 MC	African Indigenous Health Care Providers	IKSM111, IKSM121	16			X
IKSH322 Note 3 MC	IKSH322 Note 3 MC	Indigenous Knowledge and Innovations in Public Health Care I	IKSM111, IKSM121	16			X
IKSH323 Note 3 MC	IKSH323 Note 3 MC	African Traditional Medicine and Health Care Systems 1	IKSM111, IKSM121	16			X
IKSH411 Note 4 MC	IKSH411 Note 4 MC	African Traditional Medicine and Health Care Systems 11	IKSH322	16			X
IKSM111 Note 1 MC	IKSM111 Note 1 MC	The Nature of Indigenous Knowledge Systems and Innovations		12			X
IKSM112 Note 1 MC	IKSM112 Note 1 MC	African Languages and Communication Systems		12			X
IKSM113 Note 1 MC	IKSM113 Note 1 MC	Introduction to Health Care Systems in Relation to Indigenous Knowledge Systems (IKS)		12			X
IKSM114 Note 1 MC	IKSM114 Note 1 MC	The Role of Indigenous Knowledge Systems in Climate Change		12			X

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Indigenous Knowledge Systems (MC)							
IKSM115 Note 1 MC	IKSM115 Note 1 MC	Introduction to African Indigenous Life Skills Education		12			X
IKSM121 Note 1 MC	IKSM121 Note 1 MC	A Historiography of African Science and Technology		12			X
IKSM122 Note 1 MC	IKSM122 Note 1 MC	Introduction to Tools of Indigenous Knowledge Management		12			X
IKSM123 Note 1 MC	IKSM123 Note 1 MC	The Use and Roles of Signs and Symbols in African Communities		12			X
IKSM124 Note 1 MC	IKSM124 Note 1 MC	The Nature and Roles of African Indigenous Health Care Providers		12			X
IKSM125 Note 1 MC	IKSM125 Note 1 MC	African Indigenous Food Security Systems		12			X
IKSM211		The Rights of Indigenous Peoples		12			X
IKSM212 Note 1 MC	IKSM212 Note 1 MC	African Cultural Astronomy		12			X
IKSM213 Note 1 MC	IKSM213 Note 1 MC	The Nature and Characteristics of African Indigenous Health Care Systems		12			X
IKSM214 Note 1 MC	IKSM214 Note 1 MC	African Indigenous Knowledge Development and Management		12			X
IKSM215 Note 1 MC	IKSM215 Note 1 MC	Implications of Intellectual Property Rights (IPR) on Indigenous Knowledge Systems (IKS)/Traditional Knowledge (TK)		12			X
IKSM221 Note 1 4MC	IKSM221 Note 1 4MC	African Indigenous Architecture and Design		12			X
IKSM222 Note 1 MC	IKSM222 Note 1 MC	African Indigenous Approaches to Peace and Conflict Resolution		12			X
IKSM223 Note 1 MC	IKSM223 Note 1 MC	Socio-Cultural Protocols Associated with African Traditional Medicine and Health Care Systems		12			X

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Indigenous Knowledge Systems (MC)							
IKSM224 Note 1 MC	IKSM224 Note 1 MC	African Indigenous Cultural, Bio-Diversity and Heritage		12			X
IKSM225 Note 1 MC	IKSM225 Note 1 MC	Foundations of African Indigenous Education		12			X
IKSM311		African and Etno Mathematics		16			X
IKSM312 Note 2 MC	IKSM312 Note 2 MC	Indigenous Medicinal and Nutritional Significance of Living Organisms					X
IKSM313 Note 2 MC	IKSM313 Note 2 MC	Theories of African Indigenous Community Innovation Systems for Sustainable Livelihood	IKSM111, IKSM121				X
IKSM321 Note 3 MC	IKSM321 Note 3 MC	African Indigenous Metallurgy		16			X
IKSM322 Note 3 MC	IKSM322 Note 3 MC	Indigenous Knowledge (IK) and Innovations in Public Health Care		16			X
IKSM323 Note 3 MC	IKSM323 Note 3 MC	Comparative African Indigenous Textile Technologies		16			X
IKSM324 Note 3 MC	IKSM324 Note 3 MC	Indigenous Knowledge and Renewable Energy Sources for Sustainable Livelihood		16			X
IKSM411* Note 4 MC	IKSM411* Note 4 MC	Basic Research Methods		16			X
IKSM412* Note 4 MC	IKSM412* Note 4 MC	Qualitative and Quantitative Research in IKS		16			X
IKSM413 Note 4 MC	IKSM413 Note 4 MC	African Traditional Governance and Democracy		16			X
IKSM421* Compulsory MC	IKSM421* Compulsory MC	Internship and Research Project	IKSM411, IKSM412	64			X
IKSS311 MC Note 2	IKSS311 MC Note 2	Introduction to African Ethno-mathematics	IKSM111, IKSM121, IKSM122	16			X
IKSS312 MC note 2	IKSS312 MC note 2	Comparative African Indigenous and Western Science and Technology Systems	IKSM111; IKSM121	16			X

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Indigenous Knowledge Systems (MC)							
IKSS321 Note 3 MC	IKSS321 Note 3 MC	African Indigenous Metallurgy I	IKSM111, IKSM121	16			X
IKSS322 Note 3 MC	IKSS322 Note 3 MC	African Indigenous Ethno-mathematics II	IKSM111, IKSM121, IKSS311	16			X
IKSS323 Note 3 MC	IKSS323 Note 3 MC	Comparative African Indigenous Textile Technologies	IKSM111, IKSM121	16			X
IKSS324 Note 3 MC	IKSS324 Note 3 MC	Indigenous Knowledge and Renewable Energy Sources for Sustainable Livelihood I	IKSM111, IKSM121	16			X
IKSS413 Note 4	IKSS413 Note 4 MC	African Indigenous Metallurgy II	IKSS321	16			X

NOTE 1	Year level 1 & 2: Compulsory Note 1 All first and second year modules are compulsory for all students
NOTE 2	Year level 3: Candidates have the choice of electives modules Note 2 In year three 1st semester students must take the compulsory module* and select 3 modules from the following
NOTE 3	Note:-3 In year three 2nd semester students must select four modules from the following
NOTE 4	Year level 4: Candidates have the choice of electives modules Note:-4 In year three 1st semester students must take the compulsory module* and select 3 modules from the following

Microbiology / M*ikrobiologie*							
MKBN121	MKBN121	Microbiology for Nursing / *Mikrobiologie vir Verpleegkunde*		12			
MKBN211	MKBN211 (PC) MKBS211 & MKBS212 (MC)	Introductory Microbiology / *Inleidende Mikrobiologie*	NCHE111 NCHE121	16	X		X

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Microbiology / M*ikrobiologie*							
MKBS221	MKBS221 (PC)	Introductory Microbial Genetics, Virology and Immunology/ *Inleidende Mikrobiese Genetika, Virologie en Immunologie*	MKBN211 (40%)	16	X		X
MKBS313	MKBS313	Microbial Physiology/ *Mikrobiese Fisiologie*	MKBN211 MKBS221	16	X		
MKBS314	MKBS314	Recombinant DNA Technology and Industrial Microbiology/ *Rekombinante DNA Tegnologie & Industriële Mikrobiologie*	MKBN211 MKBS221	16	X		
MKBS316		Microbial Ecology		16			X
MKBS317		Environmental Microbiology and Public Health		16			X
MKBS325	MKBS325	Diversity and Ecology of Micro-organisms/ *Diversiteit en Ekologie van Mikroörganismes*	MKBN211 MKBS221	32	X		
MKBS326		Industrial Microbiology and Biotechnology		16			X
MKBS327		Virology and Immunology		16			X
MKBX213	MKBX213	Microbiology for Food and Nutrition/ *Mikrobiologie vir Voedsel en Voeding*		8	X		
MKPN111	MKPN111	Microbiology (for Pharmacy)/ *Mikrobiologie (vir Farmasie)*		12	X		

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Mathematics / *Wiskunde*							
MTHS111	WISN111/ MAYM117	Introductory Algebra and Calculus I/ *Inleidende Algebra en Calculus I*	Gr12 Mathematics level 5/ *Gr12 Wiskunde vlak 5*	12	X	X	X
MTHS112	WISN112	Mathematical Techniques/ *Wiskundige Tegnieke*	Gr12 Mathematics level 4/ *Gr12 Wiskunde vlak 4* Extended/ *Verlengde* WISS112 &122	12	X	X	
MTHS113	WISN113	Basic Mathematical Techniques/ *Basiese Wiskundige Tegnieke*	Gr12 Mathematics level 4/ Gr12 *Wiskunde vlak 4*	12	X	X	
MTHS114		Applied Calculus I/ *Toegepaste Calculus I*	Gr12 Mathematics level 4/ Gr12 Wiskunde vlak 4	12	X		X
MTHS115	MAYM115	Pre-Calculus for Science I	Gr12 Mathematics level 3	12			X
MTHS119	CFMA111	Pre-Calculus for Commerce I	Gr12 Mathematics level 3	12		X	X
MTHS121	WISN121 / MAYM127	Introductory Algebra and Calculus II/ *Inleidende Algebra en Calculus II*	WISN111/ **MTHS111(40%)**	12	X	X	X
MTHS123	WISN123	Mathematical Techniques/ *Wiskundige Tegnieke*	Gr12 Mathematics level 4/ *Gr12 Wiskunde vlak 4*	12	X	X	
MTHS124		Applied Calculus II/ *Toegepaste Calculus II*	WISN111 **or** MAYM116/ **MTHS114(40%) or MTHS111(40%)**	12	X		X
MTHS125	MAYM125	Pre-Calculus for Science II	MTHS115(40%)	12			X

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Mathematics / *Wiskunde*							
MTHS129	CFMA121	Pre-Calculus for Commerce II	MTHS119(40%)	12		X	X
MTHS171		Introductory Algebra and Calculus I		12			X
MTHS172		Introductory Algebra and Calculus II	MTHS171	12			X
MTHS173		Applied Calculus I		12			X
MTHS174		Applied Calculus II	MTHS173	12			X
MTHS175		Foundation Mathematics for Law (Law Faculty, not FNAS)	Gr12 Mathematics level 3/ Mathematics Literacy level 5	16			X Law Fac
MTHS211	WISN211/ 1st Part of MAYM227	Multivariable Calculus I/ *Meerveranderlike Calculus I*	WISN121/ **MTHS121**	8	X	X	X
MTHS212	WISN212/ Part of 1st MAYM217	Linear Algebra I/ *Lineêre Algebra I*	WISN121/ **MTHS121**	8	X	X	X
MTHS221	WISN224/ 2nd Part of MAYM227	Multivariable Calculus II/ *Meerveranderlike Calculus II*	WISN211/ **MTHS211**(40%)	8	X	X	X
MTHS222	WISN226/ 2nd Part of MAYM217	Linear Algebra II/ *Lineêre Algebra II*	WISN212/ **MTHS212**(40%)	8	X	X	X
MTHS223	WISN225	Engineering Analysis/ *Ingenieursanalise*	WISN211/ **MTHS211(**40%)	8	X		
MTHS224	WISN227	Applied Linear Algebra/ *Toegepaste Lineêre Algebra*	WISN212/ **MTHS212**(40%)	8	X		
MTHS225	WISN223	Discrete Mathematics/ *Diskrete Wiskunde*	WISN111 **or** WISN112 **or** WISN113 **or** WISN123/ **MTHS111 or MTHS112 or MTHS113 or MTHS123**	8	X	X	
MTHS311	WISN324 & MAYM317	Real Analysis/ *Reële Analise*	WISN224 **or** MAYM227/ **MTHS221**	16	X	X	X

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Mathematics / *Wiskunde*							
MTHS312	WISN312	Combinatorics/ *Kombinatorika*	WISN224 **or** WISN226/ **MTHS212 & MTHS221**	16	X		X
MTHS321	WISN314 MAYM327	Complex Analysis/ *Komplese Analise*	WISN224 / **MTHS221**	16	X	X	X
MTHS322	WISN322 MAYM328	Algabraic Structures/ *Algebraïese Strukture*	WISN226/ **MTHS222**	16	X	X	X
Mathematics Extended: VTC							
WISS111	WISS111	Introduction to Mathematics I/ *Inleiding tot Wiskunde* I	Gr12 Mathematics level 3/ *Gr12 Wiskunde vlak 3*	12		X	
WISS113	WISS113	Introduction to Mathematical Techniques I/ *Inleiding tot Wiskundige Tegnieke* I	Gr12 Mathematics level 3/ *Gr12 Wiskunde vlak 3*	12		X	
WISS121	WISS121	Introduction to Mathematics II/ *Inleiding tot Wiskunde II*	WISS111(40%)	12		X	
WISS123	WISS123	Introduction to Mathematical Techniques II/ *Inleiding tot Wiskundige Tegnieke II*	WISS113(40%)	12		X	
Chemistry / *Chemie* **PC old code = CHEM/CHEN; MC old code = MCHE**							
NCHE111	Introductory Inorganic and Physical Chemistry/ *Inleidende Anorganiese en Fisiese Chemie*			12	X		X
	CHEM111	Introductory Inorganic and Physical Chemistry/ *Inleidende Anorganiese en Fisiese Chemie*		12	X		
	MCHE114	Introductory Chemistry I		12			X
MCHE115	MCHE115	Introductory Chemistry		12	MC only		

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Chemistry / *Chemie* **PC old code = CHEM/CHEN; MC old code = MCHE**							
NCHE121	Introductory Organic Chemistry/ *Inleidende Organiese Chemie*			12	X		X
	CHEM121	Introductory Organic Chemistry/ *Inleidende Organiese Chemie*		12	X		
	MCHE121	Introductory Chemistry II		12			X
NCHE171	SFCM171	Introductory Inorganic and Physical Chemistry/ *Inleidende Anorganiese en Fisiese Chemie*		12			X
NCHE172	SFCM172	Introductory Organic Chemistry/ *Inleidende Organiese Chemie*	**NCHE171 or** SFCM171	12			X
NCHE211	Analytical Chemistry II/ *Analitiese Chemie II*		**NCHE111,121 or** CHEM111,121 **or** MCHE114, 121 **or** SFCM171,172 **or NCHE171, 172**	8	X		X
	CHEN211	Analytical Chemistry II/ *Analitiese Chemie II*	**NCHE111, 121 or** CHEM 111,121	8	X		
	MCHE223	Analytical Chemistry I	MCHE114, 121 **or** SFCM171, SFCM172 **or NCHE171,172**	8			X

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Chemistry / *Chemie* **PC old code = CHEM/CHEN; MC old code = MCHE**							
NCHE212	Physical Chemistry II/ *Fisiese Chemie II*		**NCHE111,121 or** CHEM111,121 **or** MCHE114,121 **or** SFCM171,172 **or NCHE171,172 & MTHS111,121 or MTHS114, 124 or** WISN111,121	8	X		X
	CHEN212	Physical Chemistry II/ *Fisiese Chemie II*	**NCHE111, 121 or** CHEM111,121 **or** MCHE114,121 **or** SFCM171,172 **or NCHE171,172 & MTHS111,121 or MTHS114,124 or** WISN111,121	8	X		
	MCHE215	Physical Chemistry I	MCHE114, MCHE121 **or** SFCM171, SFCM172 **or NCHE171, 172**	8			X
NCHE213	CHEN213	Organic Chemistry II Pharmacy/ Biological Sciences / *Organiese Chemie II Farmasie /Biologiese Wetenskappe*	**NCHE111, 121 or** CHEM111,121 **or** (SFCM171, 172 **or NCHE171,172)**				
NCHE221	Inorganic Chemistry II/ *Anorganies Chemie II*		**NCHE111, 121 or** CHEM111,121 **or** MCHE114,121 **or** SFCM171,172 **or NCHE171, 172**	8	X		X
	CHEN222	Inorganic Chemistry II/ *Anorganies Chemie II*	**NCHE111, 121 or** CHEM111,121 **& MTHS111,121 or MTHS114,124 or** WISN111,121	8	X		
	MCHE216	Inorganic Chemistry I	MCHE114 **or** MCHE121 **or** SFCM171 **&** SFCM172 **or NCHE171, 172**	8			X

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Chemistry / *Chemie* **PC old code = CHEM/CHEN; MC old code = MCHE**							
NCHE222	Organic Chemistry II/ *Organiese Chemie II*		**NCHE111,121 or** CHEM111,121 **or** MCHE114, 121 **or** SFCM171,172 **or NCHE171,172**	8	X		X
	CHEN223	Organic Chemistry II/ *Organiese Chemie II*	CHEM111,121	8	X		
	MCHE221	Organic Chemistry I	MCHE114 **or** MCHE121 **or** SFCM171 **&** SFCM172	8			X
NCHE311	Analytical Methods III/ *Analitiese Metodes III*		**NCHE211 or** CHEN211 **or NCHE212**	16	X		X
	CHEM311	Analytical Methods III/ *Analitiese Metodes III*	CHEN211 **or NCHE212**	16	X		
	MCHE316	Analytical Chemistry II	MCHE223	16			X
NCHE312	Physical Chemistry III / *Fisiese Chemie III*		**NCHE212 or** CHEN212 **or** MCHE215	16	X		X
	CHEN312	Physical Chemistry III/ *Fisiese Chemie III*	**NCHE212 or** CHEN212	16	X		
	MCHE321	Physical Chemistry II	MCHE215, PHYM118, PHYM124, MAYM116 **or** 117, MAYM126 **or** 127	16			X
NCHE321	Inorganic Chemistry III/ *Anorganiese Chemie III*		**NCHE221 or** CHEN222 **or** MCHE216	16	X		X
	CHEN321	Inorganic Chemistry III/ *Anorganiese Chemie III*	**NCHE221 or** CHEN222	16	X		
	MCHE322	Inorganic Chemistry II	MCHE 216	16	X		

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Chemistry / *Chemie* **PC old code = CHEM/CHEN; MC old code = MCHE**							
NCHE322	Organic Chemistry III/ *Organiese Chemie III*		**NCHE222 or** CHEN223 **or** MCHE221	16	X		X
	CHEN322	Organic Chemistry III/ *Organiese Chemie III*	**NCHE222 or** CHEN223	16	X		
	MCHE315	Organic Chemistry II	MCHE221	16			X
Physics / *Fisika*							
NPHY111	FSKS111	Basic Physics I/ *Basiese Fisika I*		12	X		X
NPHY121	FSKS121	Basic Physics II/ *Basiese Fisika II*	NPHY111(40%) **&** MTHS111 (40%)	12	X		X
NPHY123		Introduction to Physics	Admissions into Agriculture Degree Program	12			X
NPHY124		Introduction to Basic Physics Concepts	Admissions into Agriculture Diploma Program	12			X
NPHY171	NPHY171	Basic Physics I		12			X
NPHY172	NPHY172	Basic Physics II	NPHY171	12			X
FSKS113	FSKS113	Physics for Biology I/ *Fisika vir Biologie I*		12	X		
FSKS123	FSKS123	Physics for Biology II/ *Fisika vir Biologie II*	FSKS113/ **NPHY111**(40%)	12	X		
NPHY211	FSKS211	Electricity and Magnetism / *Elektrisiteit en Magnetisme*	FSKS111/ **NPHY111 &** FSKS121/ **NPHY121 &** WISN111/ **MTHS111**	8	X		X
NPHY212	FSKS221	Modern Physics / *Moderne Fisika*	FSKS111/ **NPHY111 &** FSKS121/ **NPHY121 &** WISN111/ **MTHS111 &** WISN121/ **MTHS121**	8	X		X

MODULE CODE / *KODE* 2020	2019 MODULE CODE / *KODE*	DESCRIPTIVE NAME/ *BESKRYWENDE NAAM*	PRE-REQUISITES/ *VOOR-VEREISTES*	CR/ *KR*	PC/ *PK*	VTC/ *VDK*	MC/ *MK*
Physics / *Fisika*							
NPHY221	FSKS222	Introductory Quantum Physics/ *Inleidende Kwantumfisika*	FSKS212/ **NPHY212**(40%) **&** WISN211/ **MTHS211**(40%)	8	X		X
NPHY222	FSKS212	Optics and Waves / *Optika en Golwe*	FSKS212/ **NPHY212** (40%) **&** WISN211/ **MTHS211**(40%)	8	X		X
NPHY311	FSKS311	Electromagnetism/ *Elektromagnetisme*	FSKS/ **NPHY211 &** WISN/ **MTHS211**	16	X		
NPHY312	FSKS312	Wave Mechanics/ *Golfmeganika*	FSKS212/ **NPHY212 &** FSKS221/ **NPHY221 &** FSKS222/ **NPHY222 &** WISN211/ **MTHS211 & (MTHS221/** WISN224 **or MTHS223 or MTHS212/** WISN212 **or MTHS222/** WISN226 **or MTHS224)**	16	X		
NPHY321	FSKS321	Thermodynamics/ *Termodinamika*	FSKS312/ **NPHY312**	16	X		
NPHY322	FSKS322	Nuclear Physics and Elementary Particles/ *Kernfisika en Elementêre Deeltjies*	FSKS312/ NPHY312(40%)	16	X		
NPHY323	FSKS323	Astro- and Space Physics/ *Astro- en ruimtefisika*	FSKS/ **NPHY211** FSKS/ **NPHY212** FSKS/ **NPHY221**	16	X		
	PHYM215	Mechanics and Thermal Physics	PHYM118 **&** PHYM128, **or** SFPM171 **&** SFPM172	8			X

MODULE CODE / *KODE* 2020	2019 MODULE CODE / *KODE*	DESCRIPTIVE NAME/ *BESKRYWENDE NAAM*	PRE-REQUISITES/ *VOOR-VEREISTES*	CR/ *KR*	PC/ *PK*	VTC/ *VDK*	MC/ *MK*
Physics / *Fisika*							
	PHYM216	Atomic Physics	PHYM118 **&** PHYM128, **or** SFPM171 **&** SFPM172	8			X
	PHYM221	Waves and Quantum Mechanics	PHYM118 **&** PHYM128, **or** SFPM171 **&** SFPM172	8			X
	PHYM222	Electricity and Magnetism	PHYM118 **&** PHYM128, **or** SFPM171 **&** SFPM172	8			X
Agricultural Degree / *Landbougraad* (4th yr modules 2022)							
OMSA422 **(2022)**		Weeds: Interactions and Control/ *Onkruid: Interaksies en Beheer*		16	X		
OMSA423 **(2022)**		Plant Pathology / *Plant Patologie*		16	X		
OMSE415 **(2022)**		Soil Microbiology and Soil Quality/ *Grondmikrobiologie en Grondkwaliteit*		16	X		
OMSE474 **(2022)**		Projects and Seminar/ *Navorsingsprojek en Seminaar*		32	X		
OMWP411 **(2022)**		Pest Phenology and Damage Symptioms/ Econometrics *Plaagfenologie en Skade-simptome/ Ekonometrie*		16	X		
Botany / *Plantkunde*							
PLKS111	PLKS111	Plant Structure and Function/ *Plantstruktuur en –funksie*		12	X		X
PLKS122	PLKS121	Biodiversity/*Biodiversiteit*	PLKS111(40%)	12	X		X
PLKS171	PLKS171	Plant Structure and Function		12			X
PLKS172	PLKS172	Biodiversity	PLKS171	12			X
PLKS211	PLKS221	Environmental Botany / *Omgewingsplantkunde*	**PLKS111 & PLKS122** (PLKS121)	16	X		X

MODULE CODE / *KODE* 2020	2019 MODULE CODE / *KODE*	DESCRIPTIVE NAME/ *BESKRYWENDE NAAM*	PRE-REQUISITES/ *VOOR-VEREISTES*	CR/ *KR*	PC/ *PK*	VTC/ *VDK*	MC/ *MK*
Botany / *Plantkunde*							
PLKS223	PLKN213	Plant Genomics / *Plantgenomika*	**PLKS111 & PLKS122** (PLKS121)	16	X		X
PLKS314	PLKS312	Plant Physiology / *Plantfisiologie*	**PLKS223** (PLKN213)	32	X		X
PLKS324	PLKN323	Plant Ecology / *Plantekologie*	**PLKS211** (PLKS221) **& PLKS223** (PLKN213)	32	X		X
Urban and Regional Planning / *Stads- en Streekbeplanning*							
SBES212		Layout Planning/ *Uitleg Beplanning*	**SBSS111** (SBES111) **SBSS121** (SBES121)	16	X		
SBES313		Infrastructure Planning *Infrastruktuurbeplanning*	**SBES212** (SBSS211)	16	X		
SBRS221		Regional Plans/ *Streekplanne*	**SBSS121** (SBES121) **ECON211**	16	X		
SBRS313		Regional Development Theory/ *Streekontwikkelingsteorie*	SBRS221 ECON321/325 MTHS114(113) STTN111 STTN124	16	X		
SBRS411		Regional Analysis and Application/ *Streeksanalise en -toepassing*	**SBRS313** (SBRS311)	16	X		
SBSS111		Planning and Settlement History/ *Beplannings- en Nedersettings-geskiedenis*	Admission requirements as described in N.1.6/ *Toelatings-vereistes soos in N.1.6 beskryf*	12	X		
SBSS121		Introduction to Planning/ *Inleiding tot Beplanning*	**SBSS111**(40%) (SBES111)	12	X		
SBSS223		Urban Design/ *Stedelike Ontwerp*	**SBES212** (40%) (SBSS211)	16	X		

MODULE CODE / *KODE* 2020	2019 MODULE CODE / *KODE*	DESCRIPTIVE NAME/ *BESKRYWENDE NAAM*	PRE-REQUISITES/ *VOOR-VEREISTES*	CR/ *KR*	PC/ *PK*	VTC/ *VDK*	MC/ *MK*
Urban and Regional Planning / *Stads- en Streekbeplanning*							
SBSS313		Planning for Sustainable Cities/ *Beplanning vir Volhoubare Stede*	**SBSS223** (SBSL221) **SBSS212** (40%) (SBSS211)	16	X		
SBSS321		Transport Planning and Systems/ *Vervoerbeplanning en Stelsels*	**SBES313**(40%) (SBES321) **SBRS221**	16	X		
SBSS323		Planning Theory/ *Beplanningsteorie*	**SBSS313** (40%) (SBSS311) **SBRS313** (40%) (SBRS311)	16	X		
SBSS412		Integrated Housing Development/ *Geïntegreerde Behuisingsontwikkeling*	**SBSS313** (SBSS311) **SBSS323** (SBRS321)	16	X		
SBSS414		Land Use Planning and Development Policy/ *Grondgebruikbeplanning en Ontwikkelingsbeleid*	**SBES212** (SBSS211) **SBES313** (SBES321)	16	X		
SBSS424		Strategic- and Participatory Planning/ *Strategiese- en Deelnemende Beplanning*	**SBES313** (SBES321) **SBSS323** (ou kode SBRS321) **SBSS412**(40%) **SBSS414** (40%) (SBSL412)	16	X		
SBSS472		Research Project / *Navorsingsprojek*	**SBSS313** (311) **SBRS313** (311) **SBES313** (321) SBSS321 **SBSS323** (SBRS321) SECO321 **GEOG311** =(GGFS312) ECON322	32	X		
SECO321		Urban Ecology for Planners/ *Stedelike Ekologie vir Beplanners*	**SBSS313** (40%) (SBSS311)	16	X		

MODULE CODE / *KODE* 2020	2019 MODULE CODE / *KODE*	DESCRIPTIVE NAME/ *BESKRYWENDE NAAM*	PRE-REQUISITES/ *VOOR-VEREISTES*	CR/ *KR*	PC/ *PK*	VTC/ *VDK*	MC / *MK*
Urban and Regional Planning / *Stads- en Streekbeplanning*							
SGSS414		Research Methodology for Geo- and Spatial Sciences/ *Navorsings-metodologie vir Geo- en Ruimtelike Wetenskappe*	**SBSS323** (SBRS321)	16	X		
SRSK323		Urban Risk Management/ *Stedelike Risikobestuur*	**SBSS313** (40%) (SBSS311)	16	X		
SSBP421		Planning Practice / *Beplanningspraktyk*	**SBES313** (40%) (SBES311) **SBSS321** **SBSS414**(40%) (SBSL412) SBSS412 (40%)	16	X		
Statistics / *Statistiek*							
STTN111	STTN111	Descriptive Statistics/ *Beskrywende Statistiek*		12	X	X	
STTN115	STTN115	Descriptive Statistics and Inference/ *Beskrywende Statistiek en Inferensie*		12	X	X	
STTN121	STTN121	Introductory Statistical Inference I/ *Inleidende Statistiese Inferensie I*	STTN111 (40%)**or** STTN115(40%) **or** STTN122	12	X	X	
STTN122		Introductory Statistics / *Inleidende Statistiek*		12	X		
STTN124		Practical Statistics / *Praktiese Statistiek*		12	X		
STTN125	STTN125	Introductory Probability Theory/ *Inleidende Waarskynlikheidsleer*	**STTN111** (40%)**&**WISN/ **MTHS111** (40%), **Or** **STTN115**(40%) **&** WISN/ **MTHS111**(40%) **Or** **STTN122**(40%) **&** WISN/ **MTHS111**(40%)	12	X	X	
STTK214	STTK214	Statistics for Life Sciences/ *Statistiek vir Lewenswetenskappe*		16	X		

MODULE CODE / *KODE* 2020	2019 MODULE CODE / *KODE*	DESCRIPTIVE NAME/ *BESKRYWENDE NAAM*	PRE-REQUISITES/ *VOOR-VEREISTES*	CR/ *KR*	PC/ *PK*	VTC/ *V D K*	MC / *MK*
Statistics / *Statistiek*							
STTN215	STTN215	Probability and Sampling Theory/ *Waarskynlikheidsleer en Steekproefteorie*	STTN125 **&** WISN/ **MTHS121**	16	X	X	
STTN225	STTN225	Statistical Inference and Data Analysis/ *Statistiese Inferensie en Data-analise*	STTN215 (40%)	16	X	X	
STTN316		Linear Models I/ *Lineêre Modelle I*	STTN225	24	X	X	
STTN317		Statistical Software and Applications I/ *Statistiese Sagteware en Toepassings I*	STTN225	8	X	X	
STTN326		Analysis of Dependent Data/ *Analise van Afhanklike Data*	STTN225	16	X	X	
STTN327		Statistical Software and Applications II/ *Statistiese Sagteware en Toepassings II*	STTN317 (40%)	16	X	X	
Statistics / *Statistiek* (Extended VTC)							
STTF115	STTF115	Descriptive Statistics/ *Beskrywende Statistiek*		12		X	
STTF125	STTF125	Introductory Statistical Inference/ *Inleidende Statistiese Inferensie*	STTF115 (40%)	16		X	
STTF215	STTF215	Practical Statistics/ *Praktiese Statistiek*	STTF125	16		X	
STTF225	STTF225	Introduction to Probability/ *Inleiding tot Waarskynlikheidsleer*	STTF215 (40%) **&** WISN111/ **MTHS111**	16		X	

MODULE CODE / *KODE* 2020	2019 MODULE CODE / *KODE*	DESCRIPTIVE NAME/ *BESKRYWENDE NAAM*	PRE-REQUISITES/ *VOOR-VEREISTES*	CR/ *KR*	PC/ *PK*	VTC/ *VDK*	MC/ *MK*
Tourism / *Toerisme*							
TMBP111	TMBP111	Introduction to Tourism Management *Inleiding tot Toerismebestuur*		12	X		
TMBP211	TMBP211	Applied Tourism Management/ *Toegepaste Toerismebestuur*	BMAN121	16	X		
TMBP221	TMBP221	Tourism Marketing/ *Toerismebemarking*		16	X		
TMBP311	TMBP311	Sustainable Ecotourism Management/ *Volhoubare Ekotoerismebestuur*		16	X		
TMBP312	TMBP312	Introduction to Event Management (Choice Module)/ *Inleiding tot Gebeurtenisbestuur*		16	X		
TMBP321	TMBP321	Game Farm Management/ *Wildplaasbestuur*		16	X		
TMBP322	TMBP322	Applied Event Management (Choice Module)/ *Toegepaste Gebeurtenisbestuur*		16	X		
Understand the World / *Verstaan die Wêreld*							
WVAS221	WVAS221	Understanding the World of Agriculture	None	12			X
WVCS221 Note 1	WVCS221 Note 1	Understanding the Cultural World	None	12			X
WVCS315* Note 2	WVCS315* Note 2	Man and Society	None	16			X
WVES221	WVES221	Understanding the Economic World/ *Verstaan die Ekonomiese Wêreld*		12	X		
WVES311	WVES311	Business Ethics/ *Besigheidsetiek*		12	X		

MODULE CODE / *KODE* 2020	2019 MODULE CODE / *KODE*	DESCRIPTIVE NAME/ *BESKRYWENDE NAAM*	PRE-REQUISITES/ *VOOR-VEREISTES*	CR/ *KR*	PC/ *PK*	VTC/ *VDK*	MC/ *MK*
Understand the World / *Verstaan die Wêreld*							
WVNS211	WVNS211	Understanding the Natural World/ *Verstaan die Natuurlike Wêreld*		12	X		
WVNS221	WVNS221	Science, Technology and Society/ *Wetenskap, Tegnologie en Samelewing*		12	X		

NAS.1.15 RULES FOR DIPLOMAS

After completion of the 3-year Diploma, a student can either exit with a diploma qualification or could proceed to register for a BSc degree in Agriculture provided they have applied for and been granted matriculation exemption prior to registering for the Degree program of choice. Successful applicants into BSc Programme may be credited for modules taken and passed during the course of the Diploma Programme provided that a final pass mark of **60% or more** was obtained in the module earmarked for exemption. A list of Diploma modules that are judged to be equivalent to BSc modules is available from the Schools. The granting of exemptions in the selected modules to students from the Diploma Program is based on the application of the Credit Accumulation and Transfer (CAT) policy.

After completion of the 3-year Diploma, a student can either exit with a diploma qualification or could proceed to register for a BSc Agric. Successful applicants into BSc Programme will **NOT be credited** for modules taken and passed during the course of the Diploma Programme. A Diploma candidate is, therefore, required to complete BSc programme.
In the minimum period of 4 years.

NAS.1.15.1 PROGRAMME: DIPLOMA IN ANIMAL HEALTH

NAS.1.15.1.1 Specific programme outcomes

Purpose: The purpose of the qualification is to provide adequate vocational training which equips learners with a sound knowledge of disease surveillance, farm animals and production systems; and to identify problems related to the health, breeding, feeding, management and economics of livestock production, thus contributing to animal production whilst maintaining the animals' health and welfare, protecting humans from zoonosis and ensuring high-quality food products of animal origin for human consumption; and provide services to members of the veterinary profession, para-veterinary professionals, the animal population industry and the community as a whole.

NAS.1.15.1.2 Diploma in Animal Health

CODE: 2DY B01 - N302M

CAMPUS: Mafikeng (ENGLISH)

DELIVERY MODE: Full Time

Year level 1			Year level 2			Year level 3		
First semester			**First semester**			**First semester**		
Module code	**CORE**	**Cr**	**Module code**	**CORE**	**Cr**	**Module code**	**CORE**	**Cr**
ALDE111	X	12	AXDM211	X	16	AHVM316	H	12
AEDM111	X	12	AHVM212	H	8	AHVM317	H	12
AHVM111	H	12	AHVM213	H	12	AHVM318	H	12
AHVM112	H	8	AHVM214	H	12	AHVM319	H	12
MTHS115	X	12	ANDM211	X	16	AHDM316	X	8
			ANDM212	X	8	AHDM317	X	8
			ANDM213	X	8			
Total 1st Semester		**56**	**Total 1st semester**		**80**	**Total 1st semester**		**64**
Year level 1			**Year level 2**			**Year level 3**		
Second semester			**Second semester**			**Second semester**		
Module code	**CORE**	**Cr**	**Module code**	**CORE**	**Cr**	**Module code**	**CORE**	**Cr**
ALDE122	X	12	AHVM222	H	16	AHVM324	H	8
AHVM121	H	12	AHVM223	H	16	AHVM326	H	12
AHVM122	H	12	AHVM224	H	8	AHVM327	H	12
AHVM123	H	8	AHVM225	H	8	AHVM328	H	12
ANDM122	X	8	AHVM227	H	12	AHDM326	X	8
MTHS125	X	12	AHVM228	H	8			
			ANDM223	X	16			
Total 2nd semester		**64**	**Total 2nd semester**		**88**	**Total 2nd semester**		**52**
Total year level 1		**120**	**Total year level 2**		**164**	**Total year level 3**		**116**
Total credits for the programme								**400**

NAS.1.15.1.3 Old Programme Phasing out (MC):
Diploma in Animal Health

CODE: 2DY B01 - N301M – Diploma in Animal Health (Phasing out)

CODE: 266100-N102M – Diploma in Animal Health (Pipeline)

CAMPUS: Mafikeng (ENGLISH)

DELIVERY MODE: Full Time

Year level 1		**Year level 2**		**Year level 3**	
First semester		**First semester**		**First semester**	
Module code	**Cr**	**Module code**	**Cr**	**Module code**	**Cr**
AGLE111 (X)	12	AHVM213 (H)	12	AHVM316 (H)	12
AHVM111 (H)	12	AHVM212 (H)	8	AHVM317 (H)	12
AHVM112 (H)	8	ANDM211 (X)	16	AHVM313 (H)	8
AEDM111 (X)	12	ANDM212 (X)	8	AHVM318 (H)	12
MAYM115 (X)	12	AXDM211 (X)	16	AHVM319 (H)	12
		ANDM213 (X)	8		
Total 1st sem	**56**	**Total 1st sem**	**68**	**Total 1st sem**	**56**
Year level 1		**Year level 2**		**Year level 3**	
Second sem		**Second sem**		**Second sem**	
Module code	**Cr**	**Module code**	**Cr**	**Module code**	**Cr**
AGLE121 (X)	12	AHVM227 (H)	12	AHVM326 (H)	12
AHVM121 (H)	12	AHVM222 (H)	16	AHVM327 (H)	12
AHVM122 (H)	12	AHVM223 (H)	16	AHVM323 (H)	8
AHVM123 (H)	8	AHVM224 (H)	8	AHVM324 (H)	8
ANDM122 (X)	8	AHVM225 (H)	8	AHVM328 (H)	12
MAYM125 (X)	12	ANDM225 (X)	16		
Total 2nd sem	**64**	**Total 2nd sem**	**76**	**Total 2nd sem**	**52**
Total level 1	**120**	**Total level 2**	**144**	**Total level 3**	**108**
Total credits for the curriculum 372					

***Core modules are indicated with (H) and ancillary modules with (X)**

NAS.1.15.2 DIPLOMA IN ANIMAL SCIENCE

NAS.1.15.2.1 Specific programme outcomes

Purpose : The aim of the Diploma in Agriculture (Animal Science) is to give students a vocational training in the practical application of scientific principles to animal production.

CODE: 2FH B01 - N301M

CAMPUS: Mafikeng (ENGLISH)

DELIVERY MODE: Full Time

First semester			First semester			First semester		
Module code	**Core**	**Cr**	**Module code**	**Core**	**Cr**	**Module code**	**Core**	**Cr**
ALDE111	X	12	AHVM211	X	16	AXDM311	X	8
AEDM111	X	12	ANDM211	H	16	AEDM314	X	8
AHVM111	X	12	ANDM212	H	8	ANDM312	H	16
MTHS115	X	12	AXDM211	X	16	ANDM313	H	16
MCHE115	X	12				ANDM314	H	16
Total 1st semester		**60**			**56**	**Total 1st semester**		**64**
Year level 1			**Year level 3**			**Year level 3**		
Second semester			**Second semester**			**Second semester**		
Module code	**Core**	**Cr**	**Module code**	**Core**	**Cr**	**Module code**	**Core**	**Cr**
ALDE122	X	12	ANDM221	H	16	ANDM321	H	56
AHVM122	X	12	ANDM223	H	16			
ANDM121	X	12	ANDM225	H	16			
CSDM121	H	12	AHVM226	H	16			
MTHS125	X	12						
Total 2nd semester		**60**	**Total 2nd semester**		**64**	**Total 2nd semester**		**56**
Total year level 1		**120**	**Total year level 2**		**120**	**Total year level 3**		**120**
Total credits for the curriculum								**360**

NAS.1.15.2.2 **Old Programme Phasing out (MC):**
Diploma in Agriculture in Animal Science

CODE: 279100 - N101M - Diploma in Agriculture in Animal Science (Pipeline only)

CAMPUS: Mafikeng (ENGLISH)

DELIVERY MODE: Full Time

Year level 1		**Year level 2**		**Year level 3**	
First semester		**First semester**		**First semester**	
Module code	**Cr**	**Module code**	**Cr**	**Module code**	**Cr**
AGLE111 (X)	12	ANDM211 (H)	16	AEDM314 (X)	08
MCHE115 (X)	12	AHVM211 (X)	16	ANDM312 (H)	16
AHVM111 (X)	12	ANDM212 (H)	08	ANDM313 (H)	16
MAYM115 (X)	12	AXDM211 (X)	16	ANDM314 (H)	16
AEDM111 (X)	12			AXDM311 (X)	08
Total 1st sem	**60**	**Total 1st sem**	**56**	**Total 1st sem**	**64**
Year level 1		**Year level 2**		**Year level 3**	
Second sem		**Second sem**		**Second sem**	
Module code	**Cr**	**Module code**	**Cr**	**Module code**	**Cr**
AGLE121 (X)	12	ANDM221 (H)	16	ANDM321 (H)	56
AHVM122 (X)	12	ANDM223 (H)	16		
MAYM125 (X)	12	ANDM225 (H)	16		
CSDM121 (X)	12	AHVM226 (X)	16		
ANDM121 (H)	12				
Total 2nd sem	**60**	**Total 2nd sem**	**64**	**Total 2nd sem**	**56**
Total level 1	**120**	**Total level 2**	**120**	**Total level 3**	**120**
Total credits for the curriculum: 360					

NAS.1.15.3 DIPLOMA IN PLANT SCIENCE WITH CROP PRODUCTION

CODE: 2FJ B01 - N301M

CAMPUS: Mafikeng (ENGLISH)

DELIVERY MODE: Full Time

Year level 1			**Year level 2**			**Year level 3**		
First semester			**First semester**			**First semester**		
Module code	**Core**	**Cr**	**Module code**	**Core**	**Cr**	**Module code**	**Core**	**Cr**
ALDE111	X	12	AXDM211	X	16	AXDM311	X	8
AEDM111	X	12	CSDM211	H	16	AEDM314	X	8
CSDM111	H	12	CSDM212	H	12	CSDM311	H	8
MTHS115	X	12	CSDM213	H	8	CSDM312	H	16
MCHE115	X	12	CSDM215	H	8	CSDM315	H	8
						CSDM371	H	8
Total 1st semester		**60**			**60**	**Total 1st semester**		**56**
Year level 1			**Year level 3**			**Year level 3**		
Second semester			**Second semester**			**Second semester**		
Module code	**Core**	**Cr**	**Module code**	**Core**	**Cr**	**Module code**	**Core**	**Cr**
ALDE122	X	12	CSDM221	H	16	CSDM321	H	8
ANDM121	X	12	CSDM222	H	16	CSDM322	H	16
CSDM121	H	12	CSDM223	H	12	CSDM323	H	16
MTHS125	X	12	CSDM224	H	8	CSDM324	H	16
NPHY124	X	12	CSDM225	H	8	CSDM371	H	8
Total 2nd semester		**60**	**Total 2nd semester**		**60**	**Total 2nd semester**		**64**
Total year level 1		**120**	**Total year level 2**		**120**	**Total year level 3**		**120**
Total credits for the curriculum								**360**

NAS.1.15.3.1 OLD PROGRAMME Phasing out (MC):
Diploma in Agric and Crop Science

CODE: 279101- N101M - Diploma in Agric in Crop Science (Pipeline only)

CAMPUS: Mafikeng (ENGLISH)

DELIVERY MODE: Full Time

Year level 1		Year level 2		Year level 3	
First semester		First semester		First semester	
Module code	Cr	Module code	Cr	Module code	Cr
MCHE115 (X)	12	CSDM211 (H)	16	CSDM311 (H)	8
CSDM111 (H)	12	CSDM214 (H)	8	CSDM312 (H)	16
MAYM115 (X)	12	CSDM212 (H)	12	AXDM311 (X)	8
AGLE111 (X)	12	AXDM211 (X)	16	AEDM314 (X)	8
AEDM111 (X)	12	CSDM213 (H)	8	CSDM315 (H)	8
		CSDM215 (H)	8		
Total 1st sem	**60**	**Total 1st sem**	**68**	**Total 1st sem**	**48**
Year level 1		**Year level 3**		**Year level 3**	
Second sem		**Second sem**		**Second sem**	
Module code	**Cr**	**Module code**	**Cr**	**Module code**	**Cr**
MAYM125 (X)	12	CSDM222 (H)	16	CSDM321 (H)	8
CSDM121 (H)	12	CSDM221 (H)	16	CSDM322 (H)	16
ANDM121 (X)	12	CSDM224 (H)	8	CSDM325 (H)	8
PHYM128 (X)	12	CSDM223 (H)	12	CSDM324 (H)	16
AGLE121 (X)	12	CSDM225 (H)	8	CSDM323 (H)	16
Total 2nd sem	**60**	**Total 2nd sem**	**60**	**Total 2nd sem**	**64**
Total level 1	**120**	**Total level 2**	**128**	**Total level 3**	**112**
				TOTAL	**360**

***Core modules are indicated with (H) and ancillary modules with (X)**

NAS.1.16 RULES FOR THE DEGREE BACHELOR OF SCIENCE (BSC) / *REËLS VIR DIE GRAAD BACCALAUREUS SCIENTIAE (BSC)*

NAS.1.16.1 DURATION (MINIMUM AND MAXIMUM DURATION) / *DUUR (MINIMUM EN MAKSIMUM DUUR)*

[A-Rule/ A-Reël 1.14]

Full time: The minimum duration of the studies for a BSc 3yr degree is three years and BSc 4yr degree, is four years and the maximum duration for completing the degree is five years for a 3yr and six years for a 4yr degree.

Voltyds: *Die minimum duur van die studie vir 'n BSc 3jr graad is drie jaar en vir 'n BSc 4jr graad, is 4jr en die maksimum tydsduur vir die voltooiing van die graad is vyf jaar vir 'n 3jr en ses jaar vir 'n 4jr graad.*

Distance learning: The minimum duration of the studies for a BSc degree is three years and the maximum duration for completing the degree is six years.

Afstandstudie: *Die minimum duur van die studie vir 'n BSc-graad is drie jaar en die maksimum tydsduur vir die voltooiing van die graad is ses jaar.*

NAS.1.16.2 FACULTY-SPECIFIC REQUIREMENTS / *FAKULTEITSPESIFIEKE TOELATINGSVEREISTES*

See paragraph/ *Kyk paragraaf* NAS.1.16

NAS.1.16.3 STRUCTURE OF A GENERIC BACHELOR OF SCIENCE DEGREE / *STRUKTUUR VAN 'N GENERIESE BACCALAUREUS SCIENTIAE GRAAD*

The diagram shows how a generic BSc degree is compiled. Professional degrees are compiled differently. /

Die diagram dui aan hoe 'n generiese BSc-kwalifikasie saamgestel word. Professionele grade verskil hiervan.

	Semester 1							**Semester 2**						
Year / *Jaar* 1 (Tot. cr./ *kr.* = 120)	12	12	12	12	12 ALDE/A			12	12	12	12	12 ALDE/A		
Year / *Jaar* 2 (Tot. cr. / *kr.* = 120)	8	8	8	8	8	8	12 WVNS	8	8	8	8	8	8	12 WVNS
Year / *Jaar* 3 (Tot. cr. / *kr.* = 128)	16	16	16	16				16	16	16	16			
TOTAL CREDITS / *TOTALE KREDIETE* (368)	**184 credits / *krediete***							**184 credits / *krediete***						

NAS.1.16.4 OUTCOMES OF A GENERIC BACHELOR OF SCIENCE DEGREE / *UITKOMSTE VIR 'N GENERIESE BACCALAUREUS SCIENTIAE GRAAD*

(a) General / *Algemeen*

At the end of the study period, the student will have the ability to integrate the basic knowledge and techniques of the core subjects in the curriculum he completed with a view to investigating phenomena in nature relevant to the core subjects of the curriculum and solving relevant problems. /

Aan die einde van die studie is die student in staat om die basiese kennis en tegnieke van die kernvakke van die kurrikulum wat hy voltooi het te integreer om verskynsels in die natuur wat met die kernvakke van die kurrikulum verband hou te ondersoek en gepaardgaande probleme op te los.

(b) Knowledge / *Kennis*

The student must have a thorough knowledge of the core subjects of the curriculum he completed in order to be able to apply his knowledge; to understand the physical reality in terms of this knowledge; and to be ready to continue with postgraduate studies in one of the core subjects. /

Die student moet 'n deeglike kennis van die kernvakke van die kurrikulum wat voltooi is, besit, sodat die kennis toegepas kan word; die fisiese werklikheid in terme van hierdie kennis verstaan kan word; die student gereed is om met nagraadse studie in een van die kernvakke voort te kan gaan.

(c) Skills / *Vaardighede*

The student must have acquired the following skills:

- the ability to retrieve knowledge and information electronically and otherwise in preparation of lifelong learning;
- the ability to perform mathematical-analytical and mathematical-numerical data processing, problem solving and modelling;
- the ability to process, evaluate and report on scientific information;
- where applicable, the basic laboratory skills;
- the ability to work in groups and where necessary to exercise the necessary leadership.

Die student moet die volgende vaardighede aangeleer het:

- *die vermoë besit om kennis en inligting te ontsluit, elektronies en andersins ter voorbereiding van lewenslange leer;*
- *wiskundig-analitiese en wiskundig-numeriese dataverwerking, probleemoplossing en modellering kan doen;*
- *in staat wees om wetenskaplike inligting te kan verwerk, evalueer en daaroor verslag te kan doen;*
- *waar van toepassing oor basiese laboratoriumvaardighede beskik;*
- *in staat wees om in groepe te kan saamwerk en waar nodig leierskap te kan uitoefen/aanvaar.*

(d) Values / *Waardes*

The student ought to have acquired the following values:

- the ability to understand and strive after the normative aspects of practising science and in this way demonstrate a sense of responsibility towards fellow human beings and the environment in scientific investigations;
- scientific honesty and integrity.

Die student moet die volgende waardes aangeleer het:

- *die normatiewe aspekte van wetenskapsbeoefening verstaan en nastreef en sodoende 'n verantwoordelikheidsin teenoor die medemens en omgewing in wetenskaplike ondersoeke openbaar;*
- *wetenskaplike eerlikheid en integriteit.*

NAS.1.16.4.1 Programmes / *Programme*

All curricula in this programme are compiled from the module list in N.14.
NOTE: Core modules (majors) are indicated by a (H). /

Al die kurrikulums is saamgestel uit modules in die modulelys in N.14.
***OPMERKING:** Kernmodules (hoofvakke) word telkens met 'n (H) daarnaas aangedui.*

Every year a student registers subject to the rules valid for the specific year. If the curriculum/programme for which a student registered the previous year has been changed in this Calendar, the curriculum/programme of the student will be adapted according to the version in this Calendar. If possible, adaptation will be done in such a way that a student's study load will not be increased. /

'n Student registreer elke jaar onder die reëls wat vir die betrokke jaar geld. Indien die kurrikulum/program waarvoor 'n student in 'n voorafgaande jaar geregistreer het in hierdie jaarboek gewysig is, sal die student se kurrikulum/program aangepas word om in ooreenstemming te wees met die weergawe in hierdie jaarboek. Indien enigsins moontlik sal aanpassings so gedoen word dat 'n student se studielas nie daardeur verswaar word nie.

If obstacles such as insurmountable clashes in the schedule should arise because of necessary curriculum/programme changes, the Dean may decide that students who enrolled previously must switch to the changed curriculum/programme, even if an increase should result. /

Indien struikelblokke soos onoorkomelike roosterbotsings egter as gevolg van noodsaaklike kurrikulum- programwysigings sou onstaan, mag die Dekaan beslis dat reeds ingeskrewe studente na die gewysigde kurrikulum/program sal oorslaan, al sou dit 'n verswaring tot gevolg hê.

In the case where students have to repeat one or more modules at a specific year level of a curriculum/programme, the following applies: /

In die geval waar studente in 'n bepaalde jaarvlak van 'n kurrikulum/program een of meer modules uit een of meer vorige jaarvlakke van 'n kurrikulum/program moet herhaal, geld die volgende:

- The total number of credits of the modules taken by a student in any semester at any year level, also by the student who has to repeat modules, is limited in accordance with the General Rule 2.3. /

Die totale kredietpunte van die modules wat 'n student, wat ook modules moet herhaal, in enige semester op enige jaarvlak mag neem, word beperk in ooreenstemming met Algemene Reël 2.3

- The Faculty cannot undertake that modules that have to be repeated and the other modules that must be taken will all fit in the class schedule. Clashes that arise because of modules that have to be repeated will result in the student having to take those modules in a future year. /

  Die fakulteit kan nie onderneem dat modules wat herhaal moet word saam met die ander modules wat geneem moet word, op die rooster sal inpas nie; roosterbotsings wat ontstaan as gevolg van modules wat herhaal moet word, sal tot gevolg hê dat die student daardie modules in 'n latere jaar moet neem;

- If a student has not completed the modules of a specific year level of the curriculum/programme for which he enrolled in the minimum prescribed period of study, and the modules of the specific year level of the curriculum/programme have since been changed, the Dean may decide that the student must complete the relevant year level as published in the latest edition of the Calendar. This means that if a student must repeat a module that has since been replaced by another module, the Dean may decide that the student must take the latter module. /

  Indien 'n student modules van 'n bepaalde jaarvlak van die kurrikulum/program waarvoor hy ingeskryf is, nie in die minimum voorgeskrewe studietydperk voltooi het nie en die modules van die betrokke jaarvlak van dié kurrikulum/program is intussen gewysig, mag die dekaan beslis dat die student die betrokke jaarvlak moet voltooi soos gepubliseer in die jongste uitgawe van die jaarboek. Dit kom daarop neer dat indien die student 'n module moet herhaal wat intussen in die kurrikulum/program deur 'n ander module vervang is, die dekaan mag beslis dat die student laasgenoemde module moet neem.

NAS.1.16.4.2 **Articulation possibilities / *Artikulasiemoontlikhede***

Credits will be awarded for modules that have been passed in other faculties or at other universities, provided such modules contribute to the outcomes and total credit requirements of the curriculum/programme concerned. /

Krediet sal verleen word vir modules wat in ander fakulteite of by ander universiteite geslaag is, mits sodanige modules bydra tot die uitkoms- en totale kredietvereistes van die betrokke kurrikulum/program.

With the basic and applied skills that the student has acquired by this qualification in the mathematical, computer and natural science disciplines he will be prepared to continue further learning in several specialised subject areas at other institutions. /

Met die basiese en toepasbare vaardighede wat die student met hierdie kwalifikasie in die wiskundige, rekenaarkundige en natuurwetenskaplike dissiplines opgedoen het, sal die student toegerus wees om met verdere leer voort te gaan in verskeie gespesialiseerde vakgebiede aan ander inrigtings.

NAS.1.16.5 PROGRAMME: BACHELOR OF SCIENCE WITH CHEMISTRY AND PHYSICS/ *BACCALAUREUS SCIENTIAE MET CHEMIE EN FISIKA*

NAS.1.16.5.1 Programme outcomes / *Programuitkomste*

On completion of studies, the student will have the ability to integrate the basic knowledge and techniques of Physics and Mathematics in the curriculum he completed with a view to investigating phenomena in the nature relevant to the core subjects of the curriculum and solving relevant problems./

Aan die einde van die studie is die student in staat om die basiese kennis en tegnieke van die kernvakke wat voltooi is, te integreer om verskynsels in die natuur wat met die kernvakke van die kurrikulum/program verband hou te ondersoek en gepaardgaande probleme op te los.

NAS.1.16.5.2 **Programme: Bachelor of Science with Chemistry and Physics / *Baccalaureus Scientiae met Chemie en Fisika***

CODE/ *KODE*: 2FF H05 - N301P; N301M

CAMPUS/ *KAMPUS*: Potchefstroom (AFRIKAANS, ENGLISH), Mafikeng (ENGLISH)

DELIVERY MODE/ *AFLEWERINGSMETODE*: Full Time / *Voltyds*

Compilation of programme / *Samestelling van program:*

Year level 1 / *Jaarvlak 1*			**Year level 2 / *Jaarvlak 2***			**Year level 3 / *Jaarvlak 3***		
First/*Eerste* semester			**First / *Eerste* semester**			**First/ *Eerste* semester**		
Module code/ *Modulekode*	**CORE/ *KERN***	**Cr/ *Kr***	**Module code/ *Modulekode***	**CORE/ *KERN***	**Cr/ *Kr***	**Module code/ *Modulekode***	**CORE/ *KERN***	**Cr/ *Kr***
ALDE/A111	X	12	NCHE211	H	8	NCHE311	H	16
NCHE111	H	12	NCHE212	H	8	NCHE312	H	16
NPHY111	H	12	NPHY211	H	8	NPHY311	H	16
CMPG112 **(PC)** OR APPM111**	X	12	NPHY212	H	8	NPHY312	H	16
MTHS111	X	12	APPM211	X	8			
			MTHS211	X	8			
			WVNS211	X	12			
Total / *Totaal* 1st semester		**60**	**Total / *Totaal* 1st semester**		**60**	**Total / *Totaal* 1st semester**		**64**
Year level 1 / *Jaarvlak 1*			**Year level 2 / *Jaarvlak 2***			**Year level 3 / *Jaarvlak 3***		
Second/*Tweede* semester			**Second/ *Tweede* semester**			**Second/ *Tweede* semester**		
Module code/ *Modulekode*	**CORE/ *KERN***	**Cr/ *Kr***	**Module code/ *Modulekode***	**CORE/ *KERN***	**Cr/ *Kr***	**Module code/ *Modulekode***	**CORE/ *KERN***	**Cr/ *Kr***
ALDE/A122	X	12	NCHE221	H	8	NCHE321	H	16
NCHE121	H	12	NCHE222	H	8	NCHE322	H	16
NPHY121	H	12	NPHY221	H	8	NPHY321	H	16
APPM122	X	12	NPHY222	H	8	NPHY322	H	16
MTHS121	X	12	APPM222	X	8			
			MTHS221 **OR** *MTHS223	X	8			
			WVNS221	X	12			
Total / *Totaal* 2nd semester		**60**	**Total / *Totaal* 2nd semester**		**60**	**Total / *Totaal* 2nd semester**		**64**
Total year level / *Totaal jaarvlak* 1		**120**	**Total year level / *Totaal jaarvlak* 2**		**120**	**Total year level / *Totaal jaarvlak* 3**		**128**
Total credits for the programme / *Totaal krediete vir die program*								**368**

Very important to note the following:

Students who wish to take either MTHS321 or MTHS311, must select MTHS221 as elective.
*The Physics Subject Group recommends MTHS223 for this programme, although MTHS221 is also acceptable.
**APPM111 only on MC.

Baie belangrik om kennis te neem:

Studente wat MTHS321 *en/of* MTHS311 *wil neem, moet* MTHS221 *as 'n keusemodule neem.*
**Vakgroep Fisika beveel die module* MTHS223 *vir hierdie program aan, hoewel* MTHS221 *ook aanvaarbaar is.*
***APPM111 slegs op MC.*

NAS.1.16.5.3 **Bachelor of Science in Physical and Chemical Sciences /**
Baccalaureus Scientiae in Fisiese en Chemiese Wetenskappe

OLD PROGRAMME PHASING OUT/ OU PROGRAM FASEER UIT (PC)

Curriculum/ *Kurrikulum*: N151P (Pipeline only)

CODE/ *KODE*: 200190

CAMPUS/ *KAMPUS*: Potchefstroom (AFRIKAANS, ENGLISH)

DELIVERY MODE/ *AFLEWERINGSMETODE*: Full Time / *Voltyds*

Compilation of programme / *Samestelling van program:* Chemistry and Physics /
Chemie en Fisika

Year level 1 / *Jaarvlak 1*			**Year level 2 / *Jaarvlak 2***			**Year level 3 / *Jaarvlak 3***		
First/*Eerste* semester			**First / *Eerste* semester**			**First/ *Eerste* semester**		
Module code/ *Modulekode*	**CORE/ *KERN***	**Cr/ *Kr***	**Module code/ *Modulekode***	**CORE/ *KERN***	**Cr/ *Kr***	**Module code/ *Modulekode***	**CORE/ *KERN***	**Cr/ *Kr***
AGLE/A111	X	12	CHEN211	H	8	CHEM311	H	16
CHEM111	H	12	CHEN212	H	8	CHEN312	H	16
FSKS111	H	12	FSKS211	H	8	FSKS311	H	16
ITRW112	X	12	FSKS212	H	8	FSKS312	H	16
WISN111	X	12	TGWN211	X	8			
			WISN211	X	8			
			WVNS211	X	12			
Total / *Totaal* 1st semester		**60**	**Total / *Totaal* 1st semester**		**60**	**Total / *Totaal* 1st semester**		**64**
Year level 1 / *Jaarvlak 1*			**Year level 2 / *Jaarvlak 2***			**Year level 3 / *Jaarvlak 3***		
Second/*Tweede* semester			**Second/ *Tweede* semester**			**Second/ *Tweede* semester**		
Module code/ *Modulekode*	**CORE/ *KERN***	**Cr/ *Kr***	**Module code/ *Modulekode***	**CORE/ *KERN***	**Cr/ *Kr***	**Module code/ *Modulekode***	**CORE/ *KERN***	**Cr/ *Kr***
AGLE121	X	12	CHEN222	H	8	CHEN321	H	16
CHEM121	H	12	CHEN223	H	8	CHEN322	H	16
FSKS121	H	12	FSKS221	H	8	FSKS321	H	16
TGWN122	X	12	FSKS222	H	8	FSKS322	H	16
WISN121	X	12	TGWN223	X	8			
			WISN224 **OR** *WISN225	X	8			
			WVNS221	X	12			
Total / *Totaal* 2nd semester		**60**	**Total / *Totaal* 2nd semester**		**60**	**Total / *Totaal* 2nd semester**		**64**
Total year level / *Totaal jaarvlak* 1		**120**	**Total year level / *Totaal jaarvlak* 2**		**120**	**Total year level / *Totaal jaarvlak* 3**		**128**
Total credits for the programme / *Totaal krediete vir die program*								**368**

NAS.1.16.5.3.1 OLD PROGRAMME PHASING OUT (MC):
Bachelor of Science in Chemistry and Physics

Curriculum: N308M (Only Pipeline Students)

CODE: 200129

CAMPUS: Mafikeng (ENGLISH)

DELIVERY MODE: Full Time

Compilation of programme: Chemistry and Physics

Year level 1			Year level 2			Year level 3		
First semester			**First semester**			**First semester**		
Module code	**CORE**	**Cr**	**Module code**	**CORE**	**Cr**	**Module code**	**CORE**	**Cr**
AGLE111	X	12	WVNS211	X	12	PHYM315	H	8
MCHE114	H	12	MCHE215	H	8	PHYM316	H	8
PHYM118	H	12	MCHE216	H	8	PHYM317	H	8
MAYM117	X	12	MAYM217	X	16	PHYM318	H	8
CISM112	X	12	PHYM215	H	8	MCHE315	H	16
			PHYM216	H	8	MCHE316	H	16
Total 1st Semester		**60**	**Total 1st semester**		**60**	**Total 1st semester**		**64**

Year level 1			Year level 2			Year level 3		
Second semester			**Second semester**			**Second semester**		
Module code	**CORE**	**Cr**	**Module code**	**CORE**	**Cr**	**Module code**	**CORE**	**Cr**
AGLE121	X	12	WVNS221	X	12	PHYM321	H	8
MCHE121	H	12	MCHE221	H	8	PHYM322	H	8
PHYM128	H	12	MCHE223	X	8	PHYM323	H	8
MAYM127	X	12	MAYM227	H	16	PHYM324	H	8
CISM124	X	12	PHYM221	H	8	MCHE321	H	16
			PHYM222	H	8	MCHE322	H	16
Total 2nd semester		**60**	**Total 2nd semester**		**60**	**Total 2nd semester**		**64**
Total year level 1		**120**	**Total year level 2**		**120**	**Total year level 3**		**128**
Total credits for the programme								**368**

***Core modules are indicated with (H) and ancillary modules with (X)**

NAS.1.16.6 **PROGRAMME: BACHELOR OF SCIENCE WITH CHEMISTRY, MATHEMATICS AND APPLIED MATHEMATICS/**
BACCALAUREUS SCIENTIAE MET CHEMIE, WISKUNDE EN TOEGEPASTE WISKUNDE

CODE/ *KODE*: 2FF H22 - N301P

CAMPUS/ *KAMPUS*: Potchefstroom (AFRIKAANS, ENGLISH)

DELIVERY MODE/ *AFLEWERINGSMETODE*: Full Time / *Voltyds*

Compilation of programme / *Samestelling van program:*

Year level 1 / *Jaarvlak 1*			**Year level 2 / *Jaarvlak 2***			**Year level 3 / *Jaarvlak 3***		
First/*Eerste* semester			**First / *Eerste* semester**			**First/ *Eerste* semester**		
Module code/ *Modulekode*	**CORE/ *KERN***	**Cr/ *Kr***	**Module code/ *Modulekode***	**CORE/ *KERN***	**Cr/ *Kr***	**Module code/ *Modulekode***	**CORE/ *KERN***	**Cr/ *Kr***
ALDE/A111	X	12	NCHE211	H	8	NCHE311	H	16
NCHE111	H	12	NCHE212	H	8	NCHE312	H	16
NPHY111	X	12	NPHY212	X	8	APPM312	H	16
STTN111	X	12	APPM211	H	8	MTHS312	H	16
MTHS111	H	12	MTHS211	H	8			
			MTHS212	H	8			
			WVNS211	X	12			
Total / *Totaal* 1st semester		**60**	**Total / *Totaal* 1st semester**		**60**	**Total / *Totaal* 1st semester**		**64**
Year level 1 / *Jaarvlak 1*			**Year level 2 / *Jaarvlak 2***			**Year level 3 / *Jaarvlak 3***		
Second/*Tweede* semester			**Second/ *Tweede* semester**			**Second/ *Tweede* semester**		
Module code/ *Modulekode*	**CORE/ *KERN***	**Cr/ *Kr***	**Module code/ *Modulekode***	**CORE/ *KERN***	**Cr/ *Kr***	**Module code/ *Modulekode***	**CORE/ *KERN***	**Cr/ *Kr***
ALDE/A122	X	12	NCHE221	H	8	NCHE321	H	16
NCHE121	H	12	NCHE222	H	8	NCHE322	H	16
NPHY121	X	12	NPHY221	X	8	APPM322	H	16
APPM122	H	12	APPM222	H	8	MTHS322	H	16
MTHS121	H	12	MTHS221	H	8			
			MTHS222	H	8			
			WVNS221	X	12			
Total / *Totaal* 2nd semester		**60**	**Total / *Totaal* 2nd semester**		**60**	**Total / *Totaal* 2nd semester**		**64**
Total year level / *Totaal jaarvlak* 1		**120**	**Total year level / *Totaal jaarvlak* 2**		**120**	**Total year level / *Totaal jaarvlak* 3**		**128**
Total credits for the programme / *Totaal krediete vir die program*								**368**

NAS.1.16.6.1 **OLD PROGRAMME PHASING OUT / OU PROGRAM FASEER UIT PC: Bachelor of Science in Physical and Chemical Sciences / *Baccalaureus Scientiae in Fisiese en Chemiese Wetenskappe***

Curriculum/ K*urrikulum*: N152P (Pipeline only)

CODE/ *KODE*: 200190

CAMPUS/ *KAMPUS*: Potchefstroom (AFRIKAANS, ENGLISH)

DELIVERY MODE/ *AFLEWERINGSMETODE*: Full Time / *Voltyds*

Compilation of programme/ *Samestelling van program:* Chemistry, Mathematics and Applied Mathematics / *Chemie, Wiskunde en Toegepaste Wiskunde*

Year level 1 / *Jaarvlak 1*			**Year level 2 / *Jaarvlak 2***			**Year level 3 / *Jaarvlak 3***		
First/*Eerste* semester			**First / *Eerste* semester**			**First/ *Eerste* semester**		
Module code/ *Modulekode*	**CORE/ *KERN***	**Cr/ *Kr***	**Module code/ *Modulekode***	**CORE/ *KERN***	**Cr/ *Kr***	**Module code/ *Modulekode***	**CORE/ *KERN***	**Cr/ *Kr***
AGLE/A111	X	12	CHEN211	H	8	CHEM311	H	16
CHEM111	H	12	CHEN212	H	8	CHEN312	H	16
FSKS111	X	12	FSKS211	X	8	TGWN312	H	16
STTN111	X	12	TGWN211	H	8	WISN312	H	16
WISN111	H	12	WISN211	H	8			
			WISN212	H	8			
			WVNS211	X	12			
Total / *Totaal* 1st semester		**60**	**Total / *Totaal* 1st semester**		**60**	**Total / *Totaal* 1st semester**		**64**

Year level 1 / *Jaarvlak 1*			**Year level 2 / *Jaarvlak 2***			**Year level 3 / *Jaarvlak 3***		
Second/*Tweede* semester			**Second/ *Tweede* semester**			**Second/ *Tweede* semester**		
Module code/ *Modulekode*	**CORE/ *KERN***	**Cr/ *Kr***	**Module code/ *Modulekode***	**CORE/ *KERN***	**Cr/ *Kr***	**Module code/ *Modulekode***	**CORE/ *KERN***	**Cr/ *Kr***
AGLE121	X	12	CHEN222	H	8	CHEN321	H	16
CHEM121	H	12	CHEN223	H	8	CHEN322	H	16
FSKS121	X	12	FSKS222	X	8	TGWN322	H	16
TGWN122	H	12	TGWN223	H	8	WISN322	H	16
WISN121	H	12	WISN224	H	8			
			WISN226	H	8			
			WVNS221	X	12			
Total / *Totaal* 2nd semester		**60**	**Total / *Totaal* 2nd semester**		**60**	**Total / *Totaal* 2nd semester**		**64**
Total year level / *Totaal jaarvlak* 1		**120**	**Total year level / *Totaal jaarvlak* 2**		**120**	**Total year level / *Totaal jaarvlak* 3**		**128**
Total credits for the programme / *Totaal krediete vir die program*								**368**

NAS.1.16.7 PROGRAMME: BACHELOR OF SCIENCE WITH APPLIED MATHEMATICS AND CHEMISTRY

CODE: 2FF H13 - N301M

CAMPUS: Mafikeng (ENGLISH)

DELIVERY MODE: Full Time

Compilation of programme:

Year level 1			Year level 2			Year level 3		
First semester			**First semester**			**First semester**		
Module code	**CORE**	**Cr**	**Module code**	**CORE**	**Cr**	**Module code**	**CORE**	**Cr**
ALDE111	X	12	APPM212	H	8	APPM311	H	16
APPM111	H	12	APPM213	H	8	APPM313	H	16
MTHS111	X	12	MTHS211	X	8	NCHE311	H	16
NCHE111	H	12	MTHS212	X	8	NCHE312	H	16
NPHY111	X	12	NCHE211	H	8			
			NCHE212	H	8			
			WVNS211	X	12			
Total 1st Semester		**60**	**Total 1st semester**		**60**	**Total 1st semester**		**64**

Year level 1			Year level 2			Year level 3		
Second semester			**Second semester**			**Second semester**		
Module code	**CORE**	**Cr**	**Module code**	**CORE**	**Cr**	**Module code**	**CORE**	**Cr**
ALDE122	X	12	APPM222	H	8	APPM322	H	16
APPM122	H	12	APPM223	H	8	APPM323	H	16
MTHS121	X	12	MTHS221	X	8	NCHE321	H	16
NCHE121	H	12	MTHS222	X	8	NCHE322	H	16
NPHY121	X	12	NCHE221	H	8			
			NCHE222	H	8			
			WVNS221	X	12			
Total 2nd semester		**60**	**Total 2nd semester**		**60**	**Total 2nd semester**		**64**
Total year level 1		**120**	**Total year level 2**		**120**	**Total year level 3**		**128**
Total credits for the programme								**368**

NAS.1.16.7.1 **OLD PROGRAMME PHASING OUT (MC):**

Bachelor of Science in Applied Mathematics and Chemistry

Curriculum: N112M (Pipeline only)

CODE: 200169

CAMPUS: Mafikeng (ENGLISH)

DELIVERY MODE: Full Time

Compilation of programme: Applied Mathematics and Chemistry

Year level 1			Year level 2			Year level 3		
First semester			**First semester**			**First semester**		
Module code	**CORE**	**Cr**	**Module code**	**CORE**	**Cr**	**Module code**	**CORE**	**Cr**
AGLE111	X	12	WVNS211	X	12	APMM317	H	16
APMM117	H	12	APM217	H	16	APMM318	H	16
MCHE114	H	12	MCHE215	H	8	MCHE315	H	16
MAYM117	X	12	MCH216	H	8	MCHE316	H	16
PHYM118	X	12	MAYM217	X	16			
Total 1st Semester		**60**	**Total 1st semester**		**60**	**Total 1st semester**		**64**
Year level 1			**Year level 2**			**Year level 3**		
Second semester			**Second semester**			**Second semester**		
Module code	**CORE**	**Cr**	**Module code**	**CORE**	**Cr**	**Module code**	**CORE**	**Cr**
AGLE121	X	12	WVNS221	X	12	APMM327	H	16
APMM127	H	12	APMM227	H	16	APMM328	H	16
MCHE121	H	12	MCHE221	H	8	MCHE321	H	16
MAYM127	X	12	MCHE223	H	8	MCHE322	H	16
PHYM128	X	12	MAYM227	X	16			
Total 2nd semester		**60**	**Total 2nd semester**		**60**	**Total 2nd semester**		**64**
Total year level 1		**120**	**Total year level 2**		**120**	**Total year level 3**		**128**
Total credits for the programme								**368**

NAS.1.16.8 PROGRAMME: BACHELOR OF SCIENCE WITH CHEMISTRY AND MATHEMATICS

CODE: 2FF H11 - N301M

CAMPUS: Mafikeng (ENGLISH)

DELIVERY MODE: Full Time

Compilation of programme:

Year level 1			Year level 2			Year level 3		
First semester			**First semester**			**First semester**		
Module code	**CORE**	**Cr**	**Module code**	**CORE**	**Cr**	**Module code**	**CORE**	**Cr**
ALDE111	X	12	NCHE211	H	8	NCHE311	H	16
NCHE111	H	12	NCHE212	H	8	NCHE312	H	16
MTHS111	H	12	MTHS211	H	8	MTHS311	H	16
CMPG111	X	12	MTHS212	H	8	MTHS312	H	16
NPHY111	X	12	NPHY211	X	8			
			NPHY212	X	8			
			WVNS211	X	12			
Total 1st Semester		**60**	**Total 1st semester**		**60**	**Total 1st semester**		**64**
Year level 1			**Year level 2**			**Year level 3**		
Second semester			**Second semester**			**Second semester**		
Module code	**CORE**	**Cr**	**Module code**	**CORE**	**Cr**	**Module code**	**CORE**	**Cr**
ALDE122	X	12	NCHE221	H	8	NCHE321	H	16
NCHE121	H	12	NCHE222	H	8	NCHE322	H	16
MTHS121	H	12	MTHS221	H	8	MTHS321	H	16
CMPG121	X	12	MTHS222	H	8	MTHS322	H	16
NPHY121	X	12	NPHY221	X	8			
			NPHY222	X	8			
			WVNS221	X	12			
Total 2nd semester		**60**	**Total 2nd semester**		**60**	**Total 2nd semester**		**64**
Total year level 1		**120**	**Total year level 2**		**120**	**Total year level 3**		**128**
Total credits for the programme								**368**

NAS.1.16.8.1 **OLD PROGRAMME PHASING OUT (MC):**
Bachelor of Science in Chemistry and Mathematics

Curriculum: N307M (Pipeline only)

CODE: 200140

CAMPUS: Mafikeng (ENGLISH)

DELIVERY MODE: Full Time

Compilation of programme: Chemistry and Mathematics

Year level 1			Year level 2			Year level 3		
First semester			**First semester**			**First semester**		
Module code	**CORE**	**Cr**	**Module code**	**CORE**	**Cr**	**Module code**	**CORE**	**Cr**
AGLE111	X	12	WVNS211	X	12	MAYM317	H	16
MCHE114	H	12	MCHE215	H	8	MAYM318	H	16
PHYM118	X	12	MCHE216	H	8	MCHE315	H	16
MAYM117	H	12	MAYM217	H	16	MCHE316	H	16
CISM112 (X)	X	12	PHYM215	X	8			
			PHYM216	X	8			
Total 1st Semester		**60**	**Total 1st semester**		**60**	**Total 1st semester**		**64**

Year level 1			Year level 2			Year level 3		
Second semester			**Second semester**			**Second semester**		
Module code	**CORE**	**Cr**	**Module code**	**CORE**	**Cr**	**Module code**	**CORE**	**Cr**
AGLE121	X	12	WVNS221	X	12	MAYM327	H	16
MCHE121	H	12	MCHE221	H	8	MAYM328	H	16
PHYM128	X	12	MCHE223	H	8	MCHE321	H	16
MAYM127	H	12	MAY 227	H	16	MCHE322	H	16
CISM124	X	12	PHYM221	X	8			
			PHYM222	X	8			
Total 2nd semester		**60**	**Total 2nd semester**		**60**	**Total 2nd semester**		**64**
Total year level 1		**120**	**Total year level 2**		**120**	**Total year level 3**		**128**
Total credits for the programme								**368**

NAS.1.16.9 **PROGRAMME: BACHELOR OF SCIENCE WITH BIOCHEMISTRY AND CHEMISTRY /**
BACCALAUREUS SCIENTIAE MET BIOCHEMIE EN CHEMIE

CODE/ *KODE:* 2FF H06 - N301P; N301M

CAMPUS/ *KAMPUS:* Potchefstroom (AFRIKAANS, ENGLISH)
Mafikeng (ENGLISH)

DELIVERY MODE/ *AFLEWERINGSMETODE:* Full Time / *Voltyds*

Compilation of programme / *Samestelling van program:*

Year level 1 / *Jaarvlak 1*			**Year level 2 / *Jaarvlak 2***			**Year level 3 / *Jaarvlak 3***		
First/*Eerste* semester			**First / *Eerste* semester**			**First/ *Eerste* semester**		
Module code/ *Modulekode*	**CORE/ *KERN***	**Cr/ *Kr***	**Module code/ *Modulekode***	**CORE/ *KERN***	**Cr/ *Kr***	**Module code/ *Modulekode***	**CORE/ *KERN***	**Cr/ *Kr***
ALDE/A111	X	12	*FLGX213 **or/*of*** MKBN211	X	16	BCHS316	H	16
*FLGX113 **or/*of*** **NPHY111	X	12	BCHN213	H	16	BCHS317	H	16
MCBN111	H	12	NCHE211	H	8	NCHE311	H	16
MTHS114	X	12	NCHE212	H	8	NCHE312	H	16
NCHE111	H	12	WVNS211	X	12			
Total / *Totaal* 1st semester		**60**	**Total / *Totaal* 1st semester**		**60**	**Total / *Totaal* 1st semester**		**64**
Year level 1 / *Jaarvlak 1*			**Year level 2 / *Jaarvlak 2***			**Year level 3 / *Jaarvlak 3***		
Second/*Tweede* semester			**Second/ *Tweede* semester**			**Second/ *Tweede* semester**		
Module code/ *Modulekode*	**CORE/ *KERN***	**Cr/ *Kr***	**Module code/ *Modulekode***	**CORE/ *KERN***	**Cr/ *Kr***	**Module code/ *Modulekode***	**CORE/ *KERN***	**Cr/ *Kr***
ALDE/A122	X	12	NCHE221	H	8	BCHS321	H	16
MCBN121	H	12	NCHE222	H	8	BCHS322	H	16
*FLGX123 **or/*of*** **NPHY121	X	12	BCHN222	H	16	NCHE321	H	16
MTHS124	X	12	*FLGX223 *FLGX224 **or/*of*** MKBS221	X X X	8 8 16	NCHE322	H	16
NCHE121	H	12	WVNS221	X	12			
Total / *Totaal* 2nd semester		**60**	**Total / *Totaal* 2nd semester**		**60**	**Total / *Totaal* 2nd semester**		**64**
Total year level / *Totaal jaarvlak* 1		**120**	**Total year level / *Totaal jaarvlak* 2**		**120**	**Total year level / *Totaal jaarvlak* 3**		**128**
Total credits for the programme / *Totaal krediete vir die program*								**368**

*FLGX only for Potch students- not offered at Mafikeng campus.

** NPHY111/121 only for Mafikeng students.

NAS.1.16.9.1 **OLD PROGRAMME PHASING OUT / OU PROGRAM FASEER UIT (PC): Bachelor of Science in Physical and Chemical Sciences / *Baccalaureus Scientiae in Fisiese en Chemiese Wetenskappe***

Curriculum/ *Kurrikulum*: N174P (Pipeline only)

CODE/*KODE:* 200190

CAMPUS/*KAMPUS*: Potchefstroom (AFRIKAANS, ENGLISH)

DELIVERY MODE/*AFLEWERINGSMETODE*: Full Time / *Voltyds*

Compilation of programme/ *Samestelling van program:* Biochemistry and Chemistry / *Biochemie en Chemie*

Year level 1 / *Jaarvlak 1*			**Year level 2 / *Jaarvlak 2***			**Year level 3 / *Jaarvlak 3***		
First/*Eerste* semester			**First / *Eerste* semester**			**First/ *Eerste* semester**		
Module code/ *Modulekode*	**CORE/ *KERN***	**Cr/ *Kr***	**Module code/ *Modulekode***	**CORE/ *KERN***	**Cr/ *Kr***	**Module code/ *Modulekode***	**CORE/ *KERN***	**Cr/ *Kr***
CHEM111	H	12	FLGX213	X	16	BCHS316	H	16
FLGX113	X	12	BCHN213	H	16	BCHS317	H	16
FSKS113	X	12	CHEN211	H	8	CHEM311	H	16
WISN111	X	12	CHEN212	H	8	CHEN312	H	16
AGLA/E111	X	12	WVNS211	X	12			
Total / *Totaal* 1st semester		**60**	**Total / *Totaal* 1st semester**		**60**	**Total / *Totaal* 1st semester**		**64**
Year level 1 / *Jaarvlak 1*			**Year level 2 / *Jaarvlak 2***			**Year level 3 / *Jaarvlak 3***		
Second/*Tweede* semester			**Second/ *Tweede* semester**			**Second/ *Tweede* semester**		
Module code/ *Modulekode*	**CORE/ *KERN***	**Cr/ *Kr***	**Module code/ *Modulekode***	**CORE/ *KERN***	**Cr/ *Kr***	**Module code/ *Modulekode***	**CORE/ *KERN***	**Cr/ *Kr***
AGLA/E121	X	12	CHEN222	H	8	BCHS321	H	16
CHEM121	H	12	CHEN223	H	8	BCHS322	H	16
FSKS123	X	12	BCHN222	H	16	CHEN321	H	16
FLGX123	X	12	FLGX223	X	8	CHEN322	H	16
WISN121	X	12	FLGX224	X	8			
			WVNS221	X	12			
Total / *Totaal* 2nd semester		**60**	**Total / *Totaal* 2nd semester**		**60**	**Total / *Totaal* 2nd semester**		**64**
Total year level / *Totaal jaarvlak* 1		**120**	**Total year level / *Totaal jaarvlak* 2**		**120**	**Total year level / *Totaal jaarvlak* 3**		**128**
Total credits for the programme / *Totaal krediete vir die program*								**368**

NAS.1.16.9.2 **OLD PROGRAMME PHASING OUT (MC):**
Bachelor of Science in Physical and Chemical Sciences

Curriculum: N174M (Pipeline only)

CODE: 200190

CAMPUS: Mafikeng (ENGLISH)

DELIVERY MODE: Full Time

Compilation of programme: Biochemistry and Chemistry

Year level 1			**Year level 2**			**Year level 3**		
First semester			**First semester**			**First semester**		
Module code	**CORE**	**Cr**	**Module code**	**CORE**	**Cr**	**Module code**	**CORE**	**Cr**
AGLE111	X	12	WVNS211	X	12	BCHS314	H	16
BGYM113	H	12	MKBS211	X	8	BCHS315	H	16
MAYM116	X	12	MKBS212	X	8	MCHE315	H	16
MCHE114	H	12	MCHE215	H	8	MCHE316	H	16
PHYM118	X	12	MCHE216	H	8			
			BCHS211	H	8			
			BCHS212	H	8			
Total 1st Semest		**60**	**Total 1st semest**		**60**	**Total 1st semest**		**64**
Year level 1			**Year level 2**			**Year level 3**		
Second semester			**Second semester**			**Second semester**		
Module code	**CORE**	**Cr**	**Module code**	**CORE**	**Cr**	**Module code**	**CORE**	**Cr**
BGYM123	H	12	WVNS221	X	12	BCHS324	H	16
PHYM128	X	12	MKBS223	X	8	BCHS325	H	16
MAYM126	X	12	MKBS222	X	8	MCHE321	H	16
AGLE121	X	12	MCHE221	H	8	MCHE322	H	16
MCHE121	H	12	MCHE223	H	8			
			BCHS221	H	8			
			BCHS222	H	8			
Total 2nd semest		**60**	**Total 2nd semest**		**60**	**Total 2nd semest**		**64**
Total year level 1		**120**	**Total year level 2**		**120**	**Total year level 3**		**128**
Total credits for the programme								**368**

***Core modules are indicated with (H) and ancillary modules with (X)**

NAS.1.16.10 **OLD PROGRAMME PHASING OUT:**
Bachelor of Science in Biology and Chemistry

No new intake in this programme, with effect from 2018.

Curriculum: N301M (Pipeline only)

CODE: 200173

CAMPUS: Mafikeng (ENGLISH)

DELIVERY MODE: Full Time

Compilation of programme: Biology and Chemistry

Year level 1			Year level 2			Year level 3		
First semester			**First semester**			**First semester**		
Module code	**CORE**	**Cr**	**Module code**	**CORE**	**Cr**	**Module code**	**CORE**	**Cr**
AGLE111	X	12	WVNS211	X	12	BGYM313	H	16
BGYM113	H	12	BGYM213	H	8	BGYM314	H	16
MAYM116	X	12	BGYM214	H	8	MCHE315	H	16
MCHE114	H	12	MCHE215	H	8	MCHE316	H	16
PHYM118	X	12	MCHE216	H	8			
			PHYM215	X	8			
			PHYM216	X	8			
Total 1st Semester		**60**	**Total 1st semester**		**60**	**Total 1st semester**		**64**

Year level 1			Year level 2			Year level 3		
Second semester			**Second semester**			**Second semester**		
Module code	**CORE**	**Cr**	**Module code**	**CORE**	**Cr**	**Module code**	**CORE**	**Cr**
BGYM123	H	12	WVNS221	X	12	BGYM326	H	32
MCHE121	H	12	BGYM227	H	8	MCHE321	H	16
PHYM128	X	12	BGYM225	H	8	MCHE322	H	16
MAYM126	X	12	PHYM221	X	8			
ALGE121	X	12	PHYM222	X	8			
			MCHE221	H	8			
			MCHE223	H	8			
Total 2nd semester		**60**	**Total 2nd semester**		**60**	**Total 2nd semester**		**64**
Total year level 1		**120**	**Total year level 2**		**120**	**Total year level 3**		**128**
Total credits for the programme								**368**

***Core modules are indicated with (H) and ancillary modules with (X)**

NAS.1.16.11 **OLD PROGRAMME PHASING OUT:**
Bachelor of Science in Biology and Geography

No new intake in this programme, with effect from 2018.

Curriculum: N301M (Pipeline only)

CODE: 200174

CAMPUS: Mafikeng (ENGLISH)

DELIVERY MODE: Full Time

Compilation of programme: Biology and Geography

Year level 1			Year level 2			Year level 3		
First semester			**First semester**			**First semester**		
Module code	**CORE**	**Cr**	**Module code**	**CORE**	**Cr**	**Module code**	**CORE**	**Cr**
AGLE111	X	12	WVNS211	X	12	BGYM316	H	16
CISM112	X	12	BGYM215	H	8	BGYM315	H	16
MAYM116	X	12	BGYM216	H	8	GEOM316	H	16
GEOM113	H	12	GEOM214	H	8	GEOM317	H	16
BGYM113	H	12	GEOM215	H	8			
			CISM213	X	8			
			CISM214	X	8			
Total 1st Semester		**60**	**Total 1st semester**		**60**	**Total 1st semester**		**64**

Year level 1			Year level 2			Year level 3		
Second semester			**Second semester**			**Second semester**		
Module code	**CORE**	**Cr**	**Module code**	**CORE**	**Cr**	**Module code**	**CORE**	**Cr**
AGLE121	X	12	WVNS222	X	12	BGYM326	H	32
CISM122	X	12	BGYM226	H	16	GEOM328	H	16
MAYM126	X	12	GEOM224	H	8	GEOM329	H	16
BGYM123	H	12	GEOM225	H	8			
GEOM123	H	12	CISM225	X	8			
			CISM226	X	8			
Total 2nd semester		**60**	**Total 2nd semester**		**60**	**Total 2nd semester**		**64**
Total year level 1		**120**	**Total year level 2**		**120**	**Total year level 3**		**128**
Total credits for the programme								**368**

***Core modules are indicated with (H) and ancillary modules with (X)**

NAS.1.16.12 **PROGRAMME: BACHELOR OF SCIENCE WITH PHYSICS AND MATHEMATICS /**
BACCALAUREUS SCIENTIAE MET FISIKA EN WISKUNDE

*All students who wish to continue with an honours degree in Mathematics, must complete both MTHS321 and MTHS322 in the second semester of the third year./

**Alle studente wat wil voortgaan met 'n honneursgraad in Wiskunde moet in die tweede semester van die derde jaar beide* MTHS321 *en* MTHS322 *voltooi.*

CODE/ *KODE:* 2FF H23 - N301P; N301M

CAMPUS/ *KAMPUS*: Potchefstroom (AFRIKAANS, ENGLISH);
Mafikeng (ENGLISH)

DELIVERY MODE/ *AFLEWERINGSMETODE*: Full Time / *Voltyds*

Compilation of programme / *Samestelling van program:*

Year level 1 / *Jaarvlak 1*			**Year level 2 / *Jaarvlak 2***			**Year level 3 / *Jaarvlak 3***		
First/*Eerste* semester			**First / *Eerste* semester**			**First/ *Eerste* semester**		
Module code/ *Modulekode*	**CORE/ *KERN***	**Cr/ *Kr***	**Module code/ *Modulekode***	**CORE/ *KERN***	**Cr/ *Kr***	**Module code/ *Modulekode***	**CORE/ *KERN***	**Cr/ *Kr***
ALDE/A111	X	12	NPHY211	H	8	NPHY311	H	16
NPHY111	H	12	NPHY212	H	8	NPHY312	H	16
CMPG111	X	12	APPM211	X	8	MTHS311	H	16
NCHE111 **OR/*OF*** STTN111* **OR/*OF*** APPM111**	X	12	APPM212	X	8	MTHS312	H	16
MTHS111	H	12	MTHS211	H	8			
			MTHS212	H	8			
			WVNS211	X	12			
Total / *Totaal* 1st semester		**60**	**Total / *Totaal* 1st semester**		**60**	**Total / *Totaal* 1st semester**		**64**
Year level 1 / *Jaarvlak 1*			**Year level 2 / *Jaarvlak 2***			**Year level 3 / *Jaarvlak 3***		
Second/*Tweede* semester			**Second/ *Tweede* semester**			**Second/ *Tweede* semester**		
Module code/ *Modulekode*	**CORE/ *KERN***	**Cr/ *Kr***	**Module code/ *Modulekode***	**CORE/ *KERN***	**Cr/ *Kr***	**Module code/ *Modulekode***	**CORE/ *KERN***	**Cr/ *Kr***
ALDE/A122	X	12	NPHY221	H	8	NPHY321	H	16
NPHY121	H	12	NPHY222	H	8	NPHY322	H	16
CMPG121	X	12	APPM221	X	8	MTHS321	H	16
APPM122	X	12	APPM222	X	8	MTHS322	H	16
MTHS121	H	12	MTHS221	H	8			
			MTHS222	H	8			
			WVNS221	X	12			
Total / *Totaal* 2nd semester		**60**	**Total / *Totaal* 2nd semester**		**60**	**Total / *Totaal* 2nd semester**		**64**
Total year level / *Totaal jaarvlak* 1		**120**	**Total year level / *Totaal jaarvlak* 2**		**120**	**Total year level / *Totaal jaarvlak* 3**		**128**
Total credits for the programme / *Totaal krediete vir die program*								**368**

*STTN111Only available on PC
**APPM111 Only available on MC.

NAS.1.16.12.1 **OLD PROGRAMME PHASING OUT / OU PROGRAM FASEER UIT (PC):**
Bachelor of Science in Physical and Chemical Sciences /
Baccalaureus Scientiae in Fisiese en Chemiese Wetenskappe

*All students who wish to continue with an honours degree in Mathematics, must complete both WISN322 and WISN324 in the second semester of the third year./

**Alle studente wat wil voortgaan met 'n honneursgraad in Wiskunde moet in die tweede semester van die derde jaar beide WISN322 en WISN324 voltooi.*

Curriculum/ *Kurrikulum*: N154P (Pipeline only)

CODE/ *KODE:* 200190

CAMPUS/ *KAMPUS:* Potchefstroom (AFRIKAANS, ENGLISH)

DELIVERY MODE/ *AFLEWERINGSMETODE:* Full Time / *Voltyds*

Compilation of programme / *Samestelling van program:* Physics and Mathematics /
Fisika en Wiskunde

Year level 1 / *Jaarvlak 1*			**Year level 2 / *Jaarvlak 2***			**Year level 3 / *Jaarvlak 3***		
First/*Eerste* semester			**First / *Eerste* semester**			**First/ *Eerste* semester**		
Module code/ *Modulekode*	**CORE/ *KERN***	**Cr/ *Kr***	**Module code/ *Modulekode***	**CORE/ *KERN***	**Cr/ *Kr***	**Module code/ *Modulekode***	**CORE/ *KERN***	**Cr/ *Kr***
AGLA/E111	X	12	FSKS211	H	8	FSKS311	H	16
FSKS111	H	12	FSKS212	H	8	FSKS312	H	16
ITRW115	X	12	TGWN211	X	8	WISN312	H	16
CHEM111 **OR/ *OF*** STTN111	X	12	TGWN213	X	8	WISN314	H	16
WISN111	H	12	WISN211	H	8			
			WISN212	H	8			
			WVNS211	X	12			
Total / *Totaal* 1st semester		**60**	**Total / *Totaal* 1st semester**		**60**	**Total / *Totaal* 1st semester**		**64**

Year level 1 / *Jaarvlak 1*			**Year level 2 / *Jaarvlak 2***			**Year level 3 / *Jaarvlak 3***		
Second/*Tweede* semester			**Second/ *Tweede* semester**			**Second/ *Tweede* semester**		
Module code/ *Modulekode*	**CORE/ *KERN***	**Cr/ *Kr***	**Module code/ *Modulekode***	**CORE/ *KERN***	**Cr/ *Kr***	**Module code/ *Modulekode***	**CORE/ *KERN***	**Cr/ *Kr***
AGLA/E121	X	12	FSKS221	H	8	FSKS321	H	16
FSKS121	H	12	FSKS222	H	8	FSKS322	H	16
ITRW124	X	12	TGWN221	X	8	WISN324 **OR/ *OF*** FSKS323	H	16
TGWN122	X	12	TGWN223	X	8	WISN322	H	16
WISN121	H	12	WISN224	H	8			
			WISN226	H	8			
			WVNS221	X	12			
Total / *Totaal* 2nd semester		**60**	**Total / *Totaal* 2nd semester**		**60**	**Total / *Totaal* 2nd semester**		**64**
Total year level / *Totaal jaarvlak* 1		**120**	**Total year level / *Totaal jaarvlak* 2**		**120**	**Total year level / *Totaal jaarvlak* 3**		**128**
Total credits for the programme / *Totaal krediete vir die program*								**368**

NAS.1.16.12.2 **OLD PROGRAMME PHASING OUT (MC):**
Bachelor of Science in Mathematics and Physics

Curriculum: N311M (Pipeline only)

CODE: 200134

CAMPUS: Mafikeng (ENGLISH)

DELIVERY MODE: Full Time

Compilation of programme: Mathematics and Physics

Year level 1			Year level 2			Year level 3		
First semester			**First semester**			**First semester**		
Module code	**CORE**	**Cr**	**Module code**	**CORE**	**Cr**	**Module code**	**CORE**	**Cr**
AGLE111	X	12	WVNS211	X	12	MAYM317	H	16
ELYM115	X	12	ELYM215	X	16	MAYM318	H	16
PHYM118	H	12	PHYM215	H	8	PHYM315	H	8
MAYM117	X	12	PHYM216	H	8	PHYM316	H	8
CISM112	X	12	MAYM217	H	16	PHYM317	H	8
						PHYM318	H	8
Total 1st Semester		**60**	**Total 1st semester**		**60**	**Total 1st semester**		**64**
Year level 1			**Year level 2**			**Year level 3**		
Second semester			**Second semester**			**Second semester**		
Module code	**CORE**	**Cr**	**Module code**	**CORE**	**Cr**	**Module code**	**CORE**	**Cr**
AGLE121	X	12	WVNS221	X	12	MAYM327	H	16
ELYM127	X	12	ELYM227	X	16	MAYM328	H	16
PHYM128	H	12	PHYM221	H	8	PHYM321	H	8
MAYM127	H	12	PHYM222	H	8	PHYM322	H	8
CISM124	X	12	MAYM227	H	16	PHYM323	H	8
						PHYM324	H	8
Total 2nd semester		**60**	**Total 2nd semester**		**60**	**Total 2nd semester**		**64**
Total year level 1		**120**	**Total year level 2**		**120**	**Total year level 3**		**128**
Total credits for the programme								**368**

***Core modules are indicated with (H) and ancillary modules with (X)**

NAS.1.16.13 PROGRAMME: BACHELOR OF SCIENCE WITH PHYSICS AND APPLIED MATHEMATICS / *BACCALAUREUS SCIENTIAE MET FISIKA EN TOEGEPASTE WISKUNDE*

NAS.1.16.13.1 Programme outcomes/ *Programuitkomste*

*All students who wish to continue with an honours degree in Applied Mathematics, must complete two of the three modules in the second semester of the third year. APPM321 Dynamical Systems, APPM322 Optimisation and APPM323 Fluid Mechanics. Please note that the module APPM323 Fluid Mechanics will only be presented on the Potchefstroom campus if there is sufficient interest, and if capacity allows it. Please consult the subject group Mathematics and Applied Mathematics for advice in this regard./

**Alle studente wat wil voortgaan met 'n honneursgraad in Toegepaste Wiskunde moet in die tweede semester van die derde jaar ten minste twee van die drie modules APPM321 Dinamiese Stelsels, APPM322 Optimalisering en APPM323 Vloeimeganika voltooi. Let asseblief daarop dat die module APPM323* Vloeimeganika slegs op die Potchefstroom kampus aangebied sal word indien daar voldoende belangstelling is en kapasiteit dit toelaat. Raadpleeg asseblief die vakgroep Wiskunde en Toegepaste Wiskunde vir advies in die verband.*

NAS.1.16.13.2 **Bachelor of Science with Physics and Applied Mathematics / *Baccalaureus Scientiae met Fisika en Toegepaste Wiskunde***

CODE/ *KODE:* 2FF H24 - N301P; N301M

CAMPUS/ *KAMPUS*: Potchefstroom (AFRIKAANS, ENGLISH); Mafikeng (ENGLISH)

DELIVERY MODE/ *AFLEWERINGSMETODE*: Full Time / *Voltyds*

Compilation of programme / *Samestelling van program:*

Year level 1 / *Jaarvlak 1*			**Year level 2 / *Jaarvlak 2***			**Year level 3 / *Jaarvlak 3***		
First/*Eerste* semester			**First / *Eerste* semester**			**First/ *Eerste* semester**		
Module code/ *Modulekode*	**CORE/ *KERN***	**Cr/ *Kr***	**Module code/ *Modulekode***	**CORE/ *KERN***	**Cr/ *Kr***	**Module code/ *Modulekode***	**CORE/ *KERN***	**Cr/ *Kr***
ALDE/A111	X	12	NPHY211	H	8	NPHY311	H	16
CMPG111	X	12	NPHY212	H	8	NPHY312	H	16
NPHY111	H	12	APPM211	H	8	APPM311	H	16
MTHS111	X	12	APPM212	H	8	APPM312(PC) APPM313**	H	16
NCHE111 **or/*of*** STTN111* **or/*of*** APPM111**	X X H	12	MTHS211	X	8			
			MTHS212	X	8			
			WVNS211	X	12			
Total / *Totaal* 1st semester		**60**	**Total / *Totaal* 1st semester**		**60**	**Total / *Totaal* 1st semester**		**64**

Year level 1 / *Jaarvlak 1*			**Year level 2 / *Jaarvlak 2***			**Year level 3 / *Jaarvlak 3***		
Second/*Tweede* semester			**Second/ *Tweede* semester**			**Second/ *Tweede* semester**		
Module code/ *Modulekode*	**CORE/ *KERN***	**Cr/ *Kr***	**Module code/ *Modulekode***	**CORE/ *KERN***	**Cr/ *Kr***	**Module code/ *Modulekode***	**CORE/ *KERN***	**Cr/ *Kr***
ALDE/A122	X	12	NPHY221	H	8	NPHY321	H	16
NPHY121	H	12	NPHY222	H	8	NPHY322	H	16
CMPG121	X	12	APPM221	H	8	**Choose 2 of the following modules / *Kies 2 van die volgende modules***		
APPM122	H	12	APPM222	H	8			
MTHS121	X	12	MTHS221	X	8			
			MTHS222*** **or/*of*** MTHS224	X	8	APPM321* **or/*of*** APPM322	H H	16 16
			WVNS221	X	12	**or/*of*** APPM323*	H	16
Total / *Totaal* 2nd semester		**60**	**Total / *Totaal* 2nd semester**		**60**	**Total / *Totaal* 2nd semester**		**64**
Total year level / *Totaal jaarvlak* 1		**120**	**Total year level / *Totaal jaarvlak* 2**		**120**	**Total year level / *Totaal jaarvlak* 3**		**128**
Total credits for the programme / *Totaal krediete vir die program*								**368**

*STTN111 only offered at PC/ *Slegs op PC beskikbaar*

*APPM321 only offered at PC and APPM323 will be offered if student numbers justify it/ APPM321 *slegs op PC beskikbaar en APPM323 slegs beskikbaar as studentegetalle dit regverdig.*

**APPM111/313 only offered at MC / *Slegs op MC beskikbaar*

*** Students who wish to take, MTHS322 must select MTHS222 as elective./ *Studente wat* MTHS322 *wil neem, moet* MTHS222 *as keusemodule neem.*

NAS.1.16.13.3 **OLD PROGRAMME PHASING OUT/ OU PROGRAM FASEER UIT (PC):**
Bachelor of Science in Physical and Chemical Sciences /
Baccalaureus Scientiae in Fisiese en Chemiese Wetenskappe

Curriculum/ *Kurrikulum:* N155P (Pipeline only)

CODE/ *KODE:* 200190

CAMPUS/ *KAMPUS:* Potchefstroom (AFRIKAANS, ENGLISH)

DELIVERY MODE/ *AFLEWERINGSMETODE:* Full Time / *Voltyds*

Compilation of programme / *Samestelling van program:* Physics and Applied Mathematics / *Fisika en Toegepaste Wiskunde*

Year level 1 / *Jaarvlak 1*			**Year level 2 / *Jaarvlak 2***			**Year level 3 / *Jaarvlak 3***		
First/*Eerste* semester			**First / *Eerste* semester**			**First/ *Eerste* semester**		
Module code/ *Modulekode*	**CORE/ *KERN***	**Cr/ *Kr***	**Module code/ *Modulekode***	**CORE/ *KERN***	**Cr/ *Kr***	**Module code/ *Modulekode***	**CORE/ *KERN***	**Cr/ *Kr***
AGLE/A111	X	12	FSKS211	H	8	FSKS311	H	16
FSKS111	H	12	FSKS212	H	8	FSKS312	H	16
ITRW115	X	12	TGWN211	H	8	TGWN311	H	16
CHEM111 **OR/*OF*** STTN111	X	12	TGWN213	H	8	TGWN312	H	16
WISN111	H	12	WISN211	X	8			
			WISN212	X	8			
			WVNS211	X	12			
Total / *Totaal* 1st semester		**60**	**Total / *Totaal* 1st semester**		**60**	**Total / *Totaal* 1st semester**		**64**
Year level 1 / *Jaarvlak 1*			**Year level 2 / *Jaarvlak 2***			**Year level 3 / *Jaarvlak 3***		
Second/*Tweede* semester			**Second/ *Tweede* semester**			**Second/ *Tweede* semester**		
Module code/ *Modulekode*	**CORE/ *KERN***	**Cr/ *Kr***	**Module code/ *Modulekode***	**CORE/ *KERN***	**Cr/ *Kr***	**Module code/ *Modulekode***	**CORE/ *KERN***	**Cr/ *Kr***
AGLE/A121	X	12	FSKS221	H	8	FSKS321	H	16
FSKS121	H	12	FSKS222	H	8	FSKS322	H	16
ITRW124	X	12	TGWN221	H	8	TGWN323 **OR/*OF*** FSKS323	H	16
TGWN122	H	12	TGWN223	H	8	TGWN322	H	16
WISN121	H	12	WISN224	X	8			
			*WISN226 **OR/*OF*** WISN227	X	8			
			WVNS221	X	12			
Total / *Totaal* 2nd semester		**60**	**Total / *Totaal* 2nd semester**		**60**	**Total / *Totaal* 2nd semester**		**64**
Total year level / *Totaal jaarvlak* 1		**120**	**Total year level / *Totaal jaarvlak* 2**		**120**	**Total year level / *Totaal jaarvlak* 3**		**128**
Total credits for the programme / *Totaal krediete vir die program*								**368**

NAS.1.16.13.4 **OLD PROGRAMME PHASING OUT (MC):**
Bachelor of Science in Applied Mathematics and Physics

Curriculum: N304M (Pipeline only)

CODE: 200152

CAMPUS: Mafikeng (ENGLISH)

DELIVERY MODE: Full Time

Compilation of programme: Applied Mathematics and Physics

First semester			First semester			First semester		
Module code	**CORE**	**Cr**	**Module code**	**CORE**	**Cr**	**Module code**	**CORE**	**Cr**
AGLE111	X	12	WVNS211	X	12	APMM317	H	16
APMM117	H	12	APMM217	H	16	APMM318	H	16
PHYM118	H	12	PHYM215	H	8	PHYM315	H	8
MAYM117	X	12	PHYM216	H	8	PHYM316	H	8
CISM112	X	12	MAYM217	X	16	PHYM317	H	8
						PHYM318	H	8
Total 1st Semester		**60**	**Total 1st semester**		**60**	**Total 1st semester**		**64**
Year level 1			**Year level 2**			**Year level 3**		
Second semester			**Second semester**			**Second semester**		
Module code	**CORE**	**Cr**	**Module code**	**CORE**	**Cr**	**Module code**	**CORE**	**Cr**
AGLE121	X	12	WVNS221	X	12	APMM327	H	16
APMM127	H	12	APMM227	H	16	APMM328	H	16
PHYM128	H	12	PHYM221	H	8	PHYM321	H	8
MAYM127	X	12	PHYM222	H	8	PHYM322	H	8
CISM124	X	12	MAYM227	X	16	PHYM323	H	8
						PHYM324	H	8
Total 2nd semester		**60**	**Total 2nd semester**		**60**	**Total 2nd semester**		**64**
Total year level 1		**120**	**Total year level 2**		**120**	**Total year level 3**		**128**
Total credits for the programme								**368**

***Core modules are indicated with (H) and ancillary modules with (X)**

NAS.1.16.14 PROGRAMME: BACHELOR OF SCIENCE WITH APPLIED MATHEMATICS AND ELECTRONICS

CODE: 2FF H14 - N301M

CAMPUS: Mafikeng (ENGLISH)

DELIVERY MODE: Full Time

Compilation of programme:

Year level 1			Year level 2			Year level 3		
First semester			First semester			First semester		
Module code	CORE	Cr	Module code	CORE	Cr	Module code	CORE	Cr
ALDE111	X	12	APPM212	H	8	APPM311	H	16
APPM111	H	12	APPM213	H	8	APPM313	H	16
CMPG111	X	12	MTHS211	X	8	ELYM315	H	16
MTHS111	X	12	MTHS212	X	8	ELYM316	H	16
ELYM115	H	12	ELYM215	H	16			
			WVNS211	X	12			
Total 1st Semester		**60**	**Total 1st semester**		**60**	**Total 1st semester**		**64**
Year level 1			**Year level 2**			**Year level 3**		
Second semester			**Second semester**			**Second semester**		
Module code	**CORE**	**Cr**	**Module code**	**CORE**	**Cr**	**Module code**	**CORE**	**Cr**
ALDE122	X	12	APPM222	H	8	APPM322	H	16
APPM122	H	12	APPM223	H	8	APPM323	H	16
CMPG121	X	12	MTHS221	X	8	ELYM327	H	16
MTHS121	X	12	MTHS222	X	8	ELYM328	H	16
ELYM127	H	12	ELYM227	H	16			
			WVNS221	X	12			
Total 2nd semester		**60**	**Total 2nd semester**		**60**	**Total 2nd semester**		**64**
Total year level 1		**120**	**Total year level 2**		**120**	**Total year level 3**		**128**
Total credits for the programme								**368**

NAS.1.16.15 PROGRAMME: BACHELOR OF SCIENCE WITH ELECTRONICS AND MATHEMATICS

CODE: 2FF H19 - N301M

CAMPUS: Mafikeng (ENGLISH)

DELIVERY MODE: Full Time

Compilation of programme:

Year level 1			Year level 2			Year level 3		
First semester			**First semester**			**First semester**		
Module code	**CORE**	**Cr**	**Module code**	**CORE**	**Cr**	**Module code**	**CORE**	**Cr**
ALDE111	X	12	APPM212	X	8	MTHS311	H	16
APPM111	X	12	APPM213	X	8	MTHS312	H	16
ELYM115	H	12	ELYM215	H	16	ELYM315	H	16
CMPG111	X	12	MTHS211	H	8	ELYM316	H	16
MTHS111	H	12	MTHS212	H	8			
			WVNS211	X	12			
Total 1st Semester		**60**	**Total 1st semester**		**60**	**Total 1st semester**		**64**
Year level 1			**Year level 2**			**Year level 3**		
Second semester			**Second semester**			**Second semester**		
Module code	**CORE**	**Cr**	**Module code**	**CORE**	**Cr**	**Module code**	**CORE**	**Cr**
ALDE122	X	12	APPM222	X	8	MTHS321	H	16
APPM122	X	12	APPM223	X	8	MTHS322	H	16
ELYM127	H	12	ELYM227	H	16	ELYM327	H	16
CMPG121	X	12	MTHS221	H	8	ELYM328	H	16
MTHS121	H	12	MTHS222	H	8			
			WVNS221	X	12			
Total 2nd semester		**60**	**Total 2nd semester**		**60**	**Total 2nd semester**		**64**
Total year level 1		**120**	**Total year level 2**		**120**	**Total year level 3**		**128**
Total credits for the programme								**368**

NAS.1.16.15.1 OLD PROGRAMME PHASING OUT (MC):
Bachelor of Science in Electronics and Mathematics

Curriculum: N309M (Pipeline only)

CODE: 200179

CAMPUS: Mafikeng (ENGLISH)

DELIVERY MODE: Full Time

Compilation of programme: Electronics and Mathematics

Year level 1			Year level 2			Year level 3		
First semester			**First semester**			**First semester**		
Module code	**CORE**	**Cr**	**Module code**	**CORE**	**Cr**	**Module code**	**CORE**	**Cr**
AGLE111	X	12	WVNS211	X	12	MAYM317	H	16
ELYM115	H	12	ELYM215	H	16	MAYM318	H	16
APMM117	X	12	APMM217	X	16	ELYM315	H	16
MAYM117	H	12	MAYM217	H	16	ELYM316	H	16
CISM112	X	12						
Total 1st Semester		**60**	**Total 1st semester**		**60**	**Total 1st semester**		**64**
Year level 1			**Year level 2**			**Year level 3**		
Second semester			**Second semester**			**Second semester**		
Module code	**CORE**	**Cr**	**Module code**	**CORE**	**Cr**	**Module code**	**CORE**	**Cr**
AGLE121	X	12	WVNS 221	X	12	MAYM327	H	16
ELYM127	H	12	ELYM 227	H	16	MAYM328	H	16
APMM127	X	12	APMM 227	X	16	ELYM327	H	16
MAYM127	H	12	MAYM 227	H	16	ELYM328	H	16
CISM124	X	12						
Total 2nd semester		**60**	**Total 2nd semester**		**60**	**Total 2nd semester**		**64**
Total year level 1		**120**	**Total year level 2**		**120**	**Total year level 3**		**128**
Total credits for the programme								**368**

***Core modules are indicated with (H) and ancillary modules with (X)**

NAS.1.16.16 PROGRAMME: BACHELOR OF SCIENCE WITH ELECTRONICS AND PHYSICS

CODE: 2FF H20 - N301M

CAMPUS: Mafikeng (ENGLISH)

DELIVERY MODE: Full Time

Compilation of programme:

Year level 1			Year level 2			Year level 3		
First semester			**First semester**			**First semester**		
Module code	**CORE**	**Cr**	**Module code**	**CORE**	**Cr**	**Module code**	**CORE**	**Cr**
ALDE111	X	12	ELYM215	H	16	ELYM315	H	16
ELYM115	H	12	MTHS211	X	8	ELYM316	H	16
MTHS111	X	12	MTHS212	X	8	NPHY311	H	16
CPMG111	X	12	NPHY211	H	8	NPHY312	H	16
NPHY111	H	12	NPHY212	H	8			
			WVNS211	X	12			
Total 1st Semester		**60`**	**Total 1st semester**		**60**	**Total 1st semester**		**64**
Year level 1			**Year level 2**			**Year level 3**		
Second semester			**Second semester**			**Second semester**		
Module code	**CORE**	**Cr**	**Module code**	**CORE**	**Cr**	**Module code**	**CORE**	**Cr**
ALDE122	X	12	ELYM227	H	16	ELYM327	H	16
ELYM127	H	12	MTHS221	X	8	ELYM328	H	16
MTHS121	X	12	MTHS222	X	8	NPHY321	H	16
CPMG121	X	12	NPHY221	H	8	NPHY322	H	16
NPHY121	H	12	NPHY222	H	8			
			WVNS221	X	12			
Total 2nd semester		**60`**	**Total 2nd semester**		**60`**	**Total 2nd semester**		**64**
Total year level 1		**120**	**Total year level 2**		**120**	**Total year level 3**		**128**
Total credits for the programme								**368**

NAS.1.16.16.1 **OLD PROGRAMME PHASING OUT (MC):**
Bachelor of Science in Electronics and Physics

Curriculum: N310M (Pipeline only)

CODE: 200180

CAMPUS: Mafikeng (ENGLISH)

DELIVERY MODE: Full Time

Compilation of programme: Electronics and Physics

Year level 1			Year level 2			Year level 3		
First semester			**First semester**			**First semester**		
Module code	**CORE**	**Cr**	**Module code**	**CORE**	**Cr**	**Module code**	**CORE**	**Cr**
AGLE111	X	12	WVNS211	X	12	PHYM315	H	8
ELYM115	H	12	ELYM215	H	16	PHYM316	H	8
PHYM118	H	12	PHYM215	H	8	PHYM317	H	8
MAYM117	X	12	PHYM216	H	8	PHYM318	H	8
CISM112	X	12	MAYM217	X	16	ELYM315	H	16
						ELYM316	H	16
Total 1st Semester		**60**	**Total 1st semester**		**60**	**Total 1st semester**		**64**
Year level 1			**Year level 2**			**Year level 3**		
Second semester			**Second semester**			**Second semester**		
Module code	**CORE**	**Cr**	**Module code**	**CORE**	**Cr**	**Module code**	**CORE**	**Cr**
AGLE121	X	12	WVNS221	X	12	PHYM321	H	8
ELYM127	H	12	ELYM227	H	16	PHYM322	H	8
PHYM128	H	12	PHYM221	H	8	PHYM323	H	8
MAYM127	X	12	PHYM222	H	8	PHYM324	H	8
CISM124	X	12	MAYM227	X	16	ELYM327	H	16
						ELYM328	H	16
Total 2nd semester		**60**	**Total 2nd semester**		**60**	**Total 2nd semester**		**64**
Total year level 1		**120**	**Total year level 2**		**120**	**Total year level 3**		**128**
Total credits for the programme								**368**

***Core modules are indicated with (H) and ancillary modules with (X)**

NAS.1.16.17 **PROGRAMME: BACHELOR OF SCIENCE WITH PHYSICS AND COMPUTER SCIENCE /**
BACCALAUREUS SCIENTIAE MET FISIKA EN REKENAARWETENSKAP

NAS.1.16.17.1 **Faculty-specific rules for the programme / Fakulteitspesifieke reëls vir die program**

- *****CMPG222 and **CMPG224 are campus electives - PC does 222* and MC does **224
- *CMPG315 and *CMPG313 are electives on PC, but MC should take **CMPG313 In the second semester of the third year PC does advanced DB (*CMPG321) and MC does Networks (**CMPG325)
- *STTN111 only available on PC and **NCHE111/121 only available on MC
- ***Students who wish to take, MTHS322 must select MTHS222 as elective

CODE/ *KODE:* 2FF H25 - N301P; N301M

CAMPUS/ *KAMPUS:* Potchefstroom (AFRIKAANS, ENGLISH), Mafikeng (ENGLISH)

DELIVERY MODE/ *AFLEWERINGSMETODE*: Full Time / *Voltyds*

Compilation of programme / *Samestelling van program:*

Year level 1 / *Jaarvlak 1*			**Year level 2 / *Jaarvlak 2***			**Year level 3 / *Jaarvlak 3***		
First/*Eerste* semester			**First / *Eerste* semester**			**First/ *Eerste* semester**		
Module code/ *Modulekode*	**CORE/ *KERN***	**Cr/ *Kr***	**Module code/ *Modulekode***	**CORE/ *KERN***	**Cr/ *Kr***	**Module code/ *Modulekode***	**CORE/ *KERN***	**Cr/ *Kr***
ALDE/A111	X	12	CMPG211	H	16	CMPG311	H	16
CMPG111	H	12	MTHS211	X	8	CMPG313**/ CMPG315*	H	16
MTHS111	X	12	MTHS212	X	8	NPHY311	H	16
STTN111* **OR/*OF*** NCHE111**	X	12	NPHY211	H	8	NPHY312	H	16
NPHY111	H	12	NPHY212	H	8			
			WVNS211	X	12			
Total / *Totaal* 1st semester		**60**	**Total / *Totaal* 1st semester**		**60**	**Total / *Totaal* 1st semester**		**64**
Year level 1 / *Jaarvlak 1*			**Year level 2 / *Jaarvlak 2***			**Year level 3 / *Jaarvlak 3***		
Second/*Tweede* semester			**Second/ *Tweede* semester**			**Second/ *Tweede* semester**		
Module code/ *Modulekode*	**CORE/ *KERN***	**Cr/ *Kr***	**Module code/ *Modulekode***	**CORE/ *KERN***	**Cr/ *Kr***	**Module code/ *Modulekode***	**CORE/ *KERN***	**Cr/ *Kr***
ALDE/A122	X	12	APPM222	X	8	CMPG321*/ CMPG325**	H	16
CMPG121	H	12	CMPG221	H	8	CMPG324	H	16
MTHS121	X	12	CMPG222*/ CMPG224**	H	8	NPHY321	H	16
APPM122 **OR/*OF*** NCHE121**	X	12	MTHS222*** **OR/*OF*** MTHS224	X	8	NPHY322	H	16
NPHY121	H	12	NPHY221	H	8			
			NPHY222	H	8			
			WVNS221	X	12			
Total / *Totaal* 2nd semester		**60**	**Total / *Totaal* 2nd semester**		**60**	**Total / *Totaal* 2nd semester**		**64**
Total year level / *Totaal jaarvlak* 1		**120**	**Total year level / *Totaal jaarvlak* 2**		**120**	**Total year level / *Totaal jaarvlak* 3**		**128**
Total credits for the programme / *Totaal krediete vir die program*								**368**

NAS.1.16.17.2 **OLD PROGRAMME PHASING OUT / OU PROGRAM FASEER UIT (PC): Bachelor of Science in Computer and Mathematical Sciences / *Baccalaureus Scientiae in Rekenaar- en Wiskundige Wetenskappe***

Curriculum/ *Kurrikulum* : N153P (Pipeline only)

CODE/ *KODE:* 200191

CAMPUS/ *KAMPUS:* Potchefstroom (AFRIKAANS, ENGLISH)

DELIVERY MODE/ *AFLEWERINGSMETODE:* Full Time / *Voltyds*

Compilation of programme / *Samestelling van program:* Physics and Computer Science / *Fisika en Rekenaarwetenskap*

Year level 1 / *Jaarvlak 1*			**Year level 2 / *Jaarvlak 2***			**Year level 3 / *Jaarvlak 3***		
First/*Eerste* semester			**First / *Eerste* semester**			**First/ *Eerste* semester**		
Module code/ *Modulekode*	**CORE/ *KERN***	**Cr/ *Kr***	**Module code/ *Modulekode***	**CORE/ *KERN***	**Cr/ *Kr***	**Module code/ *Modulekode***	**CORE/ *KERN***	**Cr/ *Kr***
ITRW112	H	12	ITRW212	H	16	ITRW311	H	16
WISN111	X	12	WISN211	X	8	ITRW316	H	16
STTN111	X	12	WISN212	X	8	FSKS311	H	16
FSKS111	H	12	FSKS211	H	8	FSKS312	H	16
AGLA111	X	12	FSKS212	H	8			
			WVNS211	X	12			
Total / *Totaal* 1st semester		**60**	**Total / *Totaal* 1st semester**		**60**	**Total / *Totaal* 1st semester**		**64**
Year level 1 / *Jaarvlak 1*			**Year level 2 / *Jaarvlak 2***			**Year level 3 / *Jaarvlak 3***		
Second/*Tweede* semester			**Second/ *Tweede* semester**			**Second/ *Tweede* semester**		
Module code/ *Modulekode*	**CORE/ *KERN***	**Cr/ *Kr***	**Module code/ *Modulekode***	**CORE/ *KERN***	**Cr/ *Kr***	**Module code/ *Modulekode***	**CORE/ *KERN***	**Cr/ *Kr***
ITRW124	H	12	ITRW222	H	16	ITRW321	H	16
WISN121	X	12	TGWN223	X	8	ITRW322	H	16
TGWN122	X	12	*WISN226 **OR/*OF*** WISN227	X	8	FSKS321	H	16
FSKS121	H	12	FSKS221	H	8	FSKS322	H	16
AGLA121	X	12	FSKS222	H	8			
			WVNS221	X	12			
Total / *Totaal* 2nd semester		**60**	**Total / *Totaal* 2nd semester**		**60**	**Total / *Totaal* 2nd semester**		**64**
Total year level / *Totaal jaarvlak* 1		**120**	**Total year level / *Totaal jaarvlak* 2**		**120**	**Total year level / *Totaal jaarvlak* 3**		**128**
Total credits for the programme / *Totaal krediete vir die program*								**368**

NAS.1.16.18 **PROGRAMME: BACHELOR OF SCIENCE WITH CHEMISTRY AND COMPUTER SCIENCE**

CODE: 2FF H31 - N301M

CAMPUS: Mafikeng (ENGLISH)

DELIVERY MODE: Full Time

Compilation of programme:

Year level 1			**Year level 2**			**Year level 3**		
First semester			**First semester**			**First semester**		
Module code	**CORE**	**Cr**	**Module code**	**CORE**	**Cr**	**Module code**	**CORE**	**Cr**
ALDE111	X	12	MTHS211	X	8	CMPG311	H	16
NCHE111	H	12	MTHS212	X	8	CMPG313	H	16
MTHS111	X	12	CMPG211	H	16	NCHE311	H	16
CMPG111	H	12	NCHE211	H	8	NCHE312	H	16
NPHY111	X	12	NCHE212	H	8			
			WVNS211	X	12			
Total 1st Semester		**60**	**Total 1st semester**		**60**	**Total 1st semester**		**64**
Year level 1			**Year level 2**			**Year level 3**		
Second semester			**Second semester**			**Second semester**		
Module code	**CORE**	**Cr**	**Module code**	**CORE**	**Cr**	**Module code**	**CORE**	**Cr**
ALDE122	X	12	NCHE221	H	8	CMPG324	H	16
NCHE121	H	12	NCHE222	H	8	CMPG325	H	16
MTHS121	X	12	CMPG221	H	8	NCHE321	H	16
CMPG121	H	12	CMPG224	H	8	NCHE322	H	16
NPHY121	X	12	MTHS221	X	8			
			MTHS222	X	8			
			WVNS221	X	12			
Total 2nd semester		**60**	**Total 2nd semester**		**60**	**Total 2nd semester**		**64**
Total year level 1		**120**	**Total year level 2**		**120**	**Total year level 3**		**128**
Total credits for the programme								**368**

NAS.1.16.18.1 **OLD PROGRAMME PHASING OUT (PC):**
Bachelor of Science in Chemistry and Computer Science

Curriculum: N120M (Pipeline only)

CODE: 200130

CAMPUS: Mafikeng (ENGLISH)

DELIVERY MODE: Full Time

Compilation of programme: Chemistry and Computer Science

Year level 1			Year level 2			Year level 3		
First semester			**First semester**			**First semester**		
Module code	**CORE**	**Cr**	**Module code**	**CORE**	**Cr**	**Module code**	**CORE**	**Cr**
AGLE111	X	12	WVNS211	X	12	MCHE315	H	16
CISM112	H	12	CISM213	H	8	MCHE316	H	16
MAYM117	X	12	CISM214	H	8	CISM313	H	16
MCHE114	H	12	MAYM217	X	16	CISM314	H	16
PHYM118	X	12	MCHE215	H	8			
			MCHE216	H	8			
Total 1st Semester		**60**	**Total 1st semester**		**60**	**Total 1st semester**		**64**

Year level 1			Year level 2			Year level 3		
Second semester			**Second semester**			**Second semester**		
Module code	**CORE**	**Cr**	**Module code**	**CORE**	**Cr**	**Module code**	**CORE**	**Cr**
AGLE121	X	12	WVNS221	X	12	MCHE321	H	16
CISM122	H	12	CISM225	H	8	MCHE322	H	16
MAYM127	X	12	CISM226	H	8	CISM326	H	16
MCHE121	H	12	MAYM227	X	16	CISM327	H	16
PHYM128	X	12	MCHE221	H	8			
			MCHE223	H	8			
Total 2nd semester		**60**	**Total 2nd semester**		**60**	**Total 2nd semester**		**64**
Total year level 1		**120**	**Total year level 2**		**120**	**Total year level 3**		**128**
Total credits for the programme								**368**

NAS.1.16.19 **PROGRAMME: BACHELOR OF SCIENCE WITH COMPUTER SCIENCE AND ELECTRONICS**

CODE*:* 2FF H17 - N301M

CAMPUS: Mafikeng (ENGLISH)

DELIVERY MODE: Full Time

Compilation of programme:

Year level 1			**Year level 2**			**Year level 3**		
First semester			**First semester**			**First semester**		
Module code	**CORE**	**Cr**	**Module code**	**CORE**	**Cr**	**Module code**	**CORE**	**Cr**
ALDE111	X	12	CMPG211	H	16	CMPG311	H	16
ELYM115	H	12	ELYM215	H	16	CMPG313	H	16
MTHS111	X	12	MTHS211	X	8	ELYM315	H	16
CMPG111	H	12	MTHS212	X	8	ELYM316	H	16
NPHY111	X	12	WVNS211	X	12			
Total 1st Semester		**60**	**Total 1st semester**		**60**	**Total 1st semester**		**64**
Year level 1			**Year level 2**			**Year level 3**		
Second semester			**Second semester**			**Second semester**		
Module code	**CORE**	**Cr**	**Module code**	**CORE**	**Cr**	**Module code**	**CORE**	**Cr**
ALDE122	X	12	CMPG221	H	8	CMPG324	H	16
ELYM127	H	12	CMPG224	H	8	CMPG325	H	16
MTHS121	X	12	ELYM227	H	16	ELYM325	H	16
CMPG121	H	12	MTHS221	X	8	ELYM327	H	16
NPHY121	X	12	MTHS222	X	8			
			WVNS221	X	12			
Total 2nd semester		**60**	**Total 2nd semester**		**60**	**Total 2nd semester**		**64**
Total year level 1		**120**	**Total year level 2**		**120**	**Total year level 3**		**128**
Total credits for the programme								**368**

NAS.1.16.19.1 **OLD PROGRAMME PHASING OUT (MC):**
Bachelor of Science in Computer Science and Electronics

Curriculum: N125M (Pipeline only)

CODE: 200177

CAMPUS: Mafikeng (ENGLISH)

DELIVERY MODE: Full Time

Compilation of programme: Computer Science and Electronics

Year level 1			Year level 2			Year level 3		
First semester			**First semester**			**First semester**		
Module code	**CORE**	**Cr**	**Module code**	**CORE**	**Cr**	**Module code**	**CORE**	**Cr**
AGLE111	X	12	WVNS211	X	12	CISM313	H	16
CISM112	H	12	CISM213	H	8	CISM314	H	16
ELYM115	X	12	CISM214	H	8	ELYM315	H	16
MAYM117	H	12	ELYM215	H	16	ELYM316	H	16
PHYM118	X	12	MAYM217	X	16			
Total 1st Semester		**60**	**Total 1st semester**		**60**	**Total 1st semester**		**64**
Year level 1			**Year level 2**			**Year level 3**		
Second semester			**Second semester**			**Second semester**		
Module code	**CORE**	**Cr**	**Module code**	**CORE**	**Cr**	**Module code**	**CORE**	**Cr**
AGLE121	X	12	WVNS221	X	12	CISM326	H	16
CISM122	H	12	CISM225	H	8	CISM327	H	16
	X	12	CISM226	H	8	ELYM327	H	16
ELYM127	H	12	ELYM227	H	16	ELYM328	H	16
MAYM127	X	12	MAYM227	X	16			
PHYM128								
Total 2nd semester		**60**	**Total 2nd semester**		**60**	**Total 2nd semester**		**64**
Total year level 1		**120**	**Total year level 2**		**120**	**Total year level 3**		**128**
Total credits for the programme								**368**

NAS.1.16.20 **PROGRAMME: BACHELOR OF SCIENCE WITH COMPUTER SCIENCE AND STATISTICS /**
BACCALAUREUS SCIENTIAE MET REKENAARWETENSKAP EN STATISTIEK

CODE/ *KODE:* 2FF H26 - N301P; N301V

CAMPUS/ *KAMPUS:* Potchefstroom (AFRIKAANS, ENGLISH),
Vaaltriangle (ENGLISH see NAS1.7)

DELIVERY MODE/ *AFLEWERINGSMETODE:* Full Time / *Voltyds*

Compilation of programme / *Samestelling van program:*

Year level 1 / *Jaarvlak 1*			**Year level 2 / *Jaarvlak 2***			**Year level 3 / *Jaarvlak 3***		
First/*Eerste* semester			**First / *Eerste* semester**			**First/ *Eerste* semester**		
Module code/ *Modulekode*	**CORE/ *KERN***	**Cr/ *Kr***	**Module code/ *Modulekode***	**CORE/ *KERN***	**Cr/ *Kr***	**Module code/ *Modulekode***	**CORE/ *KERN***	**Cr/ *Kr***
CMPG111	H	12	CMPG211	H	16	CMPG311	H	16
STTN115	H	12	STTN215	H	16	CMPG315	H	16
MTHS111	X	12	MTHS211	X	8	STTN316	H	24
NPHY111* ECON112**	X	12	MTHS212	X	8	STTN317	H	8
ALDE/A111	X	12	WVNS211	X	12			
Total / *Totaal* 1st semester		**60**	**Total / *Totaal* 1st semester**		**60**	**Total / *Totaal* 1st semester**		**64**
Year level 1 / *Jaarvlak 1*			**Year level 2 / *Jaarvlak 2***			**Year level 3 / *Jaarvlak 3***		
Second/*Tweede* semester			**Second/ *Tweede* semester**			**Second/ *Tweede* semester**		
Module code/ *Modulekode*	**CORE/ *KERN***	**Cr/ *Kr***	**Module code/ *Modulekode***	**CORE/ *KERN***	**Cr/ *Kr***	**Module code/ *Modulekode***	**CORE/ *KERN***	**Cr/ *Kr***
CMPG121	H	12	CMPG221	H	8	CMPG321	H	16
STTN125	H	12	CMPG222	H	8	CMPG324	H	16
MTHS121	X	12	STTN225	H	16	STTN326	H	16
APPM122* ECON122**	X	12	MTHS221	X	8	STTN327	H	16
ALDE/A122	X	12	MTHS222	X	8			
			WVNS221	X	12			
Total / *Totaal* 2nd semester		**60**	**Total / *Totaal* 2nd semester**		**60**	**Total / *Totaal* 2nd semester**		**64**
Total year level / *Totaal jaarvlak* 1		**120**	**Total year level / *Totaal jaarvlak* 2**		**120**	**Total year level / *Totaal jaarvlak* 3**		**128**
Total credits for the programme / *Totaal krediete vir die program*								**368**

*Can only be taken on Potchefstroom campus / * *Kan slegs by Potchefstroomkampus geneem word.*

**Can only be taken on Vaaltriangle campus / ** *Kan slegs by die Vaaldriekhoekkampus geneem word.*

NAS.1.16.20.1 **OLD PROGRAMME PHASING OUT / OU PROGRAM FASEER UIT PC/VTC: Bachelor of Science in Computer and Mathematical Science/ *Baccalaureus Scientiae in Rekenaarwetenskap en Wiskundige Wetenskappe***

Curriculum/ *Kurrikulum*: N156P; N156V (Pipeline only)

CODE/ *KODE*: 200191

CAMPUS/ *KAMPUS:* Potchefstroom (AFRIKAANS, ENGLISH),
Vaaltriangle (ENGLISH see NAS1.7)

DELIVERY MODE/ *AFLEWERINGSMETODE:* Full Time / *Voltyds*

Compilation of programme / *Samestelling van program*: Computer Science and Statistics / *Rekenaarwetenskap en Statistiek*

Year level 1 / *Jaarvlak 1*			**Year level 2 / *Jaarvlak 2***			**Year level 3 / *Jaarvlak 3***		
First/*Eerste* semester			**First / *Eerste* semester**			**First/ *Eerste* semester**		
Module code/ *Modulekode*	**CORE/ *KERN***	**Cr/ *Kr***	**Module code/ *Modulekode***	**CORE/ *KERN***	**Cr/ *Kr***	**Module code/ *Modulekode***	**CORE/ *KERN***	**Cr/ *Kr***
ITRW112	H	12	ITRW212	H	16	ITRW311	H	16
STTN115	H	12	STTN215	H	16	ITRW316	H	16
WISN111	X	12	WISN211	X	8	STTN316	H	24
FSKS111	X	12	WISN212	X	8	STTN317		8
AGLA111	X	12	WVNS211	X	12			
Total / *Totaal* 1st semester		**60**	**Total / *Totaal* 1st semester**		**60**	**Total / *Totaal* 1st semester**		**64**
Year level 1 / *Jaarvlak 1*			**Year level 2 / *Jaarvlak 2***			**Year level 3 / *Jaarvlak 3***		
Second/*Tweede* semester			**Second/ *Tweede* semester**			**Second/ *Tweede* semester**		
Module code/ *Modulekode*	**CORE/ *KERN***	**Cr/ *Kr***	**Module code/ *Modulekode***	**CORE/ *KERN***	**Cr/ *Kr***	**Module code/ *Modulekode***	**CORE/ *KERN***	**Cr/ *Kr***
ITRW124	H	12	ITRW222	H	16	ITRW321	H	16
STTN125	H	12	STTN225	H	16	ITRW322	H	16
WISN121	X	12	WISN224	X	8	STTN326	H	16
TGWN122	X	12	WISN226	X	8	STTN327	H	16
AGLA121	X	12	WVNS221	X	12			
Total / *Totaal* 2nd semester		**60**	**Total / *Totaal* 2nd semester**		**60**	**Total / *Totaal* 2nd semester**		**64**
Total year level / *Totaal jaarvlak* 1		**120**	**Total year level / *Totaal jaarvlak* 2**		**120**	**Total year level / *Totaal jaarvlak* 3**		**128**
Total credits for the programme / *Totaal krediete vir die program*								**368**

NAS.1.16.21 **PROGRAMME: BACHELOR OF SCIENCE WITH COMPUTER SCIENCE AND MATHEMATICS /**
BACCALAUREUS SCIENTIAE MET REKENAARWETENSKAP EN WISKUNDE

CODE/ *KODE*: 2FF H09 - N301P; N301M

CAMPUS/ *KAMPUS:* Potchefstroom (AFRIKAANS, ENGLISH), Mafikeng (ENGLISH)

DELIVERY MODE/ *AFLEWERINGSMETODE:* Full Time / *Voltyds*

Compilation of programme / *Samestelling van program:*

Year level 1 / *Jaarvlak 1*			**Year level 2 / *Jaarvlak 2***			**Year level 3 / *Jaarvlak 3***		
First/*Eerste* semester			**First / *Eerste* semester**			**First/ *Eerste* semester**		
Module code/ *Modulekode*	**CORE/ *KERN***	**Cr/ *Kr***	**Module code/ *Modulekode***	**CORE/ *KERN***	**Cr/ *Kr***	**Module code/ *Modulekode***	**CORE/ *KERN***	**Cr/ *Kr***
CMPG111	H	12	CMPG211	H	16	CMPG311	H	16
STTN115* **OR/*OF*** APPM111**	X	12	STTN215* **OR/*OF*** APPM212** **&** APPM213**	X	16 8 8	CMPG313** **OR/*OF*** CMPG315*	H	16
MTHS111	H	12	MTHS211	H	8	MTHS311	H	16
NPHY111	X	12	MTHS212	H	8	MTHS312	H	16
ALDE/A111	X	12	WVNS211	X	12			
Total / *Totaal* 1st semester		**60**	**Total / *Totaal* 1st semester**		**60**	**Total / *Totaal* 1st semester**		**64**
Year level 1 / *Jaarvlak 1*			**Year level 2 / *Jaarvlak 2***			**Year level 3 / *Jaarvlak 3***		
Second/*Tweede* semester			**Second/ *Tweede* semester**			**Second/ *Tweede* semester**		
Module code/ *Modulekode*	**CORE/ *KERN***	**Cr/ *Kr***	**Module code/ *Modulekode***	**CORE/ *KERN***	**Cr/ *Kr***	**Module code/ *Modulekode***	**CORE/ *KERN***	**Cr/ *Kr***
APPM122	H	12	CMPG221	H	8	CMPG324	H	16
CMPG121	H	12	CMPG222* **OR/*OF*** CMPG224**	H	8 8	CMPG321* **OR/*OF*** CMPG325**	H	16
MTHS121	H	12	MTHS221	H	8	MTHS321	H	16
			MTHS222	H	8	MTHS322	H	16
STTN125* **OR/*OF*** NPHY121**	X	12	STTN225* **OR/*OF*** APPM222** **&** APPM223**	X	16 8 8			
ALDE/A122	X	12	WVNS221	X	12			
Total / *Totaal* 2nd semester		**60**	**Total / *Totaal* 2nd semester**		**60**	**Total / *Totaal* 2nd semester**		**64**
Total year level / *Totaal jaarvlak* 1		**120**	**Total year level / *Totaal jaarvlak* 2**		**120**	**Total year level / *Totaal jaarvlak 3***		**128**
Total credits for the programme / *Totaal krediete vir die program*								**368**

1st & 2nd yr: *STTN115/125 and STTN215/225 only PC
1st yr: **APPM111, **NPHY121 and **APPM212/213 and **APPM222/223 only MC
2nd yr: *CMPG222 only PC/PK and **CMPG224 only MC
3rd yr: *CMPG313/315 are electives on PC, but MC should take **CMPG313.
3rd yr: In the 2nd semester of the 3rd yr PC does *CMPG321 and MC does **CMPG325.

NAS.1.16.21.1 **OLD PROGRAMME PHASING OUT / OU PROGRAM FASEER UIT PC:**
Bachelor of Science in Computer and Mathematical Sciences /
Baccalaureus Scientiae in Rekenaar- en Wiskundige Wetenskappe

Curriculum/ *Kurrikulum:* N157P (Pipeline only)

CODE/ *KODE*: 200191

CAMPUS/ *KAMPUS*: Potchefstroom (AFRIKAANS, ENGLISH)

DELIVERY MODE/ *AFLEWERINGSMETODE*: Full Time / *Voltyds*

Compilation of programme / *Samestelling van program:* Computer Science and Mathematics/
Rekenaarwetenskap en Wiskunde

Year level 1 / *Jaarvlak 1*			**Year level 2 / *Jaarvlak 2***			**Year level 3 / *Jaarvlak 3***		
First/*Eerste* semester			**First / *Eerste* semester**			**First/ *Eerste* semester**		
Module code/ *Modulekode*	**CORE/ *KERN***	**Cr/ *Kr***	**Module code/ *Modulekode***	**CORE/ *KERN***	**Cr/ *Kr***	**Module code/ *Modulekode***	**CORE/ *KERN***	**Cr/ *Kr***
ITRW112	H	12	ITRW212	H	16	ITRW311	H	16
WISN111	H	12	WISN211	H	8	ITRW316	H	16
STTN115	X	12	WISN212	H	8	WISN314	H	16
FSKS111	X	12	STTN215	X	16	WISN312	H	16
AGLE111	X	12	WVNS211	X	12			
Total / *Totaal* 1st semester		**60**	**Total / *Totaal* 1st semester**		**60**	**Total / *Totaal* 1st semester**		**64**
Year level 1 / *Jaarvlak 1*			**Year level 2 / *Jaarvlak 2***			**Year level 3 / *Jaarvlak 3***		
Second/*Tweede* semester			**Second/ *Tweede* semester**			**Second/ *Tweede* semester**		
Module code/ *Modulekode*	**CORE/ *KERN***	**Cr/ *Kr***	**Module code/ *Modulekode***	**CORE/ *KERN***	**Cr/ *Kr***	**Module code/ *Modulekode***	**CORE/ *KERN***	**Cr/ *Kr***
ITRW124	H	12	ITRW222	H	16	ITRW321	H	16
WISN121	H	12	WISN224	H	8	ITRW322	H	16
STTN125	X	12	WISN226	H	8	WISN324	H	16
TGWN122	H	12	STTN225	X	16	WISN322	H	16
AGLE121	X	12	WVNS221	X	12			
Total / *Totaal* 2nd semester		**60**	**Total / *Totaal* 2nd semester**		**60**	**Total / *Totaal* 2nd semester**		**64**
Total year level / *Totaal jaarvlak* 1		**120**	**Total year level / *Totaal jaarvlak* 2**		**120**	**Total year level / *Totaal jaarvlak* 3**		**128**
Total credits for the programme / *Totaal krediete vir die program*								**368**

NAS.1.16.21.2 **OLD PROGRAMME PHASING OUT (MC):**
Bachelor of Science in Computer Science and Mathematics

Curriculum: N127M (Pipeline only)

CODE: 200137

CAMPUS: Mafikeng (ENGLISH)

DELIVERY MODE: Full Time

Compilation of programme: Computer Science and Mathematics

Year level 1			Year level 2			Year level 3		
First semester			First semester			First semester		
Module code	CORE	Cr	Module code	CORE	Cr	Module code	CORE	Cr
AGLE111	X	12	WVNS211	X	12	CISM313	H	16
CISM112	H	12	CISM213	H	8	CISM314	H	16
PHYM118	X	12	CISM214	H	8	MAYM317	H	16
MAYM117	H	12	MAYM217	H	16	MAYM318	H	16
APMM117	X	12	APMM217	X	16			
Total 1st Semester		60	Total 1st semester		60	Total 1st semester		64
Year level 1			Year level 2			Year level 3		
Second semester			Second semester			Second semester		
Module code	CORE	Cr	Module code	CORE	Cr	Module code	CORE	Cr
AGLE121	X	12	WVNS221	X	12	CISM326	H	16
CISM122	H	12	CISM225	H	8	CISM327	H	16
MAYM127	H	12	CISM226	H	8	MAYM327	H	16
APMM127	X	12	MAYM227	H	16	MAYM328	H	16
PHYM 128	X	12	APMM227	X	16			
Total 2nd semester		60	Total 2nd semester		60	Total 2nd semester		64
Total year level 1		120	Total year level 2		120	Total year level 3		128
Total credits for the programme								368

NAS.1.16.22 **PROGRAMME: BACHELOR OF SCIENCE WITH COMPUTER SCIENCE AND ECONOMICS/**
BACCALAUREUS SCIENTIAE MET REKENAARWETENSKAP EN EKONOMIE

CODE/ *KODE:* 2FF H28 - **N301P; N301V**

CAMPUS/ *KAMPUS:* Potchefstroom (AFRIKAANS, ENGLISH),
Vaaltriangle (ENGLISH, see NAS1.7)

DELIVERY MODE/ *AFLEWERINGSMETODE:* Full Time / *Voltyds*

Compilation of programme / *Samestelling van program:*

Year level 1 / *Jaarvlak 1*			**Year level 2 / *Jaarvlak 2***			**Year level 3 / *Jaarvlak 3***		
First/*Eerste* semester			**First / *Eerste* semester**			**First/ *Eerste* semester**		
Module code/ *Modulekode*	**CORE/ *KERN***	**Cr/ *Kr***	**Module code/ *Modulekode***	**CORE/ *KERN***	**Cr/ *Kr***	**Module code/ *Modulekode***	**CORE/ *KERN***	**Cr/ *Kr***
ALDE/A111	X	12	ECON211	H	16	ECON313*	H	16
CMPG111	H	12	CMPG211	H	16	ECON314*	H	16
MTHS111	X	12	MTHS211	X	8	CMPG311	H	16
ECON112	H	12	MTHS212	X	8	CMPG315	H	16
ACCF111 **OR/*OF*** ACCS111	X	16	WVNS211	X	12			
Total / *Totaal* 1st semester		**64**	**Total / *Totaal* 1st semester**		**60**	**Total / *Totaal* 1st semester**		**64**
Year level 1 / *Jaarvlak 1*			**Year level 2 / *Jaarvlak 2***			**Year level 3 / *Jaarvlak 3***		
Second/*Tweede* semester			**Second/ *Tweede* semester**			**Second/ *Tweede* semester**		
Module code/ *Modulekode*	**CORE/ *KERN***	**Cr/ *Kr***	**Module code/ *Modulekode***	**CORE/ *KERN***	**Cr/ *Kr***	**Module code/ *Modulekode***	**CORE/ *KERN***	**Cr/ *Kr***
ALDE/A122	X	12	ECON221	H	16	ECON322*	H	16
CMPG121	H	12	CMPG221	H	8	ECON325*	H	16
MTHS121	X	12	CMPG222	H	8	CMPG321	H	16
ECON122	H	12	MTHS221	X	8	CMPG324	H	16
ACCF121 **OR/*OF*** ACCS121	X	16	MTHS222	X	8			
			WVNS221	X	12			
Total / *Totaal* 2nd semester		**64**	**Total / *Totaal* 2nd semester**		**60**	**Total / *Totaal* 2nd semester**		**64**
Total year level / *Totaal jaarvlak* 1		**128**	**Total year level / *Totaal jaarvlak* 2**		**120**	**Total year level / *Totaal jaarvlak* 3**		**128**
Total credits for the programme / *Totaal krediete vir die program*								**376**

***Please note** that as of 2020, the package of modules ECON313, ECON314, ECON322 and ECON325 will be a prerequisite for Honours studies in Economics.
That means that students registered for this degree need to already do these modules in 2019 to going on to Honours in Economics. / Neem kennis dat vanaf 2020, die volgende modules as voorvereistes vir die Honeursstudie in Ekonomie sal wees: ECON313, ECON314, ECON322 en ECON325

NAS.1.16.22.1 **OLD PROGRAMME PHASING OUT / OU PROGRAM FASEER UIT PC/VTC: Bachelor of Science in Computer and Mathematical Sciences/ *Baccalaureus Scientiae in Rekenaar- en Wiskundige Wetenskappe***

Curriculum/ *Kurrikulum:* N175P; N175V (Pipeline only)

CODE/ *KODE*: 200191 - N175P; N175V

CAMPUS/ *KAMPUS*: Potchefstroom (AFRIKAANS, ENGLISH),
Vaaltriangle (ENGLISH see NAS1.7)

DELIVERY MODE/ *AFLEWERINGSMETODE*: Full Time / *Voltyds*

Compilation of programme / *Samestelling van program:* Computer Science and Economics / *Rekenaarwetenskap en Ekonomie*

Year level 1 / *Jaarvlak 1*			**Year level 2 / *Jaarvlak 2***			**Year level 3 / *Jaarvlak 3***		
First/*Eerste* semester			**First / *Eerste* semester**			**First/ *Eerste* semester**		
Module code/ *Modulekode*	**CORE/ *KERN***	**Cr/ *Kr***	**Module code/ *Modulekode***	**CORE/ *KERN***	**Cr/ *Kr***	**Module code/ *Modulekode***	**CORE/ *KERN***	**Cr/ *Kr***
ITRW112	H	12	ECON211	H	16	EKRP311	H	16
WISN111	X	12	ITRW212	H	16	ECON311	H	16
ECON111	H	12	WISN211	X	8	ITRW311	H	16
ACCF111 **OF** ACCS111	X	16	WISN212	X	8	ITRW316	H	16
AGLA111	X	12	WVNS211	X	12			
Total / *Totaal* 1st semester		**64**	**Total / *Totaal* 1st semester**		**60**	**Total / *Totaal* 1st semester**		**64**
Year level 1 / *Jaarvlak 1*			**Year level 2 / *Jaarvlak 2***			**Year level 3 / *Jaarvlak 3***		
Second/*Tweede* semester			**Second/ *Tweede* semester**			**Second/ *Tweede* semester**		
Module code/ *Modulekode*	**CORE/ *KERN***	**Cr/ *Kr***	**Module code/ *Modulekode***	**CORE/ *KERN***	**Cr/ *Kr***	**Module code/ *Modulekode***	**CORE/ *KERN***	**Cr/ *Kr***
ITRW124	H	12	ECON221	H	16	EKRP321	H	16
WISN121	X	12	ITRW222	H	16	ECON321	H	16
ECON121	H	12	WISN224	X	8	ITRW321	H	16
ACCF121 **OF** ACCS121	X	16	WISN226	X	8	ITRW322	H	16
AGLA121	X	12	WVNS221	X	12			
Total / *Totaal* 2nd semester		**64**	**Total / *Totaal* 2nd semester**		**60**	**Total / *Totaal* 2nd semester**		**64**
Total year level / *Totaal jaarvlak* 1		**128**	**Total year level / *Totaal jaarvlak* 2**		**120**	**Total year level / *Totaal jaarvlak* 3**		**128**
Total credits for the programme / *Totaal krediete vir die program*								**376**

NAS.1.16.23 **PROGRAMME: BACHELOR OF SCIENCE WITH MATHEMATICS AND ECONOMICS/**
BACCALAUREUS SCIENTIAE MET WISKUNDE EN EKONOMIE

CODE/ *KODE:* 2FF H29 - N301P

CAMPUS/ *KAMPUS*: Potchefstroom (AFRIKAANS, ENGLISH)

DELIVERY MODE/ *AFLEWERINGSMETODE*: Full Time / *Voltyds*

Compilation of programme / *Samestelling van program:*

Year level 1 / *Jaarvlak 1*			**Year level 2 / *Jaarvlak 2***			**Year level 3 / *Jaarvlak 3***		
First/*Eerste* semester			**First / *Eerste* semester**			**First/ *Eerste* semester**		
Module code/ *Modulekode*	**CORE/ *KERN***	**Cr/ *Kr***	**Module code/ *Modulekode***	**CORE/ *KERN***	**Cr/ *Kr***	**Module code/ *Modulekode***	**CORE/ *KERN***	**Cr/ *Kr***
ALDE/A111	X	12	ECON211	H	16	ECON313*	H	16
CMPG111	X	12	CMPG211	X	16	ECON314*	H	16
MTHS111	H	12	MTHS211	H	8	MTHS311	H	16
ECON112	H	12	MTHS212	H	8	MTHS312	H	16
ACCF111 **OR/*OF*** ACCS111	X	16	WVNS211	X	12			
Total / *Totaal* 1st semester		**64**	**Total / *Totaal* 1st semester**		**60**	**Total / *Totaal* 1st semester**		**64**
Year level 1 / *Jaarvlak 1*			**Year level 2 / *Jaarvlak 2***			**Year level 3 / *Jaarvlak 3***		
Second/*Tweede* semester			**Second/ *Tweede* semester**			**Second/ *Tweede* semester**		
Module code/ *Modulekode*	**CORE/ *KERN***	**Cr/ *Kr***	**Module code/ *Modulekode***	**CORE/ *KERN***	**Cr/ *Kr***	**Module code/ *Modulekode***	**CORE/ *KERN***	**Cr/ *Kr***
ALDE/A122	X	12	ECON221	H	16	ECON322*	H	16
CMPG121	X	12	CMPG221 **OR/*OF*** APPM222	X	8	ECON325*	H	16
MTHS121	H	12	CMPG222	X	8	MTHS321	H	16
ECON122	H	12	MTHS221	H	8	MTHS322	H	16
ACCF121 **OR/*OF*** ACCS121	X	16	MTHS222	H	8			
			WVNS221	X	12			
		64			**60**			**64**
Total year level / *Totaal jaarvlak* 1		**128**	**Total year level / *Totaal jaarvlak* 2**		**120**	**Total year level / *Totaal jaarvlak* 3**		**128**
Total credits for the programme / *Totaal krediete vir die program*								**376**

*Please note that as of 2020, the package of modules ECON313, ECON314, ECON322 and ECON325 will be a prerequisite for Honours studies in Economics.
That means that students registered for this degree need to already do these modules in 2019 to going on to Honours in Economics. / Neem kennis dat vanaf 2020, die volgende modules as voorvereistes vir die Honeursstudie in Ekonomie sal wees: ECON313, ECON314, ECON322 en ECON325.

NAS.1.16.23.1 **OLD PROGRAMME PHASING OUT / OU PROGRAM FASEER UIT (PC): Bachelor of Science in Computer and Mathematical Sciences/ *Baccalaureus Scientiae in Rekenaar- en Wiskundige Wetenskappe***

Curriculum/ *Kurrikulum:* N176P (Pipeline only)

CODE/ *KODE*: 200191

CAMPUS/ *KAMPUS*: Potchefstroom (AFRIKAANS, ENGLISH)

DELIVERY MODE/ *AFLEWERINGSMETODE*: Full Time / *Voltyds*

Compilation of programme / *Samestelling van program:* Mathematics and Economics / *Wiskunde en Ekonomie*

Year level 1 / *Jaarvlak 1*			**Year level 2 / *Jaarvlak 2***			**Year level 3 / *Jaarvlak 3***		
First/*Eerste* semester			**First / *Eerste* semester**			**First/ *Eerste* semester**		
Module code/ *Modulekode*	**CORE/ *KERN***	**Cr/ *Kr***	**Module code/ *Modulekode***	**CORE/ *KERN***	**Cr/ *Kr***	**Module code/ *Modulekode***	**CORE/ *KERN***	**Cr/ *Kr***
ITRW112	X	12	ECON211	H	16	ECON311	H	16
WISN111	H	12	ITRW212	X	16	TGWN312	H	16
ECON111	H	12	WISN211	H	8	WISN314	H	16
ACCF111 **OR/*OF*** ACCS111	X	16	WISN212	H	8	WISN312	H	16
AGLE/A111	X	12	WVNS211	X	12			
Total / *Totaal* 1st semester		**64**	**Total / *Totaal* 1st semester**		**60**	**Total / *Totaal* 1st semester**		**64**
Year level 1 / *Jaarvlak 1*			**Year level 2 / *Jaarvlak 2***			**Year level 3 / *Jaarvlak 3***		
Second/*Tweede* semester			**Second/ *Tweede* semester**			**Second/ *Tweede* semester**		
Module code/ *Modulekode*	**CORE/ *KERN***	**Cr/ *Kr***	**Module code/ *Modulekode***	**CORE/ *KERN***	**Cr/ *Kr***	**Module code/ *Modulekode***	**CORE/ *KERN***	**Cr/ *Kr***
ITRW124	X	12	ECON211	H	16	ECON321	H	16
WISN121	H	12	ITRW222	X	16	TGWN322	H	16
ECON121	H	12	WISN224	H	8	WISN324	H	16
ACCF121 **OR/*OF*** ACCS121	X	16	WISN226	H	8	WISN322	H	16
AGLE/A121	X	12	WVNS221	X	12			
Total / *Totaal* 2nd semester		**64**	**Total / *Totaal* 2nd semester**		**60**	**Total / *Totaal* 2nd semester**		**64**
Total year level / *Totaal jaarvlak* 1		**128**	**Total year level / *Totaal jaarvlak* 2**		**120**	**Total year level / *Totaal jaarvlak* 3**		**128**
Total credits for the programme / *Totaal krediete vir die program*								**376**

NAS.1.16.24 **PROGRAMME: BACHELOR OF SCIENCE WITH GEOGRAPHY AND APPLIED MATHEMATICS/**
BACCALAUREUS SCIENTIAE MET GEOGRAFIE EN TOEGEPASTE WISKUNDE

CODE/ *KODE:* 2FF H30 - N301P

CAMPUS/ *KAMPUS*: Potchefstroom (AFRIKAANS, ENGLISH)

DELIVERY MODE/ *AFLEWERINGSMETODE*: Full Time / *Voltyds*

Compilation of programme / *Samestelling van program:*

Year level 1 / *Jaarvlak 1*			**Year level 2 / *Jaarvlak 2***			**Year level 3 / *Jaarvlak 3***		
First/*Eerste* semester			**First / *Eerste* semester**			**First/ *Eerste* semester**		
Module code/ *Modulekode*	**CORE/ *KERN***	**Cr/ *Kr***	**Module code/ *Modulekode***	**CORE/ *KERN***	**Cr/ *Kr***	**Module code/ *Modulekode***	**CORE/ *KERN***	**Cr/ *Kr***
ALDE/A111	X	12	APPM212	H	8	APPM311	H	16
CMPG115	X	12	GEOG211	H	16	APPM312	H	16
GEOG111	H	12	GEOG212	H	8	GEOG311	H	32
NPHY111	X	12	MTHS211	X	8			
MTHS111	X	12	MTHS212	X	8			
			WVNS211	X	12			
Total / *Totaal* 1st semester		**60**	**Total / *Totaal* 1st semester**		**60**	**Total / *Totaal* 1st semester**		**64**
Year level 1 / *Jaarvlak 1*			**Year level 2 / *Jaarvlak 2***			**Year level 3 / *Jaarvlak 3***		
Second/*Tweede* semester			**Second/ *Tweede* semester**			**Second/ *Tweede* semester**		
Module code/ *Modulekode*	**CORE/ *KERN***	**Cr/ *Kr***	**Module code/ *Modulekode***	**CORE/ *KERN***	**Cr/ *Kr***	**Module code/ *Modulekode***	**CORE/ *KERN***	**Cr/ *Kr***
ALDE/A121	X	12	APPM222	H	8	APPM321	H	16
GEOG121	H	12	GEOG221	H	16	APPM322	H	16
NPHY121	X	12	NPHY222	X	8	GEOG321	H	32
MTHS121	X	12	MTHS223	X	8			
STTN122	X	12	MTHS224	X	8			
			WVNS221	X	12			
Total / *Totaal* 2nd semester		**60**	**Total / *Totaal* 2nd semester**		**60**	**Total / *Totaal* 2nd semester**		**64**
Total year level / *Totaal jaarvlak* 1		**120**	**Total year level / *Totaal jaarvlak* 2**		**120**	**Total year level / *Totaal jaarvlak 3***		**128**
Total credits for the programme / *Totaal krediete vir die program*								**368**

NAS.1.17 PROGRAMME: BACHELOR OF SCIENCE IN INFORMATION TECHNOLOGY / *BACCALAUREUS SCIENTIAE IN INLIGTINGSTEGNOLOGIE*

NAS.1.17.1 IT DISTANCE LEARNING / *IT AFSTANDSONDERRIG:*

The NWU's Faculty of Natural and Agricultural Sciences will be offering our three (3) year BSc Computer Science and Information Technology degree in the form of distance learning from 2018. This mode of delivery is only available at the Potchefstroom campus. This degree is equivalent to the three year BSc Computer Science and Information Technology degree offered by the faculty on the NWU Potchefstroom and Vaal Triangle Campus. **Students are not allowed to switch between semesters from full-time to distance or from distance to full-time**. Take note: capacity for distance learning is limited. /

Die NWU se Fakulteit Natuur- en Landbouwetenskappe bied vanaf 2018 die drie (3) jaar BSc Rekenaarwetenskap en Inligtingstegnologie-graad aan in die vorm van afstandsleer. Hierdie metode van aflewering, is egter slegs by die Potchefstroomkampus beskikbaar.
Hierdie graad is gelykstaande aan die driejarige BSc Rekenaarwetenskap- en Inligtingtegnologie-graad wat deur die fakulteit op die NWU Potchefstroom- en Vaaldriehoekkampus aangebied word. ***Studente word nie toegelaat om tussen semesters van voltyds na afstand of van afstand na voltyds oor te skakel nie.*** *Neem kennis: kapasiteit vir afstandsleer is beperk.*

NAS.1.17.1.1 What are the minimum requirements for BSc IT distance learning? / *Wat is die minimum vereistes vir BSc IT afstandsonderrig?*

Specific Requirements / *Spesifieke Vereistes*:

- Basic Computer Literacy
- Access to a computer or laptop with a Microsoft Windows 7, 8 or 10 operating system, including access to the Internet from the computer or laptop with an Internet speed of at least 2Mbps.
- Microsoft Office 2016 or Office 365. Registered students of the NWU will be able to install Office 365 ProPlus for free.
- It is **COMPULSORY**, and the responsibility of the student to obtain the necessary technology such as a computer and mobile phone that meet the minimum specifications of the NWU namely: Wi-Fi enabled, Windows-, Android- or Apple operating system, 3G enabled (preferably) and 32 Gig (preferably) /

- *Basiese Rekenaargeletterdheid*
- *Toegang tot 'n rekenaar of skootrekenaar met 'n Microsoft Windows 7, 8 of 10 bedryfstelsel, insluitend toegang tot die internet vanaf die rekenaar of skootrekenaar met 'n Internetspoed van minstens 2Mbps.*
- *Microsoft Office 2016 of Office 365. Geregistreerde studente van die NWU sal Office 365 ProPlus gratis kan installeer.*
- *Dit is* ***VERPLIGTEND*** *en die verantwoordelikheid van die student om die nodige tegnologie soos 'n rekenaar en selfoon te kry wat aan die minimum vereistes van die NWU voldoen, naamlik: Wi-Fi-enabled, Windows-, Android- of Apple-bedryfstelsel, 3G-enabled (verkieslik) en 32 Gig (verkieslik).*

Students enrolled for the degree will not attend classes on campus. They submit assignments via eFundi and attend contact/facilitation sessions referred to as Interactive Whiteboard Sessions (IWBs). It is not compulsory to attend IWB

sessions and they are also recorded and placed on the UODL website to view when convenient. Students will be communicated with via eFundi and SMS.
Take note: Fees payable per year for BSc in IT distance learning, include tuition fees, textbooks and software. All study material required for a particular year, will be sent to the student by courier. /

Studente wat vir die graad ingeskryf is, draf nie op kampus klas nie. Studente dien werkopdragte via eFundi in en woon kontak-/fasiliteringsessies by waarna verwys word as Interaktiewe Witbord Sessies (IWB's). Bywoning van hierdie sessies is nie verpligtend nie. Kontaksessies word opgeneem en word ook op die UODL webwerf geplaas, waarna studente kan kyk wanneer dit hul pas. Die universiteit sal met hierdie studente via eFundi en SMS kommunikeer.
Neem kennis: Gelde betaalbaar vir BSc in IT afstandstudie, sluit klasgelde, handboeke en sagteware in. Alle studiemateriaal wat benodig word vir 'n betrokke jaar, word per koerier na die student gestuur.

NAS.1.17.2 **PROGRAMME: BACHELOR OF SCIENCE IN INFORMATION TECHNOLOGY/ *BACCALAUREUS SCIENTIAE IN INLIGTINGSTEGNOLOGIE***

CODE/ K*ODE*: 2DX H01 - N302P; N302V (Contact/*Kontak*)

CODE/ K*ODE*: 2HA H01 - N301P (**Distance:** Offered only in ENGLISH /
Afstand: *Word slegs in ENGELS aangebied*)

CAMPUS/ *KAMPUS*: Potchefstroom (AFRIKAANS, ENGLISH),
Vaaltriangle (ENGLISH see NAS1.7)

DELIVERY MODE/ *AFLEWERINGSMETODE*: Full Time / *Voltyds* **and/*en*** Distance / *Afstand*

Compilation of programme / *Samestelling van program:*

Year level 1 / *Jaarvlak 1*			**Year level 2 / *Jaarvlak 2***			**Year level 3 / *Jaarvlak 3***		
First/*Eerste* semester			**First / *Eerste* semester**			**First/ *Eerste* semester**		
Module code/ *Modulekode*	**CORE/ *KERN***	**Cr/ *Kr***	**Module code/ *Modulekode***	**CORE/ *KERN***	**Cr/ *Kr***	**Module code/ *Modulekode***	**CORE/ *KERN***	**Cr/ *Kr***
CMPG111	H	12	CMPG211	H	16	CMPG311	H	16
STTN111	X	12	CMPG212	H	8	CMPG312	H	16
BMAN111	X	12	CMPG213	H	16	CMPG313	H	16
*MTHS111 **OR/*OF*** MTHS113	X	12	CMPG214	H	8	CMPG315	H	16
ACCS111 **OR/*OF*** *ACCF111		16	CMPG215	H	8			
			WVNS211	X	12			
Total / *Totaal* 1st semester		**64**	**Total / *Totaal* 1st semester**		**68**	**Total / *Totaal* 1st semester**		**64**
Year level 1 / *Jaarvlak 1*			**Year level 2 / *Jaarvlak 2***			**Year level 3 / *Jaarvlak 3***		
Second/*Tweede* semester			**Second/ *Tweede* semester**			**Second/ *Tweede* semester**		
Module code/ *Modulekode*	**CORE/ *KERN***	**Cr/ *Kr***	**Module code/ *Modulekode***	**CORE/ *KERN***	**Cr/ *Kr***	**Module code/ *Modulekode***	**CORE/ *KERN***	**Cr/ *Kr***
CMPG121	H	12	CMPG221	H	8	CMPG321	H	16
CMPG122	H	12	CMPG222	H	8	CMPG322	H	16
STTN121	X	12	CMPG223	H	16	CMPG323	H	16
ACCS121 **OR/*OF*** *ACCF121	X	16	BMAN223	X	16	CMPG324	H	16
ALDE/A122	X	12	WVNS221	X	12			
			MTHS225	X	8			
Total / *Totaal* 2nd semester		**64**	**Total / *Totaal* 2nd semester**		**68**	**Total / *Totaal* 2nd semester**		**64**
Total year level / *Totaal jaarvlak* 1		**128**	**Total year level / *Totaal jaarvlak* 2**		**136**	**Total year level / *Totaal jaarvlak* 3**		**128**
Total credits for the programme / *Totaal krediete vir die program*								**392**

*****MTHS111, ACCF111 and ACCF121: Only available for full time campus students- not available for distance learning / *Slegs beskikbaar vir voltydse kampusstudente, nie vir afstandsleer beskikbaar nie*.

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NAS.1.17.2.1 OLD PROGRAMME PHASING OUT / OU PROGRAM FASEER UIT (PC/VTC):
Bachelor of Science in Information Technology /
Baccalaureus Scientiae in Inligtingstegnologie

Curriculum/ *Kurrikulum*: *N301P; N301V; N150P; N150V*

CODE/ *KODE:* 2DX H01 – N301P; N301V *(Pipeline only)*

CODE/ *KODE:* 264 100 – N150P; N150V (Pipeline only / Slegs *Pyplyn*)

CAMPUS/ *KAMPUS:* Potchefstroom (AFRIKAANS, ENGLISH),
Vaaltriangle (ENGLISH see NAS1.7)

DELIVERY MODE/ *AFLEWERINGSMETODE:* Full Time / *Voltyds*

Compilation of programme / *Samestelling van program*: Information Technology/
Inligtingstegnologie

Year level 1 / *Jaarvlak 1*			**Year level 2 / *Jaarvlak 2***			**Year level 3 / *Jaarvlak 3***		
First/*Eerste* semester			**First / *Eerste* semester**			**First/ *Eerste* semester**		
Module code/ *Modulekode*	**CORE/ *KERN***	**Cr/ *Kr***	**Module code/ *Modulekode***	**CORE/ *KERN***	**Cr/ *Kr***	**Module code/ *Modulekode***	**CORE/ *KERN***	**Cr/ *Kr***
ITRW112	H	12	ITRW211	H	8	ITRW311	H	16
STTN111	X	12	ITRW212	H	16	ITRW313	H	8
WISN111 **OR/*OF*** WISN113	X	12	ITRW213	H	16	ITRW315	H	8
BMAN111	X	12	ITRW214	H	16	ITRW316	H	16
ACCS111 **OR/*OF*** ACCF111	X	16	WVNS211	X	12	ITRW317	H	16
Total / *Totaal* 1st semester		**64**	**Total / *Totaal* 1st semester**		**68**	**Total / *Totaal* 1st semester**		**64**
Year level 1 / *Jaarvlak 1*			**Year level 2 / *Jaarvlak 2***			**Year level 3 / *Jaarvlak 3***		
Second/*Tweede* semester			**Second/ *Tweede* semester**			**Second/ *Tweede* semester**		
Module code/ *Modulekode*	**CORE/ *KERN***	**Cr/ *Kr***	**Module code/ *Modulekode***	**CORE/ *KERN***	**Cr/ *Kr***	**Module code/ *Modulekode***	**CORE/ *KERN***	**Cr/ *Kr***
ITRW123	H	12	ITRW222	H	16	ITRW321	H	16
ITRW124	H	12	ITRW225	H	16	ITRW322	H	16
STTN121	X	12	BMAN222	X	16	ITRW324	H	16
ACCS121 **OR/*OF*** ACCF121	X	16	WVNS221	X	12	ITRW325	H	16
AGLA121	X	12	WISN223	X	8			
Total / *Totaal* 2nd semester		**64**	**Total / *Totaal* 2nd semester**		**68**	**Total / *Totaal* 2nd semester**		**64**
Total year level / *Totaal jaarvlak* 1		**128**	**Total year level / *Totaal jaarvlak* 2**		**136**	**Total year level / *Totaal jaarvlak* 3**		**128**
Total credits for the programme / *Totaal krediete vir die program*								**392**

NAS.1.18 PROGRAMME: BACHELOR OF SCIENCE IN MATHEMATICAL SCIENCES / *BACCALAUREUS SCIENTIAE IN WISKUNDIGE WETENSKAPPE*

NAS.1.18.1 PROGRAMME OUTCOMES / *PROGRAMUITKOMSTE*

At the completion of this qualification in Mathematical Sciences the student should have:

(i) the ability to integrate the knowledge and techniques of the core subjects in the programme in order to understand reality, investigate and apply the knowledge and techniques to solve relevant problems;

(ii) the skills to gather information electronically and otherwise, and be able to process, evaluate and report on scientific information, solve problems, prepare for lifelong learning, and finally, to perform mathematical-analytical and mathematical-numerical data processing;

(iii) the ability to work as an individual or in groups and, where necessary to exercise the necessary leadership; to be able to communicate in writing and present scientific data and possible solutions to identified problems orally;

(iv) the ability to maintain high ethical norms when practising science and demonstrating responsibility towards fellow human beings and the environment, in particular when performing scientific investigations. /

By voltooiing *van die kwalifikasie in Wiskundige Wetenskappe behoort die student die volgende vaardighede te toon:*

(i) die kennis en tegnieke van die kernvakke in die program te kan integreer om die werklikheid te verstaan, en kennis en tegnieke toe te pas om relevante probleme op te los;

(ii) die vermoë om informasie elektronies en andersins te versamel, te kan prosesseer, beoordeel, en verslag te kan doen oor wetenskaplike informasie, probleme op te los, voor te berei vir lewenslange ondersoek, en laastens, om wiskundig-analitiese en wiskundig-numeriese data prosessering te doen;

(iii) die vermoë om as individu of in 'n groep te werk en, waar nodig die nodige leierskap te kan uitoefen; om wetenskaplike data en moontlike oplossings wat geïdentifiseer is, in skrif of mondelings te kan aanbied;

(iv) die vermoë om in die beoefening van wetenskap hoë etiese norme te kan handhaaf, en verantwoordelikheid teenoor medemense en die omgewing te kan toon, in die besonder met die uitvoer van wetenskaplike ondersoeke.

NAS.1.18.2 PROGRAMME: BACHELOR OF SCIENCE IN MATHEMATICAL SCIENCES WITH STATISTICS AND MATHEMATICS /
BACCALAUREUS SCIENTIAE IN WISKUNDIGE WETENSKAPPE MET STATISTIEK EN WISKUNDE

CODE/ *KODE:* 2FG H02 - N301P

CAMPUS/ *KAMPUS*: Potchefstroom (AFRIKAANS, ENGLISH)

DELIVERY MODE/ *AFLEWERINGSMETODE:* Full Time / *Voltyds*

Compilation of programme / *Samestelling van program*:

Year level 1 / *Jaarvlak 1*			**Year level 2 / *Jaarvlak 2***			**Year level 3 / *Jaarvlak 3***		
First/*Eerste* semester			**First / *Eerste* semester**			**First/ *Eerste* semester**		
Module code/ *Modulekode*	**CORE/ *KERN***	**Cr/ *Kr***	**Module code/ *Modulekode***	**CORE/ *KERN***	**Cr/ *Kr***	**Module code/ *Modulekode***	**CORE/ *KERN***	**Cr/ *Kr***
CMPG111	X	12	CMPG211	X	16	MTHS311	H	16
NPHY111	X	12	MTHS211	H	8	MTHS312	H	16
MTHS111	H	12	MTHS212	H	8	STTN316	H	24
STTN115	H	12	STTN215	H	16	STTN317	H	8
ALDE/A111	X	12	WVNS211	X	12			
Total / *Totaal* 1st semester		**60**	**Total / *Totaal* 1st semester**		**60**	**Total / *Totaal* 1st semester**		**64**
Year level 1 / *Jaarvlak 1*			**Year level 2 / *Jaarvlak 2***			**Year level 3 / *Jaarvlak 3***		
Second/*Tweede* semester			**Second/ *Tweede* semester**			**Second/ *Tweede* semester**		
Module code/ *Modulekode*	**CORE/ *KERN***	**Cr/ *Kr***	**Module code/ *Modulekode***	**CORE/ *KERN***	**Cr/ *Kr***	**Module code/ *Modulekode***	**CORE/ *KERN***	**Cr/ *Kr***
APPM122	H	12	CMPG221	X	8	MTHS321	H	16
CMPG121	X	12	CMPG222	X	8	MTHS322	H	16
MTHS121	H	12	MTHS221	H	8	STTN326	H	16
STTN125	H	12	MTHS222	H	8	STTN327	H	16
ALDE/A122	X	12	STTN225	H	16			
			WVNS221	X	12			
Total / *Totaal* 2nd semester		**60**	**Total / *Totaal* 2nd semester**		**60**	**Total / *Totaal* 2nd semester**		**64**
Total year level / *Totaal jaarvlak* 1		**120**	**Total year level / *Totaal jaarvlak* 2**		**120**	**Total year level / *Totaal jaarvlak* 3**		**128**
Total credits for the programme / *Totaal krediete vir die program*								**368**

NAS.1.18.2.1 **OLD PROGRAMME PHASING OUT / OU PROGRAM FASEER UIT (PC): Bachelor of Science in Computer and Mathematical Sciences/ *Baccalaureus Scientiae in Rekenaar- en Wiskundige Wetenskappe***

Curriculum/ *Kurrikulum*: N158P (Pipeline only)

CODE/ *KODE*: 200191

CAMPUS/ *KAMPUS*: Potchefstroom (AFRIKAANS, ENGLISH)

DELIVERY MODE/ *AFLEWERINGSMETODE*: Full Time / *Voltyds*

Compilation of programme / Samestelling van program: Statistics and Mathematics / *Statistiek en Wiskunde*

Year level 1 / *Jaarvlak 1*			**Year level 2 / *Jaarvlak 2***			**Year level 3 / *Jaarvlak 3***		
First/*Eerste* semester			**First / *Eerste* semester**			**First/ *Eerste* semester**		
Module code/ *Modulekode*	**CORE/ *KERN***	**Cr/ *Kr***	**Module code/ *Modulekode***	**CORE/ *KERN***	**Cr/ *Kr***	**Module code/ *Modulekode***	**CORE/ *KERN***	**Cr/ *Kr***
ITRW112	X	12	ITRW212	X	16	WISN314	H	16
FSKS111	X	12	WISN211	H	8	WISN312	H	16
WISN111	H	12	WISN212	H	8	STTN316	H	24
STTN115	H	12	STTN215	H	16	STTN317		8
AGLA111	X	12	WVNS211	X	12			
Total / *Totaal* 1st semester		**60**	**Total / *Totaal* 1st semester**		**60**	**Total / *Totaal* 1st semester**		**64**
Year level 1 / *Jaarvlak 1*			**Year level 2 / *Jaarvlak 2***			**Year level 3 / *Jaarvlak 3***		
Second/*Tweede* semester			**Second/ *Tweede* semester**			**Second/ *Tweede* semester**		
Module code/ *Modulekode*	**CORE/ *KERN***	**Cr/ *Kr***	**Module code/ *Modulekode***	**CORE/ *KERN***	**Cr/ *Kr***	**Module code/ *Modulekode***	**CORE/ *KERN***	**Cr/ *Kr***
TGWN122	H	12	ITRW222	X	16	WISN324	H	16
ITRW124	X	12	WISN224	H	8	WISN322	H	16
WISN121	H	12	WISN226	H	8	STTN326	H	16
STTN125	H	12	STTN225	H	16	STTN327	H	16
AGLA121	X	12	WVNS221	X	12			
Total / *Totaal* 2nd semester		**60**	**Total / *Totaal* 2nd semester**		**60**	**Total / *Totaal* 2nd semester**		**64**
Total year level / *Totaal jaarvlak* 1		**120**	**Total year level / *Totaal jaarvlak* 2**		**120**	**Total year level / *Totaal jaarvlak* 3**		**128**
Total credits for the programme / *Totaal krediete vir die program*								**368**

NAS.1.18.2.2 OLD PROGRAMME PHASING OUT (MC):
Bachelor of Science in Statistics and Mathematics Sciences

Curriculum: N306M (Pipeline only)

CODE: 200138

CAMPUS: Mafikeng (English)

DELIVERY MODE: FULL TIME

Compilation of programme: Statistics and Mathematics

Year level 1 / *Jaarvlak 1*			**Year level 2 / *Jaarvlak 2***			**Year level 3 / *Jaarvlak 3***		
First/*Eerste* semester			**First / *Eerste* semester**			**First/ *Eerste* semester**		
Module code/ *Modulekode*	**CORE/ *KERN***	**Cr/ *Kr***	**Module code/ *Modulekode***	**CORE/ *KERN***	**Cr/ *Kr***	**Module code/ *Modulekode***	**CORE/ *KERN***	**Cr/ *Kr***
MAYM117	H	12	MAYM217	H	16	MAYM317	H	16
STFM111	H	12	STFM211	H	8	MAYM318	H	16
APMM117	X	12	STFM212	H	8	STFM311	H	16
CISM112	H	12	APPM217	X	16	STFM312	H	16
AGLE111	X	12	WVNS211	X	12			
Total / *Totaal* 1st semester		**60**	**Total / *Totaal* 1st semester**		**60**	**Total / *Totaal* 1st semester**		**64**
Year level 1 / *Jaarvlak 1*			**Year level 2 / *Jaarvlak 2***			**Year level 3 / *Jaarvlak 3***		
Second/*Tweede* semester			**Second/ *Tweede* semester**			**Second/ *Tweede* semester**		
Module code/ *Modulekode*	**CORE/ *KERN***	**Cr/ *Kr***	**Module code/ *Modulekode***	**CORE/ *KERN***	**Cr/ *Kr***	**Module code/ *Modulekode***	**CORE/ *KERN***	**Cr/ *Kr***
MAY127	H	12	MAYM227	H	16	MAYM327	H	16
STFM121	H	12	STFM221	H	8	MAYM328	H	16
APMM127	X	12	STFM222	H	8	STFM321	H	16
CISM124	X	12	APMM227	X	16	STFM322	H	16
AGLE121	X	12	WVNS221	X	12			
Total / *Totaal* 2nd semester		**60**	**Total / *Totaal* 2nd semester**		**60**	**Total / *Totaal* 2nd semester**		**64**
Total year level / *Totaal jaarvlak* 1		**120**	**Total year level / *Totaal jaarvlak* 2**		**120**	**Total year level / *Totaal jaarvlak* 3**		**128**
Total credits for the programme / *Totaal krediete vir die program*								**368**

NAS.1.18.3 PROGRAMME: BACHELOR OF SCIENCE IN MATHEMATICAL SCIENCES / *BACCALAUREUS SCIENTIAE IN WISKUNDIGE WETENSKAPPE*

NAS.1.18.3.1 Programme outcomes: Mathematics / *Programuitkomste*: *Wiskunde*

To fulfil the requirements of this degree all students on the Potchefstroom campus, must take at ***least two** of the three modules in the second semester of the third year: APPM321 Dynamical Systems, APPM322 Optimisation and APPM323 Fluid Mechanics. Please note that the module APPM323** Fluid Mechanics will only be presented on the Potchefstroom campus if there is sufficient interest, and if capacity allows it. Please consult the subject group Mathematics and Applied Mathematics for advice in this regard. /

*Om die voorwaardes van die graad te bereik, moet all studente op die Potchefstroom in die tweede semester van die derde jaar ten minste ***twee** van die drie modules APPM321 Dinamiese Stelsels, APPM322 Optimalisering en APPM323 Vloeimeganika voltooi. Let asseblief daarop dat die module APPM323** Vloeimeganika slegs op die Potchefstroom kampus aangebied sal word indien daar voldoende belangstelling is en kapasiteit dit toelaat. Raadpleeg asseblief die vakgroep Wiskunde en Toegepaste Wiskunde vir advies in die verband.*

NAS.1.18.4 **BACHELOR OF SCIENCE IN MATHEMATICAL SCIENCES / *BACCALAUREUS SCIENTIAE IN WISKUNDIGE WETENSKAPPE***

CODE/ *KODE*: 2FG H01 - N301P

CAMPUS/ *KAMPUS*: Potchefstroom (AFRIKAANS, ENGLISH)

DELIVERY MODE/ *AFLEWERINGSMETODE*: Full Time / *Voltyds*

Compilation of programme/ *Samestelling van program:*

Year level 1 / *Jaarvlak 1*			**Year level 2 / *Jaarvlak 2***			**Year level 3 / *Jaarvlak 3***		
First/*Eerste* semester			**First / *Eerste* semester**			**First/ *Eerste* semester**		
Module code/ *Modulekode*	**CORE/ *KERN***	**Cr/ *Kr***	**Module code/ *Modulekode***	**CORE/ *KERN***	**Cr/ *Kr***	**Module code/ *Modulekode***	**CORE/ *KERN***	**Cr/ *Kr***
ALDE/A111	X	12	STTN215	X	16	APPM311	H	16
NPHY111	X	12	APPM211	H	8	APPM312	H	16
CMPG111	X	12	APPM212	H	8	MTHS311	H	16
STTN115	X	12	MTHS211	H	8	MTHS312	H	16
MTHS111	H	12	MTHS212	H	8			
			WVNS211	X	12			
Total / *Totaal* 1st semester		**60**	**Total / *Totaal* 1st semester**		**60**	**Total / *Totaal* 1st semester**		**64**

Year level 1 / *Jaarvlak 1*			**Year level 2 / *Jaarvlak 2***			**Year level 3 / *Jaarvlak 3***		
Second/*Tweede* semester			**Second/ *Tweede* semester**			**Second/ *Tweede* semester**		
Module code/ *Modulekode*	**CORE/ *KERN***	**Cr/ *Kr***	**Module code/ *Modulekode***	**CORE/ *KERN***	**Cr/ *Kr***	**Module code/ *Modulekode***	**CORE/ *KERN***	**Cr/ *Kr***
ALDE/A122	X	12	APPM221	H	8	MTHS321	H	16
CMPG122	X	12	APPM222	H	8	MTHS322	H	16
STTN125	X	12	STTN225	X	16	*Select 2 of the following modules / *Kies 2 van die volgende modules**		
APPM122	H	12	MTHS221	H	8	APPM321 APPM322 APPM323**	H H H	16 16 16
MTHS121	H	12	MTHS222	H	8			
			WVNS221	X	12			
Total / *Totaal* 2nd semester		**60**	**Total / *Totaal* 2nd semester**		**60**	**Total / *Totaal* 2nd semester**		**64**
Total year level / *Totaal jaarvlak* 1		**120**	**Total year level / *Totaal jaarvlak* 2**		**120**	**Total year level / *Totaal jaarvlak* 3**		**128**
Total credits for the programme / *Totaal krediete vir die program*								**368**

NAS.1.18.4.1 OLD PROGRAMME PHASING OUT / OU PROGRAM FASEER UIT (PC): Bachelor of Science in Computer and Mathematical Sciences/ *Baccalaureus Scientiae in Rekenaar- en Wiskundige Wetenskappe*

Curriculum/ *Kurrikulum*: N159P (Pipeline only)

CODE/ *KODE*: 200191

CAMPUS/ *KAMPUS*: Potchefstroom (AFRIKAANS, ENGLISH)

DELIVERY MODE/ *AFLEWERINGSMETODE*: Full Time / *Voltyds*

Compilation of programme / *Samestelling van program:* Mathematics/ *Wiskunde*

Year level 1 / *Jaarvlak 1*			**Year level 2 / *Jaarvlak 2***			**Year level 3 / *Jaarvlak 3***		
First/*Eerste* semester			**First / *Eerste* semester**			**First/ *Eerste* semester**		
Module code/ *Modulekode*	**CORE/ *KERN***	**Cr/ *Kr***	**Module code/ *Modulekode***	**CORE/ *KERN***	**Cr/ *Kr***	**Module code/ *Modulekode***	**CORE/ *KERN***	**Cr/ *Kr***
FSKS111	X	12	STTN215	X	16	TGWN311	H	16
ITRW112	X	12	TGWN211	H	8	TGWN312	H	16
STTN115	X	12	TGWN213	H	8	WISN314	H	16
WISN111	H	12	WISN211	H	8	WISN312	H	16
AGLE111	X	12	WISN212	H	8			
			WVNS211	X	12			
Total / *Totaal* 1st semester		**60**	**Total / *Totaal* 1st semester**		**60**	**Total / *Totaal* 1st semester**		**64**
Year level 1 / *Jaarvlak 1*			**Year level 2 / *Jaarvlak 2***			**Year level 3 / *Jaarvlak 3***		
Second/*Tweede* semester			**Second/ *Tweede* semester**			**Second/ *Tweede* semester**		
Module code/ *Modulekode*	**CORE/ *KERN***	**Cr/ *Kr***	**Module code/ *Modulekode***	**CORE/ *KERN***	**Cr/ *Kr***	**Module code/ *Modulekode***	**CORE/ *KERN***	**Cr/ *Kr***
AGLE121	X	12	STTN225	X	16	TGWN323	H	16
ITRW123	X	12	TGWN221	H	8	TGWN322	H	16
STTN125	X	12	TGWN223	H	8	WISN324	H	16
TGWN122	H	12	WISN224	H	8	WISN322	H	16
WISN121	H	12	WISN226	H	8			
			WVNS221	X	12			
Total / *Totaal* 2nd semester		**60**	**Total / *Totaal* 2nd semester**		**60**	**Total / *Totaal* 2nd semester**		**64**
Total year level / *Totaal jaarvlak* 1		**120**	**Total year level / *Totaal jaarvlak* 2**		**120**	**Total year level / *Totaal jaarvlak* 3**		**128**
Total credits for the programme / *Totaal krediete vir die program*								**368**

NAS.1.18.5 PROGRAMME: BACHELOR OF SCIENCE IN MATHEMATICAL SCIENCES WITH APPLIED MATHEMATICS AND MATHEMATICS

CODE*:* 2FG H03 - N301M

CAMPUS: Mafikeng (ENGLISH)

DELIVERY MODE: Full Time

Compilation of programme:

Year level 1			**Year level 2**			**Year level 3**		
First semester			**First semester**			**First semester**		
Module code	**CORE**	**Cr**	**Module code**	**CORE**	**Cr**	**Module code**	**CORE**	**Cr**
ALDE111	X	12	APPM212	H	8	APPM311	H	16
APPM111	H	12	APPM213	H	8	APPM313	H	16
CMPG111	X	12	MTHS211	H	8	MTHS311	H	16
NPHY111	X	12	MTHS212	H	8	MTHS312	H	16
MTHS111	H	12	NPHY211	X	8			
			NPHY212	X	8			
			WVNS211	X	12			
Total 1st Semester		**60**	**Total 1st semester**		**60**	**Total 1st semester**		**64**
Year level 1			**Year level 2**			**Year level 3**		
Second semester			**Second semester**			**Second semester**		
Module code	**CORE**	**Cr**	**Module code**	**CORE**	**Cr**	**Module code**	**CORE**	**Cr**
ALDE122	X	12	APPM222	H	8	APPM322	H	16
APPM122	H	12	APPM223	H	8	APPM323	H	16
CMPG121	X	12	MTHS221	H	8	MTHS321	H	16
MTHS121	H	12	MTHS222	H	8	MTHS322	H	16
NPHY121	X	12	NPHY221	X	8			
			NPHY222	X	8			
			WVNS221	X	12			
Total 2nd semester		**60**	**Total 2nd semester**		**60**	**Total 2nd semester**		**64**
Total year level 1		**120**	**Total year level 2**		**120**	**Total year level 3**		**128**
Total credits for the programme								**368**

NAS.1.18.5.1 **OLD PROGRAMME PHASING OUT (MC):**
Bachelor of Science in Applied Mathematics-Mathematics

Curriculum: N305M (Pipeline only)

CODE/ *KODE*: 200172 – N305M

CAMPUS/ *KAMPUS*: Mafikeng (ENGLISH)

DELIVERY MODE/ *AFLEWERINGSMETODE*: Full Time

Compilation of programme: Applied Mathematics and Mathematics

Year level 1 / *Jaarvlak 1*			**Year level 2 / *Jaarvlak 2***			**Year level 3 / *Jaarvlak 3***		
First/*Eerste* semester			**First / *Eerste* semester**			**First/ *Eerste* semester**		
Module code/ *Modulekode*	**CORE/ *KERN***	**Cr/ *Kr***	**Module code/ *Modulekode***	**CORE/ *KERN***	**Cr/ *Kr***	**Module code/ *Modulekode***	**CORE/ *KERN***	**Cr/ *Kr***
AGLE111	X	12	WVNS211	X	12	APMM317	H	16
APMM117	H	12	APMM217	H	16	APMM318	H	16
PHYM118	X	12	PHYM215	X	8	MAYM317	H	16
MAYM117	H	12	PHYM216	X	8	MAYM318	H	16
CISM112	X	12	MAYM217	H	16			
Total / *Totaal* 1st semester		**60**	**Total / *Totaal* 1st semester**		**60**	**Total / *Totaal* 1st semester**		**64**
Year level 1 / *Jaarvlak 1*			**Year level 2 / *Jaarvlak 2***			**Year level 3 / *Jaarvlak 3***		
Second/*Tweede* semester			**Second/ *Tweede* semester**			**Second/ *Tweede* semester**		
Module code/ *Modulekode*	**CORE/ *KERN***	**Cr/ *Kr***	**Module code/ *Modulekode***	**CORE/ *KERN***	**Cr/ *Kr***	**Module code/ *Modulekode***	**CORE/ *KERN***	**Cr/ *Kr***
AGLE121	X	12	WVNS221	X	12	APMM327	H	16
APMM127	H	12	APMM227	H	16	APMM328	H	16
PHYM128	X	12	PHYM221	X	8	MAYM327	H	16
MAYM127	H	12	PHYM222	X	8	MAYM328	H	16
CISM124	X	12	MAYM227	H	16			
Total / *Totaal* 2nd semester		**60**	**Total / *Totaal* 2nd semester**		**60**	**Total / *Totaal* 2nd semester**		**64**
Total year level / *Totaal jaarvlak* 1		**120**	**Total year level / *Totaal jaarvlak* 2**		**120**	**Total year level / *Totaal jaarvlak* 3**		**128**
Total credits for the programme / *Totaal krediete vir die program*								**368**

NAS.1.19 PROGRAMME: BACHELOR OF SCIENCE IN BIOLOGICAL SCIENCES/ *BACCALAUREUS SCIENTIAE IN BIOLOGIESE WETENSKAPPE*

NAS.1.19.1 Programme: Bachelor of Science in Biological Sciences with Microbiology and Biochemistry / *Baccalaureus Scientiae in Biologiese Wetenskappe met Mikrobiologie en Biochemie*

CODE/ *KODE:* 2DK H11 - N301P; N301M

CAMPUS/ *KAMPUS*: Potchefstroom (AFRIKAANS, ENGLISH)
Mafikeng (ENGLISH)

DELIVERY MODE/ *AFLEWERINGSMETODE*: Full Time / *Voltyds*

Compilation of programme / *Samestelling van program:*

Year level 1 / *Jaarvlak 1*			**Year level 2 / *Jaarvlak 2***			**Year level 3 / *Jaarvlak 3***		
First/*Eerste* semester			**First / *Eerste* semester**			**First/ *Eerste* semester**		
Module code/ *Modulekode*	**CORE/ *KERN***	**Cr/ *Kr***	**Module code/ *Modulekode***	**CORE/ *KERN***	**Cr/ *Kr***	**Module code/ *Modulekode***	**CORE/ *KERN***	**Cr/ *Kr***
NCHE111	H	12	MKBN211	H	16	***Only PC/*Slegs PC** ****Only MC/*Slegs MC***		
MTHS114	X	12	BCHN213	H	16	MKBS313* **OR/*OF*** MKBS316**	H	16
NPHY111** **OR/*OF*** FLGX113* **OR/*OF*** PLKS111	X	12	NCHE211 **&** NCHE212	X	16	MKBS314* **OR/*OF*** MKBS317**	H	16
MCBN111	X	12	WVNS211	X	12	BCHS316	H	16
ALDE/A111	X	12				BCHS317	H	16
Total / *Totaal* 1st semester		**60**	**Total / *Totaal* 1st semester**		**60**	**Total / *Totaal* 1st semester**		**64**
Year level 1 / *Jaarvlak 1*			**Year level 2 / *Jaarvlak 2***			**Year level 3 / *Jaarvlak 3***		
Second/*Tweede* semester			**Second/ *Tweede* semester**			**Second/ *Tweede* semester**		
Module code/ *Modulekode*	**CORE/ *KERN***	**Cr/ *Kr***	**Module code/ *Modulekode***	**CORE/ *KERN***	**Cr/ *Kr***	**Module code/ *Modulekode***	**CORE/ *KERN***	**Cr/ *Kr***
NCHE121	H	12	MKBS221	H	16	BCHS321	H	16
MTHS124	X	12	BCHN222	H	16	BCHS322	H	16
NPHY121** **OR/*OF*** FLGX123* **OR/*OF*** PLKS122	X	12	NCHE221 **&** NCHE222	X	16	MKBS325* **OR/*OF*** MKBS326** **&** MKBS327**	H H H	32 16 16
MCBN121	X	12	WVNS221	X	12	*Only PC/Slegs PC **Only MC/Slegs MC		
ALDE/A122	X	12						
Total / *Totaal* 2nd semester		**60**	**Total / *Totaal* 2nd semester**		**60**	**Total / *Totaal* 2nd semester**		**64**
Total year level / *Totaal jaarvlak* 1		**120**	**Total year level / *Totaal jaarvlak* 2**		**120**	**Total year level / *Totaal jaarvlak* 3**		**128**
Total credits for the programme / *Totaal krediete vir die program*								**368**

*Can only be taken on Potchefstroom campus / * *Kan slegs by Potchefstroomkampus geneem word.*

**Can only be taken on Mafikeng campus / ** *Kan slegs by die Mafikengkampus geneem word.*

NAS.1.19.1.1 **OLD PROGRAMME PHASING OUT / OU PROGRAM FASEER UIT (PC): Bachelor of Science in Environmental and Biological Sciences/ *Baccalaureus Scientiae in Omgewings- en Biologiese Wetenskappe***

Curriculum/ *Kurrikulum*: N167P (Pipeline only)

CODE/ *KODE:* 200118

CAMPUS/ *KAMPUS:* Potchefstroom (AFRIKAANS, ENGLISH)

DELIVERY MODE/ *AFLEWERINGSMETODE*: Full Time / *Voltyds*

Compilation of programme / *Samestelling van program:* Microbiology and Biochemistry/ *Mikrobiologie en Biochemie*

Year level 1 / *Jaarvlak 1*			**Year level 2 / *Jaarvlak 2***			**Year level 3 / *Jaarvlak 3***		
First/*Eerste* semester			**First / *Eerste* semester**			**First/ *Eerste* semester**		
Module code/ *Modulekode*	**CORE/ *KERN***	**Cr/ *Kr***	**Module code/ *Modulekode***	**CORE/ *KERN***	**Cr/ *Kr***	**Module code/ *Modulekode***	**CORE/ *KERN***	**Cr/ *Kr***
CHEM111	H	12	MKBN211	H	16	MKBS313	H	16
WISN111	X	12	BCHN213	H	16	MKBS314	H	16
FSKS113	X	12	CHEN211 **&** CHEN212	X	8 8	BCHS316	H	16
PLKS111 **OR/*OF*** *FLGX*113	X	12	WVNS211	X	12	BCHS317	H	16
AGLE/A111	X	12						
Total / *Totaal* 1st semester		**60**	**Total / *Totaal* 1st semester**		**60**	**Total / *Totaal* 1st semester**		**64**
Year level 1 / *Jaarvlak 1*			**Year level 2 / *Jaarvlak 2***			**Year level 3 / *Jaarvlak 3***		
Second/*Tweede* semester			**Second/ *Tweede* semester**			**Second/ *Tweede* semester**		
Module code/ *Modulekode*	**CORE/ *KERN***	**Cr/ *Kr***	**Module code/ *Modulekode***	**CORE/ *KERN***	**Cr/ *Kr***	**Module code/ *Modulekode***	**CORE/ *KERN***	**Cr/ *Kr***
CHEM121	H	12	MKBS221	H	16	MKBS325	H	32
WISN121	X	12	BCHN222	H	16	BCHS321	H	16
FSKS123	X	12	CHEN222 **&** CHEN223	X	16	BCHS322	H	16
PLKS121 **OR/*OF*** FLGX123	X	12	WVNS221	X	12			
AGLE/A121	X	12						
Total / *Totaal* 2nd semester		**60**	**Total / *Totaal* 2nd semester**		**60**	**Total / *Totaal* 2nd semester**		**64**
Total year level / *Totaal jaarvlak* 1		**120**	**Total year level / *Totaal jaarvlak* 2**		**120**	**Total year level / *Totaal jaarvlak* 3**		**128**
Total credits for the programme / *Totaal krediete vir die program*								**368**

NAS.1.19.1.2 **OLD PROGRAMME PHASING OUT (MC):**
Bachelor of Science in Microbiology and Biochemistry

CODE: 200 118 - N167M (Pipeline only)

CAMPUS: Mafikeng (ENGLISH)

DELIVERY MODE: Full Time

Compilation of programme:

Year level 1			Year level 2			Year level 3		
First semester			**First semester**			**First semester**		
Module code	**CORE**	**Cr**	**Module code**	**CORE**	**Cr**	**Module code**	**CORE**	**Cr**
AGLE111	X	12	WVNS211	X	12	MKBS316	H	16
BGYM113	H	12	MKBS211	H	8	MKBS317	H	16
MAYM116	X	12	MKBS212	H	8	BCHS314	H	16
MCHE114	H	12	BCHS211	H	8	BCHS315	H	16
PHYM118	X	12	BCHS212	H	8			
			MCHE215	X	8			
			MCHE216	X	8			
Total 1st Semester		**60**	**Total 1st semester**		**60**	**Total 1st semester**		**64**
Year level 1			**Year level 2**			**Year level 3**		
Second semester			**Second semester**			**Second semester**		
Module code	**CORE**	**Cr**	**Module code**	**CORE**	**Cr**	**Module code**	**CORE**	**Cr**
BGYM123	H	12	WVNS221	X	12	MKBS326	H	16
MCHE121	H	12	MKBS223	H	8	MKBS327	H	16
PHYM128	X	12	MKBS222	H	8	BCHS324	H	16
MAYM126	X	12	BCHS221	H	8	BCHS325	H	16
AGLE121	X	12	BCHS222	H	8			
			MCHE221	X	8			
			MCHE223	X	8			
Total 2nd semester		**60**	**Total 2nd semester**		**60**	**Total 2nd semester**		**64**
Total year level 1		**120**	**Total year level 2**		**120**	**Total year level 3**		**128**
Total credits for the programme								**368**

NAS.1.19.2 **PROGRAMME: BACHELOR OF SCIENCE IN BIOLOGICAL SCIENCES WITH BOTANY AND BIOCHEMISTRY /**
BACCALAUREUS SCIENTIAE IN BIOLOGIESE WETENSKAPPE MET PLANTKUNDE EN BIOCHEMIE

This programme represents an aligned programme, which replaces the programmes containing Biology on the MC. To reflect the fields of expertise on the two campuses, the third year Botany modules are electives, which are campus specific. / *Hierdie program verteenwoordig 'n belynde program wat die Biologie-bevattende programme op die MK vervang. Om die vakkundigheid op die twee kampusse te weerspieël, is die derdejaar Plantkunde-modules keusemodules, wat kampusspesifiek is.*

CODE/ *KODE:* 2DK H02 - N302P; N301M

CAMPUS/ *KAMPUS:* Potchefstroom (AFRIKAANS, ENGLISH);
Mafikeng (ENGLISH)

DELIVERY MODE/ *AFLEWERINGSMETODE:* Full Time / *Voltyds*

Compilation of programme / *Samestelling van program*:

Year level 1 / *Jaarvlak 1*			**Year level 2 / *Jaarvlak 2***			**Year level 3 / *Jaarvlak 3***		
First/*Eerste* semester			**First / *Eerste* semester**			**First/ *Eerste* semester**		
Module code/ *Modulekode*	**CORE/ *KERN***	**Cr/ *Kr***	**Module code/ *Modulekode***	**CORE/ *KERN***	**Cr/ *Kr***	**Module code/ *Modulekode***	**CORE/ *KERN***	**Cr/ *Kr***
PLKS111	H	12	PLKS211	H	16	PLKS314	H	32
NCHE111	X	12	BCHN213	H	16	BCHS316	H	16
MTHS114	X	12	NCHE211 **&** NCHE212	X	8 8	BCHS317	H	16
MCBN111	X	12	WVNS211	X	12			
ALDE/A111	X	12						
Total / *Totaal* 1st semester		**60**	**Total / *Totaal* 1st semester**		**60**	**Total / *Totaal* 1st semester**		**64**
Year level 1 / *Jaarvlak 1*			**Year level 2 / *Jaarvlak 2***			**Year level 3 / *Jaarvlak 3***		
Second/*Tweede* semester			**Second/ *Tweede* semester**			**Second/ *Tweede* semester**		
Module code/ *Modulekode*	**CORE/ *KERN***	**Cr/ *Kr***	**Module code/ *Modulekode***	**CORE/ *KERN***	**Cr/ *Kr***	**Module code/ *Modulekode***	**CORE/ *KERN***	**Cr/ *Kr***
PLKS122	H	12	PLKS223	H	16	PLKS324	H	32
NCHE121	X	12	BCHN222	H	16	BCHS321	H	16
MTHS124	X	12	NCHE221 **&** NCHE222	X	8 8	BCHS322	H	16
MCBN121	X	12	WVNS221	X	12			
ALDE/A122	X	12						
Total / *Totaal* 2nd semester		**60**	**Total / *Totaal* 2nd semester**		**60**	**Total / *Totaal* 2nd semester**		**64**
Total year level / *Totaal jaarvlak* 1		**120**	**Total year level / *Totaal jaarvlak* 2**		**120**	**Total year level / *Totaal jaarvlak* 3**		**128**
Total credits for the programme / *Totaal krediete vir die program*								**368**

NAS.1.19.2.1 **OLD PROGRAMME PHASING OUT / *OU PROGRAM FASEER UIT* (PC): Bachelor of Science in Biological Sciences with Botany and Biochemistry/**
Baccalaureus Scientiae in Biologiese Wetenskappe met Plantkunde en Biochemie

CODE/ *KODE:* 2DK H02 - N301P (Pipeline only)

CODE/ *KODE:* 200118 - N170P (Pipeline / *Pyplyn*)

CAMPUS/ *KAMPUS:* Potchefstroom (AFRIKAANS, ENGLISH)

DELIVERY MODE/ *AFLEWERINGSMETODE:* Full Time / *Voltyds*

Compilation of programme / *Samestelling van program:* Botany and Biochemistry / *Plantkunde en Biochemie*

Year level 1 / *Jaarvlak 1*			**Year level 2 / *Jaarvlak 2***			**Year level 3 / *Jaarvlak 3***		
First/*Eerste* semester			**First / *Eerste* semester**			**First/ *Eerste* semester**		
Module code/ *Modulekode*	**CORE/ *KERN***	**Cr/ *Kr***	**Module code/ *Modulekode***	**CORE/ *KERN***	**Cr/ *Kr***	**Module code/ *Modulekode***	**CORE/ *KERN***	**Cr/ *Kr***
PLKS111	H	12	PLKN213	H	16	PLKS312	H	12
CHEM111	X	12	BCHN213	H	16	BCHS316	H	16
WISN111	X	12	CHEN211 **&** CHEN212	X	8 8	BCHS317	H	16
DRKS111 **OR/OF** GLGN112	X	12	WVNS211	X	12			
AGLA111	X	12						
Total / *Totaal* 1st semester		**60**	**Total / *Totaal* 1st semester**		**60**	**Total / *Totaal* 1st semester**		**64**
Year level 1 / *Jaarvlak 1*			**Year level 2 / *Jaarvlak 2***			**Year level 3 / *Jaarvlak 3***		
Second/*Tweede* semester			**Second/ *Tweede* semester**			**Second/ *Tweede* semester**		
Module code/ *Modulekode*	**CORE/ *KERN***	**Cr/ *Kr***	**Module code/ *Modulekode***	**CORE/ *KERN***	**Cr/ *Kr***	**Module code/ *Modulekode***	**CORE/ *KERN***	**Cr/ *Kr***
PLKS121	H	12	PLKS221	H	16	PLKN323	H	32
CHEM121	X	12	BCHN222	H	16	BCHS321	H	16
WISN121	X	12	CHEN222 **&** CHEN223	X	8 8	BCHS322	H	16
DRKS121 **OR/OF** GLGN122	X	12	WVNS221	X	12			
AGLA121	X	12						
Total / *Totaal* 2nd semester		**60**	**Total / *Totaal* 2nd semester**		**60**	**Total / *Totaal* 2nd semester**		**64**
Total year level / *Totaal jaarvlak* 1		**120**	**Total year level / *Totaal jaarvlak* 2**		**120**	**Total year level / *Totaal jaarvlak 3***		**128**
Total credits for the programme / *Totaal krediete vir die program*								**368**

NAS.1.19.3 **Programme: Bachelor of Science in Biological Sciences with Zoology and Biochemistry /**
Baccalaureus Scientiae in Biologiese Wetenskappe met Dierkunde en Biochemie

CODE/ *KODE*: 2DK H07 - N302P

CAMPUS/ *KAMPUS:* Potchefstroom (AFRIKAANS, ENGLISH)

DELIVERY MODE/ *AFLEWERINGSMETODE:* Full Time / *Voltyds*

Compilation of programme / *Samestelling van program:*

Year level 1 / *Jaarvlak 1*			**Year level 2 / *Jaarvlak 2***			**Year level 3 / *Jaarvlak 3***		
First/*Eerste* semester			**First / *Eerste* semester**			**First/ *Eerste* semester**		
Module code/ *Modulekode*	**CORE/ *KERN***	**Cr/ *Kr***	**Module code/ *Modulekode***	**CORE/ *KERN***	**Cr/ *Kr***	**Module code/ *Modulekode***	**CORE/ *KERN***	**Cr/ *Kr***
DRKS111	H	12	DRKN211	H	16	DRKS311	H	32
NCHE111	H	12	BCHN213	H	16	BCHS316	H	16
MCBN111	X	12	NCHE211 **&** NCHE212	X	8 8	BCHS317	H	16
MTHS114	X	12	WVNS211	X	12			
ALDE/A111	X	12						
Total / *Totaal* 1st semester		**60**	**Total / *Totaal* 1st semester**		**60**	**Total / *Totaal* 1st semester**		**64**
Year level 1 / *Jaarvlak 1*			**Year level 2 / *Jaarvlak 2***			**Year level 3 / *Jaarvlak 3***		
Second/*Tweede* semester			**Second/ *Tweede* semester**			**Second/ *Tweede* semester**		
Module code/ *Modulekode*	**CORE/ *KERN***	**Cr/ *Kr***	**Module code/ *Modulekode***	**CORE/ *KERN***	**Cr/ *Kr***	**Module code/ *Modulekode***	**CORE/ *KERN***	**Cr/ *Kr***
DRKS121	H	12	DRKS221	H	16	DRKN321	H	16
NCHE121	H	12	BCHN222	H	16	DRKS322	H	16
MCBN121	X	12	NCHE221 **&** NCHE222	X	8 8	BCHS321	H	16
MTHS124	X	12	WVNS221	X	12	BCHS322	H	16
ALDA/E122	X	12						
Total / *Totaal* 2nd semester		**60**	**Total / *Totaal* 2nd semester**		**60**	**Total / *Totaal* 2nd semester**		**64**
Total year level / *Totaal jaarvlak* 1		**120**	**Total year level / *Totaal jaarvlak* 2**		**120**	**Total year level / *Totaal jaarvlak* 3**		**128**
Total credits for the programme / *Totaal krediete vir die program*								**368**

NAS.1.19.3.1 **OLD PROGRAMME PHASING OUT / *OU PROGRAM FASEER UIT* (PC): Bachelor of Science in Biological Sciences with Zoology and Biochemistry/ *Baccalaureus Scientiae in Biologiese Wetenskappe met Dierkunde en Biochemie***

CODE/ *KODE:* 2DK H07 - N301P (Pipeline) [N160P old code closed]

CAMPUS/ *KAMPUS:* Potchefstroom (AFRIKAANS, ENGLISH)

DELIVERY MODE/ *AFLEWERINGSMETODE:* Full Time / Voltyds

Compilation of programme / *Samestelling van program:*

Year level 1 / *Jaarvlak 1*			**Year level 2 / *Jaarvlak 2***			**Year level 3 / *Jaarvlak 3***		
First/*Eerste* semester			**First / *Eerste* semester**			**First/ *Eerste* semester**		
Module code/ *Modulekode*	**CORE/ *KERN***	**Cr/ *Kr***	**Module code/ *Modulekode***	**CORE/ *KERN***	**Cr/ *Kr***	**Module code/ *Modulekode***	**CORE/ *KERN***	**Cr/ *Kr***
DRKS111	H	12	DRKN211	H	16	DRKS311	H	32
CHEM111	H	12	BCHN213	H	16	BCHS316	H	16
FLGX113	X	12	CHEN211 & CHEN212	X	8 8	BCHS317	H	16
WISN111	X	12	WVNS211	X	12			
AGLA111	X	12						
Total / *Totaal* 1st semester		**60**	**Total / *Totaal* 1st semester**		**60**	**Total / *Totaal* 1st semester**		**64**
Year level 1 / *Jaarvlak 1*			**Year level 2 / *Jaarvlak 2***			**Year level 3 / *Jaarvlak 3***		
Second/*Tweede* semester			**Second/ *Tweede* semester**			**Second/ *Tweede* semester**		
Module code/ *Modulekode*	**CORE/ *KERN***	**Cr/ *Kr***	**Module code/ *Modulekode***	**CORE/ *KERN***	**Cr/ *Kr***	**Module code/ *Modulekode***	**CORE/ *KERN***	**Cr/ *Kr***
DRKS121	H	12	DRKS221	H	16	DRKN321	H	16
CHEM121	H	12	BCHN222	H	16	DRKS322	H	16
FLGX123	X	12	CHEN222 & CHEN223	X	8 8	BCHS321	H	16
WISN121	X	12	WVNS221	X	12	BCHS322	H	16
AGLA121	X	12						
Total / *Totaal* 2nd semester		**60**	**Total / *Totaal* 2nd semester**		**60**	**Total / *Totaal* 2nd semester**		**64**
Total year level / *Totaal jaarvlak* 1		**120**	**Total year level / *Totaal jaarvlak* 2**		**120**	**Total year level / *Totaal jaarvlak* 3**		**128**
Total credits for the programme / *Totaal krediete vir die program*								**368**

NAS.1.19.4 **PROGRAMME: BACHELOR OF SCIENCE IN BIOLOGICAL SCIENCES WITH CHEMISTRY AND PHYSIOLOGY /**
BACCALAUREUS SCIENTIAE IN BIOLOGIESE WETENSKAPPE MET CHEMIE EN FISIOLOGIE

CODE/ *KODE:* 2DK H06 - N302P

CAMPUS/ *KAMPUS:* Potchefstroom (AFRIKAANS, ENGLISH)

DELIVERY MODE/ *AFLEWERINGSMETODE:* Full Time / Voltyds

Compilation of programme / *Samestelling van program:*

Year level 1 / *Jaarvlak 1*			**Year level 2 / *Jaarvlak 2***			**Year level 3 / *Jaarvlak 3***		
First/*Eerste* semester			**First / *Eerste* semester**			**First/ *Eerste* semester**		
Module code/ *Modulekode*	**CORE/ *KERN***	**Cr/ *Kr***	**Module code/ *Modulekode***	**CORE/ *KERN***	**Cr/ *Kr***	**Module code/ *Modulekode***	**CORE/ *KERN***	**Cr/ *Kr***
ALDE/A111	X	12	BCHN213	X	16	NCHE311	H	16
NCHE111	H	12	NCHE211	H	8	NCHE312	H	16
FLGX113	H	12	NCHE212	H	8	FLGX312	H	8
MCBN111	X	12	FLGX213	H	16	FLGX313	H	8
MTHS114	X	12	WVNS211	X	12	FLGX317	H	8
Total / *Totaal* 1st semester		**60**	**Total / *Totaal* 1st semester**		**60**	**Total / *Totaal* 1st semester**		**56**
Year level 1 / *Jaarvlak 1*			**Year level 2 / *Jaarvlak 2***			**Year level 3 / *Jaarvlak 3***		
Second/*Tweede* semester			**Second/ *Tweede* semester**			**Second/ *Tweede* semester**		
Module code/ *Modulekode*	**CORE/ *KERN***	**Cr/ *Kr***	**Module code/ *Modulekode***	**CORE/ *KERN***	**Cr/ *Kr***	**Module code/ *Modulekode***	**CORE/ *KERN***	**Cr/ *Kr***
ALDE/A122	X	12	BCHN222	X	16	NCHE321	H	16
NCHE121	H	12	NCHE221	H	8	NCHE322	H	16
FLGX123	H	12	NCHE222	H	8	FLGX325	H	16
MCBN121	X	12	FLGX223	H	8	FLGX328	H	8
MTHS124	X	12	FLGX224	H	8	FLGX329	H	8
			WVNS221	X	12	FKLT331	H	8
Total / *Totaal* 2nd semester		**60**	**Total / *Totaal* 2nd semester**		**60**	**Total / *Totaal* 2nd semester**		**72**
Total year level / *Totaal jaarvlak* 1		**120**	**Total year level / *Totaal jaarvlak* 2**		**120**	**Total year level / *Totaal jaarvlak* 3**		**128**
Total credits for the programme / *Totaal krediete vir die program*								**368**

NAS.1.19.4.1 **OLD PROGRAMME PHASING OUT / *OU PROGRAM FASEER UIT* (PC): Bachelor of Science in Biological Sciences with Chemistry and Physiology/ *Baccalaureus Scientiae in Biologiese Wetenskappe met Chemie en Fisiologie***

CODE/ *KODE*: 2DK H06 - N301P (Pipeline only)

CODE/ *KODE*: 200190 - N177P (Pipeline/ *Pyplyn*)
Bachelor of Science in Biological Sciences / *Baccalaureus Scientiae in Biologiese Wetenskappe*

CAMPUS/ *KAMPUS*: Potchefstroom (AFRIKAANS, ENGLISH)

DELIVERY MODE/ *AFLEWERINGSMETODE*: Full Time / *Voltyds*

Compilation of programme / *Samestelling van program:*

Year level 1 / *Jaarvlak 1*			**Year level 2 / *Jaarvlak 2***			**Year level 3 / *Jaarvlak 3***		
First/*Eerste* semester			**First / *Eerste* semester**			**First/ *Eerste* semester**		
Module code/ *Modulekode*	**CORE/ *KERN***	**Cr/ *Kr***	**Module code/ *Modulekode***	**CORE/ *KERN***	**Cr/ *Kr***	**Module code/ *Modulekode***	**CORE/ *KERN***	**Cr/ *Kr***
AGLA111	X	12	BCHN213	X	16	CHEM311	H	16
CHEM111	H	12	CHEN211	H	8	CHEN312	H	16
FLGX113	H	12	CHEN212	H	8	FLGX312	H	8
FSKS113	X	12	FLGX213	H	16	FLGX313	H	8
WISN111	X	12	WVNS211	X	12	FLGX317	H	8
Total / *Totaal* 1st semester		**60**	**Total / *Totaal* 1st semester**		**60**	**Total / *Totaal* 1st semester**		**56**
Year level 1 / *Jaarvlak 1*			**Year level 2 / *Jaarvlak 2***			**Year level 3 / *Jaarvlak 3***		
Second/*Tweede* semester			**Second/ *Tweede* semester**			**Second/ *Tweede* semester**		
Module code/ *Modulekode*	**CORE/ *KERN***	**Cr/ *Kr***	**Module code/ *Modulekode***	**CORE/ *KERN***	**Cr/ *Kr***	**Module code/ *Modulekode***	**CORE/ *KERN***	**Cr/ *Kr***
AGLA121	X	12	BCHN222	X	16	CHEN321	H	16
CHEM121	H	12	CHEN222	H	8	CHEN322	H	16
FLGX123	H	12	CHEN223	H	8	FLGX325	H	16
FSKS123	X	12	FLGX223	H	8	FLGX326	H	16
WISN121	X	12	FLGX224	H	8	FLGX329	H	8
			WVNS221	X	12			
Total / *Totaal* 2nd semester		**60**	**Total / *Totaal* 2nd semester**		**60**	**Total / *Totaal* 2nd semester**		**72**
Total year level / *Totaal jaarvlak* 1		**120**	**Total year level / *Totaal jaarvlak* 2**		**120**	**Total year level / *Totaal jaarvlak* 3**		**128**
Total credits for the programme / *Totaal krediete vir die program*								**368**

NAS.1.19.5 **PROGRAMME: BACHELOR OF SCIENCE IN BIOLOGICAL SCIENCES WITH ZOOLOGY AND PHYSIOLOGY /**
BACCALAUREUS SCIENTIAE IN BIOLOGIESE WETENSKAPPE MET DIERKUNDE EN FISIOLOGIE

CODE/ *KODE:* 2DK H03 - N302P

CAMPUS/ *KAMPUS:* Potchefstroom (AFRIKAANS, ENGLISH)

DELIVERY MODE/ *AFLEWERINGSMETODE:* Full Time / *Voltyds*

Compilation of programme / *Samestelling van program:*

Year level 1 / *Jaarvlak 1*			**Year level 2 / *Jaarvlak 2***			**Year level 3 / *Jaarvlak 3***		
First/*Eerste* semester			**First / *Eerste* semester**			**First/ *Eerste* semester**		
Module code/ *Modulekode*	**CORE/ *KERN***	**Cr/ *Kr***	**Module code/ *Modulekode***	**CORE/ *KERN***	**Cr/ *Kr***	**Module code/ *Modulekode***	**CORE/ *KERN***	**Cr/ *Kr***
ALDE/A111	X	12	DRKN211	H	16	DRKS311	H	32
NCHE111	X	12	FLGX213	H	16	FLGX312	H	8
DRKS111	H	12	MKBN211	X	16	FLGX313	H	8
FLGX113	H	12	WVNS211	X	12	FLGX317	H	8
FSKS113 **OR/*OF*** PLKS111	X	12						
Total / *Totaal* 1st semester		**60**	**Total / *Totaal* 1st semester**		**60**	**Total / *Totaal* 1st semester**		**56**
Year level 1 / *Jaarvlak 1*			**Year level 2 / *Jaarvlak 2***			**Year level 3 / *Jaarvlak 3***		
Second/*Tweede* semester			**Second/ *Tweede* semester**			**Second/ *Tweede* semester**		
Module code/ *Modulekode*	**CORE/ *KERN***	**Cr/ *Kr***	**Module code/ *Modulekode***	**CORE/ *KERN***	**Cr/ *Kr***	**Module code/ *Modulekode***	**CORE/ *KERN***	**Cr/ *Kr***
ALDE/A122	X	12	DRKS221	H	16	DRKN321	H	16
NCHE121	X	12	FLGX223	H	8	DRKS322	H	16
DRKS121	H	12	FLGX224	H	8	FLGX325	H	16
FLGX123	H	12	MKBS221	X	16	FLGX328	H	8
FSKS123 **OR/*OF*** PLKS122	X	12	WVNS221	X	12	FLGX329	H	8
						FKLT331	H	8
Total / *Totaal* 2nd semester		**60**	**Total / *Totaal* 2nd semester**		**60**	**Total / *Totaal* 2nd semester**		**72**
Total year level / *Totaal jaarvlak* 1		**120**	**Total year level / *Totaal jaarvlak* 2**		**120**	**Total year level / *Totaal jaarvlak* 3**		**128**
Total credits for the programme / *Totaal krediete vir die program*								**368**

NAS.1.19.5.1 **OLD PROGRAMME PHASING OUT / *OU PROGRAM FASEER UIT* (PC): Bachelor of Science in Biological Sciences with Zoology and Physiology / *Baccalaureus Scientiae in Biologiese Wetenskappe met Dierkunde en Fisiologie***

CODE/ *KODE*: 2DK H03 - N301P (Pipeline only)

CODE/ *KODE*: 200118 - N185P (Pipeline / *Pyplyn*)
BSc in Environmental and Biological Sciences / *BSc in Omgewings- en Biologiese Wetenskappe*

CAMPUS/ *KAMPUS*: Potchefstroom (AFRIKAANS, ENGLISH)

DELIVERY MODE/ *AFLEWERINGSMETODE*: Full Time / *Voltyds*

Compilation of programme / *Samestelling van program:*

Year level 1 / *Jaarvlak 1*			**Year level 2 / *Jaarvlak 2***			**Year level 3 / *Jaarvlak 3***		
First/*Eerste* semester			**First / *Eerste* semester**			**First/ *Eerste* semester**		
Module code/ *Modulekode*	**CORE/ *KERN***	**Cr/ *Kr***	**Module code/ *Modulekode***	**CORE/ *KERN***	**Cr/ *Kr***	**Module code/ *Modulekode***	**CORE/ *KERN***	**Cr/ *Kr***
AGLA111	X	12	DRKN211	H	16	DRKS311	H	32
CHEM111	X	12	FLGX213	H	16	FLGX312	H	8
DRKS111	H	12	MKBN211	X	16	FLGX313	H	8
FLGX113	H	12	WVNS211	X	12	FLGX317	H	8
FSKS113 **OR/OF** PLKS111	X	12						
Total / *Totaal* 1st semester		**60**	**Total / *Totaal* 1st semester**		**60**	**Total / *Totaal* 1st semester**		**56**
Year level 1 / *Jaarvlak 1*			**Year level 2 / *Jaarvlak 2***			**Year level 3 / *Jaarvlak 3***		
Second/*Tweede* semester			**Second/ *Tweede* semester**			**Second/ *Tweede* semester**		
Module code/ *Modulekode*	**CORE/ *KERN***	**Cr/ *Kr***	**Module code/ *Modulekode***	**CORE/ *KERN***	**Cr/ *Kr***	**Module code/ *Modulekode***	**CORE/ *KERN***	**Cr/ *Kr***
AGLA121	X	12	DRKS221	H	16	DRKN321	H	16
CHEM121	X	12	FLGX223	H	8	DRKS322	H	16
DRKS121	H	12	FLGX224	H	8	FLGX325	H	16
FLGX123	H	12	MKBS221	X	16	FLGX326	H	16
FSKS123 **OR/OF** PLKS121	X	12	WVNS221	X	12	FLGX329	H	8
Total / *Totaal* 2nd semester		**60**	**Total / *Totaal* 2nd semester**		**60**	**Total / *Totaal* 2nd semester**		**72**
Total year level / *Totaal jaarvlak* 1		**120**	**Total year level / *Totaal jaarvlak* 2**		**120**	**Total year level / *Totaal jaarvlak* 3**		**128**
Total credits for the programme / *Totaal krediete vir die program*								**368**

NAS.1.19.6 PROGRAMME: BACHELOR OF SCIENCE IN BIOLOGICAL SCIENCES WITH MICROBIOLOGY AND PHYSIOLOGY /
BACCALAUREUS SCIENTIAE IN BIOLOGIESE WETENSKAPPE MET MIKROBIOLOGIE EN FISIOLOGIE

CODE/ *KODE:* 2DK H04 - N302P

CAMPUS/ *KAMPUS:* Potchefstroom (AFRIKAANS, ENGLISH)

DELIVERY MODE/ *AFLEWERINGSMETODE:* Full Time / *Voltyds*

Compilation of programme / *Samestelling van program:*

Year level 1 / *Jaarvlak 1*			**Year level 2 / *Jaarvlak 2***			**Year level 3 / *Jaarvlak 3***		
First/*Eerste* semester			**First / *Eerste* semester**			**First/ *Eerste* semester**		
Module code/ *Modulekode*	**CORE/ *KERN***	**Cr/ *Kr***	**Module code/ *Modulekode***	**CORE/ *KERN***	**Cr/ *Kr***	**Module code/ *Modulekode***	**CORE/ *KERN***	**Cr/ *Kr***
ALDE/A111	X	12	NCHE211	X	8	FLGX312	H	8
NCHE111	X	12	NCHE213	X	8	FLGX313	H	8
DRKS111	X	12	FLGX213	H	16	FLGX317	H	8
FLGX113	H	12	MKBN211	H	16	MKBS313	H	16
FSKS113	X	12	WVNS211	X	12	MKBS314	H	16
Total / *Totaal* 1st semester		**60**	**Total / *Totaal* 1st semester**		**60**	**Total / *Totaal* 1st semester**		**56**
Year level 1 / *Jaarvlak 1*			**Year level 2 / *Jaarvlak 2***			**Year level 3 / *Jaarvlak 3***		
Second/*Tweede* semester			**Second/ *Tweede* semester**			**Second/ *Tweede* semester**		
Module code/ *Modulekode*	**CORE/ *KERN***	**Cr/ *Kr***	**Module code/ *Modulekode***	**CORE/ *KERN***	**Cr/ *Kr***	**Module code/ *Modulekode***	**CORE/ *KERN***	**Cr/ *Kr***
ALDE/A122	X	12	BCHN222	X	16	FLGX325	H	16
NCHE121	X	12	FLGX223	H	8	FLGX328	H	8
DRKS121	X	12	FLGX224	H	8	FLGX329	H	8
FLGX123	H	12	MKBS221	H	16	MKBS325	H	32
FSKS123	X	12	WVNS221	X	12	FKLT331	H	8
Total / *Totaal* 2nd semester		**60**	**Total / *Totaal* 2nd semester**		**60**	**Total / *Totaal* 2nd semester**		**72**
Total year level / *Totaal jaarvlak* 1		**120**	**Total year level / *Totaal jaarvlak* 2**		**120**	**Total year level / *Totaal jaarvlak* 3**		**128**
Total credits for the programme / *Totaal krediete vir die program*								**368**

NAS.1.19.6.1 **OLD PROGRAMME PHASING OUT / *OU PROGRAM FASEER UIT* (PC): Bachelor of Science in Biological Sciences with Microbiology and Physiology /**
Baccalaureus Scientiae in Biologiese Wetenskappe met Mikrobiologie en Fisiologie

CODE/ *KODE:* 2DK H04 - N301P (Pipeline only)

CODE/ *KODE:* 200118 - N186P (Pipeline/ *Pyplyn*)
BSc in Environmental and Biological Sciences / *BSc in Omgewings- en Biologiese Wetenskappe*

CAMPUS/ *KAMPUS:* Potchefstroom (AFRIKAANS, ENGLISH)

DELIVERY MODE/ *AFLEWERINGSMETODE:* Full Time / *Voltyds*

Compilation of programme / *Samestelling van program:*

Year level 1 / *Jaarvlak 1*			**Year level 2 / *Jaarvlak 2***			**Year level 3 / *Jaarvlak 3***		
First/*Eerste* semester			**First / *Eerste* semester**			**First/ *Eerste* semester**		
Module code/ *Modulekode*	**CORE/ *KERN***	**Cr/ *Kr***	**Module code/ *Modulekode***	**CORE/ *KERN***	**Cr/ *Kr***	**Module code/ *Modulekode***	**CORE/ *KERN***	**Cr/ *Kr***
AGLA111	X	12	CHEN211	X	8	FLGX312	H	8
CHEM111	X	12	CHEN213	X	8	FLGX313	H	8
DRKS111	X	12	FLGX213	H	16	FLGX317	H	8
FLGX113	H	12	MKBN211	H	16	MKBS313	H	16
FSKS113	X	12	WVNS211	X	12	MKBS314	H	16
Total / *Totaal* 1st semester		**60**	**Total / *Totaal* 1st semester**		**60**	**Total / *Totaal* 1st semester**		**56**
Year level 1 / *Jaarvlak 1*			**Year level 2 / *Jaarvlak 2***			**Year level 3 / *Jaarvlak 3***		
Second/*Tweede* semester			**Second/ *Tweede* semester**			**Second/ *Tweede* semester**		
Module code/ *Modulekode*	**CORE/ *KERN***	**Cr/ *Kr***	**Module code/ *Modulekode***	**CORE/ *KERN***	**Cr/ *Kr***	**Module code/ *Modulekode***	**CORE/ *KERN***	**Cr/ *Kr***
AGLA121	X	12	BCHN222	X	16	FLGX325	H	16
CHEM121	X	12	FLGX223	H	8	FLGX326	H	16
DRKS121	X	12	FLGX224	H	8	FLGX329	H	8
FLGX123	H	12	MKBS221	H	16	MKBS325	H	32
FSKS123	X	12	WVNS221	X	12			
Total / *Totaal* 2nd semester		**60**	**Total / *Totaal* 2nd semester**		**60**	**Total / *Totaal* 2nd semester**		**72**
Total year level / *Totaal jaarvlak* 1		**120**	**Total year level / *Totaal jaarvlak* 2**		**120**	**Total year level / *Totaal jaarvlak* 3**		**128**
Total credits for the programme / *Totaal krediete vir die program*								**368**

NAS.1.19.7 **PROGRAMME: BACHELOR OF SCIENCE IN BIOLOGICAL SCIENCES WITH ZOOLOGY AND MICROBIOLOGY /**
BACCALAUREUS SCIENTIAE IN BIOLOGIESE WETENSKAPPE MET DIERKUNDE EN MIKROBIOLOGIE

CODE/ *KODE:* 2DK H08 - N301P

CODE/ *KODE:* 200118 - N163P (Pipeline only)

BSc in Environmental and Biological Sciences / *BSc in Omgewings- en Biologiese Wetenskappe*

CAMPUS/ *KAMPUS:* Potchefstroom (AFRIKAANS, ENGLISH)

DELIVERY MODE/ *AFLEWERINGSMETODE:* Full Time / *Voltyds*

Compilation of programme / *Samestelling van program:*

Year level 1 / *Jaarvlak 1*			**Year level 2 / *Jaarvlak 2***			**Year level 3 / *Jaarvlak 3***		
First/*Eerste* semester			**First / *Eerste* semester**			**First/ *Eerste* semester**		
Module code/ *Modulekode*	**CORE/ *KERN***	**Cr/ *Kr***	**Module code/ *Modulekode***	**CORE/ *KERN***	**Cr/ *Kr***	**Module code/ *Modulekode***	**CORE/ *KERN***	**Cr/ *Kr***
DRKS111	H	12	DRKN211	H	16	DRKS311	H	32
NCHE111	H	12	MKBN211	H	16	MKBS313	H	16
FLGX113	X	12	BCHN213* **OR/*OF*** PLKS211 **OR/*OF*** FLGX213	X	16	MKBS314	H	16
PLKS111 **OR/*OF*** MCBN111*	X	12	WVNS211	X	12			
ALDE/A111	X	12						
Total / *Totaal* 1st semester		**60**	**Total / *Totaal* 1st semester**		**60**	**Total / *Totaal* 1st semester**		**64**
Year level 1 / *Jaarvlak 1*			**Year level 2 / *Jaarvlak 2***			**Year level 3 / *Jaarvlak 3***		
Second/*Tweede* semester			**Second/ *Tweede* semester**			**Second/ *Tweede* semester**		
Module code/ *Modulekode*	**CORE/ *KERN***	**Cr/ *Kr***	**Module code/ *Modulekode***	**CORE/ *KERN***	**Cr/ *Kr***	**Module code/ *Modulekode***	**CORE/ *KERN***	**Cr/ *Kr***
DRKS121	H	12	DRKS221	H	16	DRKN321	H	16
NCHE121	H	12	MKBS221	H	16	DRKS322	H	16
FLGX123	X	12	BCHN222* **OR/*OF*** PLKS223 **OR/*OF*** FLGX223 **&** FLGX224	X	16	MKBS325	H	32
PLKS122 **OR/*OF*** MCBN121*	X	12	WVNS221	X	12			
ALDE/A122	X	12						
Total / *Totaal* 2nd semester		**60**	**Total / *Totaal* 2nd semester**		**60**	**Total / *Totaal* 2nd semester**		**64**
Total year level / *Totaal jaarvlak* 1		**120**	**Total year level / *Totaal jaarvlak* 2**		**120**	**Total year level / *Totaal jaarvlak* 3**		**128**
Total credits for the programme / *Totaal krediete vir die program*								**368**

MCBN111* and MCBN121* has to be taken in the first year in order to select BCHN213 and BCHN222 in the second year.

NAS.1.19.8 **PROGRAMME: BACHELOR OF SCIENCE IN BIOLOGICAL SCIENCES WITH ZOOLOGY AND BOTANY /**
BACCALAUREUS SCIENTIAE IN BIOLOGIESE WETENSKAPPE MET DIERKUNDE EN PLANTKUNDE

CODE/ *KODE:* 2DK H09 - N301P:

CODE/ *KODE:* 200118 - N164P (Pipeline only)

BSc in Environmental and Biological Sciences / *BSc in Omgewings- en Biologiese Wetenskappe*

CAMPUS/ *KAMPUS*: Potchefstroom (AFRIKAANS, ENGLISH)

DELIVERY MODE/ *AFLEWERINGSMETODE*: Full Time / *Voltyds*

Compilation of programme / *Samestelling van program:*

Year level 1 / *Jaarvlak 1*			**Year level 2 / *Jaarvlak 2***			**Year level 3 / *Jaarvlak 3***		
First/*Eerste* semester			**First / *Eerste* semester**			**First/ *Eerste* semester**		
Module code/ *Modulekode*	**CORE/ *KERN***	**Cr/ *Kr***	**Module code/ *Modulekode***	**CORE/ *KERN***	**Cr/ *Kr***	**Module code/ *Modulekode***	**CORE/ *KERN***	**Cr/ *Kr***
DRKS111	H	12	DRKN211	H	16	DRKS311	H	32
PLKS111	H	12	PLKS211	H	16	PLKS314	H	32
NCHE111	X	12	BCHN213* **OR/OF** GDKN211 **OR/*OF*** MKBN211	X	16			
FLGX113 **OR/*OF*** GLGN112 **OR/*OF*** MCBN111*	X	12	WVNS211	X	12			
ALDE/A111	X	12						
Total / *Totaal* 1st semester		**60**	**Total / *Totaal* 1st semester**		**60**	**Total / *Totaal* 1st semester**		**64**
Year level 1 / *Jaarvlak 1*			**Year level 2 / *Jaarvlak 2***			**Year level 3 / *Jaarvlak 3***		
Second/*Tweede* semester			**Second/ *Tweede* semester**			**Second/ *Tweede* semester**		
Module code/ *Modulekode*	**CORE/ *KERN***	**Cr/ *Kr***	**Module code/ *Modulekode***	**CORE/ *KERN***	**Cr/ *Kr***	**Module code/ *Modulekode***	**CORE/ *KERN***	**Cr/ *Kr***
DRKS121	H	12	DRKS221	H	16	DRKN321	H	16
PLKS122	H	12	PLKS223	H	16	DRKS322	H	16
NCHE121	X	12	BCHN222* **OR/*OF*** GDKN221 **OR/*OF*** MKBS221	X	16	PLKS324	H	32
FLGX123 **OR/*OF*** GDKN121 **OR/*OF*** MCBN121*	X	12	WVNS221	X	12			
ALDE/A122	X	12						
Total / *Totaal* 2nd semester		**60**	**Total / *Totaal* 2nd semester**		**60**	**Total / *Totaal* 2nd semester**		**64**
Total year level / *Totaal jaarvlak* 1		**120**	**Total year level / *Totaal jaarvlak* 2**		**120**	**Total year level / *Totaal jaarvlak* 3**		**128**
Total credits for the programme / *Totaal krediete vir die program*								**368**

MCBN111* and MCBN121* has to be taken in the first year in order to select BCHN213 and BCHN222 in the second year

Take note: FLGX is not available as an option in Year Level 2.

NAS.1.19.9 **PROGRAMME: BACHELOR OF SCIENCE IN BIOLOGICAL SCIENCES WITH MICROBIOLOGY AND BOTANY /**
BACCALAUREUS SCIENTIAE IN BIOLOGIESE WETENSKAPPE MET MIKROBIOLOGIE EN PLANTKUNDE

This programme represents an aligned programme, which replaces the programmes containing Biology on the MC. To reflect the fields of expertise on the two campuses, the third year Microbiology modules are electives, which are campus specific. /

Hierdie program verteenwoordig 'n belynde program wat die Biologie-bevattende programme op die MC vervang. Om die kundigheidsveld op die twee kampusse te weerspieël, is die derdejaar Mikrobiologie modules keusemodules, wat kampusspesifiek is.

CODE/ *KODE*: 2DK H10 - N302P; N301M

CAMPUS/ *KAMPUS*: Potchefstroom (AFRIKAANS, ENGLISH);
Mafikeng (ENGLISH)

DELIVERY MODE/ *AFLEWERINGSMETODE*: Full Time / *Voltyds*

Compilation of programme / *Samestelling van program:*

Year level 1 / *Jaarvlak 1*			**Year level 2 / *Jaarvlak 2***			**Year level 3 / *Jaarvlak 3***		
First/*Eerste* semester			**First / *Eerste* semester**			**First/ *Eerste* semester**		
Module code/ *Modulekode*	**CORE/ *KERN***	**Cr/ *Kr***	**Module code/ *Modulekode***	**CORE/ *KERN***	**Cr/ *Kr***	**Module code/ *Modulekode***	**CORE/ *KERN***	**Cr/ *Kr***
PLKS111	H	12	MKBN211	H	16	MKBS313* **OR/*OF*** MKBS316**	H	16
NCHE111	X	12	PLKS211	H	16	MKBS314* **OR/*OF*** MKBS317**	H	16
*DRKS111 **OR/*OF*** GEOG111 **OR/*OF*** ***MCBN111	X	12	BCHN213*** **OR/*OF*** GEOG211 **OR/*OF*** DRKN211*	X	16	PLKS314	H	32
*FSKS113 **OR/*OF*** **NPHY111	X	12	WVNS211	X	12			
ALDE/A111	X	12						
Total / *Totaal* 1st semester		**60**	**Total / *Totaal* 1st semester**		**60**	**Total / *Totaal* 1st semester**		**64**

Year level 1 / *Jaarvlak 1*			Year level 2 / *Jaarvlak 2*			Year level 3 / *Jaarvlak 3*		
Second/*Tweede* semester			**Second/ *Tweede* semester**			**Second/ *Tweede* semester**		
Module code/ *Modulekode*	**CORE/ *KERN***	**Cr/ *Kr***	**Module code/ *Modulekode***	**CORE/ *KERN***	**Cr/ *Kr***	**Module code/ *Modulekode***	**CORE/ *KERN***	**Cr/ *Kr***
PLKS122	H	12	PLKS223	H	16	PLKS324	H	32
NCHE121	X	12	MKBS221	H	16	MKBS325* **OR/*OF*** MKBS326** **&** MKBS327**	H H H	32 16 16
*DRKS121 **OR/*OF*** GEOG121 **OR/*OF*** ***MCBN121	X	12	BCHN222*** **OR/*OF*** GEOG221 **OR/*OF*** DRKS221*	X	16			
*FSKS123 **OR/*OF*** **NPHY121	X	12	WVNS221	X	12			
ALDE/A122	X	12						
Total / *Totaal* 2nd semester		**60**	**Total / *Totaal* 2nd semester**		**60**	**Total / *Totaal* 2nd semester**		**64**
Total year level / *Totaal jaarvlak* 1		**120**	**Total year level / *Totaal jaarvlak* 2**		**120**	**Total year level / *Totaal jaarvlak* 3**		**128**
Total credits for the programme / *Totaal krediete vir die program*								**368**

* Can only be taken on the Potchefstroom campus/ Kan slegs op die Potchefstroomkampus geneem word.

**Can only be taken on the Mafikeng campus/ *Kan slegs op die Mafikengkampus geneem word.*

*** MCBN111 and MCBN121 has to be taken in the first year in order to select BCHN213 and BCHN222 in the second year. / *MCBN111 en MCBN121 moet in die eerste jaar geneem word, indien BCHN213 en BCHN222 op jaarvlak twee geneem wil word.*

NAS.1.19.9.1 **OLD PROGRAMME PHASING OUT / OU PROGRAM FASEER UIT (PC): Bachelor of Science in Biological Sciences with Microbiology and Botany/ *Baccalaureus Scientiae in Biologiese Wetenskappe met Mikrobiologie en Plantkunde***

CODE/ *KODE*: 2DK H10 - N301P (Pipeline only / *Slegs Pyplyn*)
BSc in Biological Sciences with Microbiology and Botany / *BSc in Biologiese Wetenskappe met Mikrobiologie en Plantkunde*

CODE/ *KODE*: 200118 - N169P (Pipeline only /*Slegs Pyplyn*)
BSc in Environmental and Biological Sciences / *BSc in Omgewings- en Biologiese Wetenskappe*

CAMPUS/ *KAMPUS*: Potchefstroom (AFRIKAANS, ENGLISH)

DELIVERY MODE/ *AFLEWERINGSMETODE*: Full Time / *Voltyds*

Compilation of programme / *Samestelling van program*:

Year level 1 / *Jaarvlak 1*			**Year level 2 / *Jaarvlak 2***			**Year level 3 / *Jaarvlak 3***		
First/*Eerste* semester			**First / *Eerste* semester**			**First/ *Eerste* semester**		
Module code/ *Modulekode*	**CORE/ *KERN***	**Cr/ *Kr***	**Module code/ *Modulekode***	**CORE/ *KERN***	**Cr/ *Kr***	**Module code/ *Modulekode***	**CORE/ *KERN***	**Cr/ *Kr***
PLKS111	H	12	MKBN211	H	16	MKBS313	H	16
CHEM111	X	12	PLKN213	H	16	MKBS314	H	16
FSKS113	X	12	BCHN213 **OR** DRKN211	X	16	PLKS312	H	32
DRKS111 **OR** *GLGN112	X	12	WVNS211	X	12			
AGLA/E111	X	12						
Total / *Totaal* 1st semester		**60**	**Total / *Totaal* 1st semester**		**60**	**Total / *Totaal* 1st semester**		**64**
Year level 1 / *Jaarvlak 1*			**Year level 2 / *Jaarvlak 2***			**Year level 3 / *Jaarvlak 3***		
Second/*Tweede* semester			**Second/ *Tweede* semester**			**Second/ *Tweede* semester**		
Module code/ *Modulekode*	**CORE/ *KERN***	**Cr/ *Kr***	**Module code/ *Modulekode***	**CORE/ *KERN***	**Cr/ *Kr***	**Module code/ *Modulekode***	**CORE/ *KERN***	**Cr/ *Kr***
PLKS121	H	12	MKBS221	H	16	MKBS325	H	32
CHEM121	X	12	PLKS221	H	16			
FSKS123	X	12	BCHN222 **OR** DRKS221	X	16	PLKN323	H	32
DRKS121 **OR** *GLGN122	X	12	WVNS221	X	12			
AGLA/E121	X	12						
Total / *Totaal* 2nd semester		**60**	**Total / *Totaal* 2nd semester**		**60**	**Total / *Totaal* 2nd semester**		**64**
Total year level / *Totaal jaarvlak* 1		**120**	**Total year level / *Totaal jaarvlak* 2**		**120**	**Total year level / *Totaal jaarvlak* 3**		**128**
Total credits for the programme / *Totaal krediete vir die program*								**368**

*Take note: GLGN112/122 - No elective is available at level 2 for GLGN.

NAS.1.20 PROGRAMME: BACHELOR OF SCIENCE IN ENVIRONMENTAL SCIENCES / *BACCALAUREUS SCIENTIAE IN OMGEWINGSWETENSKAPPE*

NAS.1.20.1 FACULTY-SPECIFIC RULES FOR THE PROGRAMME / *FAKULTEITSPESIFIEKE REËLS VIR DIE PROGRAM*

The Faculty of Agricultural and Natural Science has a number of approved curricula that have a good basic training in environmental sciences. In compiling the programme/curricula work possibilities and manpower needs of our country are also considered. This programme/curriculum prepares the student for postgraduate studies (**Honours in Environmental Sciences**), recommended in order to register with the South African Council for Natural Scientific Professions (SACNASP). /

*Die Fakulteit van Natuur- en Landbouwetenskappe het 'n aantal programme/kurrikulums goedgekeur wat 'n goeie basiese opleiding in die omgewingswetenskappe bied. By die samestelling van die programme/kurrikulums is ook oorweging geskenk aan beroepsmoontlikhede en die mannekragbehoeftes van ons land. Hierdie programme/kurrikulums berei die student ook voor vir nagraadse studie (**Honneurs in Omgewingswetenskappe**), wat aanbeveel word met die oog op registrasie by die Suid-Afrikaanse Raad vir Natuurwetenskaplike Professies (SARNAP).*

NAS.1.20.2 FACULTY SPECIFIC ADMISSION REQUIREMENTS/ *FAKULTEITSPESIFIEKE TOELATINGSVEREISTES*

See paragraph *NAS.1.16.3 / Kyk paragraaf NAS.1.16.3*

Students that register for programmes/curriculums that include DRKS311, DRTS311, PLKN323, PLTN323, GDKN221 or GLGN321, should be aware that a compulsory field excursion forms part of this module. /

Studente wat vir programme/kurrikulums aansoek doen waarin DRKS311, DRTS311, PLKN323 asook PLTN323, GDKN221 en GLGN321 voorkom, moet bewus wees daarvan dat 'n verpligte veld-ekskursie deel vorm van hierdie modules.

NAS.1.20.3 **PROGRAMME: BACHELOR OF SCIENCE IN ENVIRONMENTAL SCIENCES WITH MICROBIOLOGY AND CHEMISTRY /**
BACCALAUREUS SCIENTIAE IN OMGEWINGSWETENSKAPPE MET MIKROBIOLOGIE EN CHEMIE

CODE/ *KODE:* 2DJ H10 - N301P; N301M

CAMPUS/ *KAMPUS*: Potchefstroom (AFRIKAANS, ENGLISH), Mafikeng (ENGLISH)

DELIVERY MODE/ *AFLEWERINGSMETODE:* Full Time / *Voltyds*

Compilation of programme / *Samestelling van program:*

Year level 1 / *Jaarvlak 1*			**Year level 2 / *Jaarvlak 2***			**Year level 3 / *Jaarvlak 3***		
First/*Eerste* semester			**First / *Eerste* semester**			**First/ *Eerste* semester**		
Module code/ *Modulekode*	**CORE/ *KERN***	**Cr/ *Kr***	**Module code/ *Modulekode***	**CORE/ *KERN***	**Cr/ *Kr***	**Module code/ *Modulekode***	**CORE/ *KERN***	**Cr/ *Kr***
ALDE/A111	X	12	BCHN213	X	16	NCHE311	H	16
MCBN111	X	12	NCHE211	H	8	NCHE312	H	16
MTHS114	X	12	NCHE212	H	8	MKBS313* **OR/*OF*** MKBS316**	H	16
NCHE111	H	12	MKBN211	H	16	MKBS314* **OR/*OF*** MKBS317**	H	16
FLGX113* **OR/*OF*** FSKS113* **OR/*OF*** NPHY111**	X	12	WVNS211	X	12			
Total / *Totaal* 1st semester		**60**	**Total / *Totaal* 1st semester**		**60**	**Total / *Totaal* 1st semester**		**64**
Year level 1 / *Jaarvlak 1*			**Year level 2 / *Jaarvlak 2***			**Year level 3 / *Jaarvlak 3***		
Second/*Tweede* semester			**Second/ *Tweede* semester**			**Second/ *Tweede* semester**		
Module code/ *Modulekode*	**CORE/ *KERN***	**Cr/ *Kr***	**Module code/ *Modulekode***	**CORE/ *KERN***	**Cr/ *Kr***	**Module code/ *Modulekode***	**CORE/ *KERN***	**Cr/ *Kr***
ALDE/A122	X	12	BCHN222	X	16	NCHE321	H	16
MCBN121	X	12	NCHE221	H	8	NCHE322	H	16
MTHS124	X	12	NCHE222	H	8	MKBS325* **OR/*OF*** MKBS326** **&** MKBS327**	H H H	32 16 16
NCHE121	H	12	MKBS221	H	16			
FSKS123* **OR/*OF*** FLGX123* **OR/*OF*** NPHY121**	X	12	WVNS221	X	12			
Total / *Totaal* 2nd semester		**60**	**Total / *Totaal* 2nd semester**		**60**	**Total / *Totaal* 2nd semester**		**64**
Total year level / *Totaal jaarvlak* 1		**120**	**Total year level / *Totaal jaarvlak* 2**		**120**	**Total year level / *Totaal jaarvlak* 3**		**128**
Total credits for the programme / *Totaal krediete vir die program*								**368**

*Can only be taken on the Potchefstroom campus/ *Kan slegs op die Potchefstroomkampus geneem word.*

** Can only be taken on the Mafikeng campus/ *Kan slegs op die Mafikengkampus geneem word.*

NAS.1.20.3.1 **OLD PROGRAMME PHASING OUT / OU PROGRAM FASEER UIT (PC): Bachelor of Science Environmental and Biological Sciences / *Baccalaureus Scientiae in Omgewings- en Biologiese Wetenskappe***

CODE/ *KODE:* 200118 - N168P (Pipeline only)
BSc in Environmental and Biological Sciences / *BSc in Omgewings- en Biologiese Wetenskappe*

CAMPUS/ *KAMPUS:* Potchefstroom (AFRIKAANS, ENGLISH)

DELIVERY MODE/ *AFLEWERINGSMETODE:* Full Time / *Voltyds*

Compilation of programme / *Samestelling van program:*

Year level 1 / *Jaarvlak 1*			**Year level 2 / *Jaarvlak 2***			**Year level 3 / *Jaarvlak 3***		
First/*Eerste* semester			**First / *Eerste* semester**			**First/ *Eerste* semester**		
Module code/ *Modulekode*	**CORE/ *KERN***	**Cr/ *Kr***	**Module code/ *Modulekode***	**CORE/ *KERN***	**Cr/ *Kr***	**Module code/ *Modulekode***	**CORE/ *KERN***	**Cr/ *Kr***
CHEM111	H	12	MKBN211	H	16	MKBS313	H	16
WISN111	X	12	CHEN211 & CHEN212	H	8 8	MKBS314	H	16
FSKS113	X	12	BCHN213	X	16	CHEM311	H	16
DRKS111	X	12	WVNS211	X	12	CHEN312	H	16
AGLA/E111	X	12						
Total / *Totaal* 1st semester		**60**	**Total / *Totaal* 1st semester**		**60**	**Total / *Totaal* 1st semester**		**64**

Year level 1 / *Jaarvlak 1*			**Year level 2 / *Jaarvlak 2***			**Year level 3 / *Jaarvlak 3***		
Second/*Tweede* semester			**Second/ *Tweede* semester**			**Second/ *Tweede* semester**		
Module code/ *Modulekode*	**CORE/ *KERN***	**Cr/ *Kr***	**Module code/ *Modulekode***	**CORE/ *KERN***	**Cr/ *Kr***	**Module code/ *Modulekode***	**CORE/ *KERN***	**Cr/ *Kr***
CHEM121	H	12	MKBS221	H	16	MKBS325	H	32
WISN121	X	12	CHEN222 & CHEN223	H	8 8	CHEN321	H	16
FSKS123	X	12	BCHN222	X	16	CHEN322	H	16
DRKS121	X	12	WVNS221	X	12			
AGLA/E 121	X	12						
Total / *Totaal* 2nd semester		**60**	**Total / *Totaal* 2nd semester**		**60**	**Total / *Totaal* 2nd semester**		**64**
Total year level / *Totaal jaarvlak* 1		**120**	**Total year level / *Totaal jaarvlak* 2**		**120**	**Total year level / *Totaal jaarvlak* 3**		**128**
Total credits for the programme / *Totaal krediete vir die program*								**368**

NAS.1.20.3.2 **OLD PROGRAMME PHASING OUT (MC):**
Bachelor of Science in Microbiology and Chemistry

CODE: 200118 - N168M (Pipeline only)

CAMPUS: Mafikeng (ENGLISH)

DELIVERY MODE: Full Time

Compilation of programme:

Year level 1			Year level 2			Year level 3		
First semester			First semester			First semester		
Module code	CORE	Cr	Module code	CORE	Cr	Module code	CORE	Cr
AGLE111	X	12	WVNS211	X	12	MKBS316	H	16
BGYM113	H	12	MKBS211	H	8	MKBS317	H	16
MAYM116	X	12	MKBS212	H	8	MCHE315	H	8
MCHE114	H	12	MCHE215	H	8	MCHE316	H	8
		12	MCHE216	H	8			
			BCHS211	X	8			
			BCHS212	X	8			
Total 1st Semester		60	Total 1st semester		60	Total 1st semester		64
Year level 1			Year level 2			Year level 3		
Second semester			Second semester			Second semester		
Module code	CORE	Cr	Module code	CORE	Cr	Module code	CORE	Cr
AGLE121	X	12	WVNS221	X	12	MKBS326	H	16
BGYM123	H	12	MKBS223	H	8	MKBS327	H	16
MAYM126	X	12	MKBS222	H	8	MCHE322	H	8
MCHE121	H	12	MCHE221	H	8	MCHE321	H	8
PHYM128	X	12	MCHE223	H	8			
			BCHS221	X	8			
			BCHS222	X	8			
Total 2nd semester		60	Total 2nd semester		60	Total 2nd semester		64
Total year level 1		120	Total year level 2		120	Total year level 3		128
Total credits for the programme								368

NAS.1.20.4 **PROGRAMME: BACHELOR OF SCIENCE IN ENVIRONMENTAL SCIENCES WITH CHEMISTRY AND GEOGRAPHY**

CODE: 2DJ H18 - N301M

CAMPUS: Mafikeng (ENGLISH)

DELIVERY MODE: Full Time

Compilation of programme:

Year level 1 / *Jaarvlak 1*			**Year level 2 / *Jaarvlak 2***			**Year level 3 / *Jaarvlak 3***		
First/*Eerste* semester			**First / *Eerste* semester**			**First/ *Eerste* semester**		
Module code/ *Modulekode*	**CORE/ *KERN***	**Cr/ *Kr***	**Module code/ *Modulekode***	**CORE/ *KERN***	**Cr/ *Kr***	**Module code/ *Modulekode***	**CORE/ *KERN***	**Cr/ *Kr***
ALDE111	X	12	NCHE211	H	8	NCHE311	H	16
NCHE111	H	12	NCHE212	H	8	NCHE312	H	16
MTHS111	X	12	NPHY211**&** NPHY212 **OR** MTHS211**&** MTHS212	X X X X	8 8 8 8	GEOG311	H	32
NPHY111	X	12	GEOG211	H	16			
GEOG111	H	12	WVNS211	X	12			
Total / *Totaal* 1st semester		**60**	**Total / *Totaal* 1st semester**		**60**	**Total / *Totaal* 1st semester**		**64**
Year level 1 / *Jaarvlak 1*			**Year level 2 / *Jaarvlak 2***			**Year level 3 / *Jaarvlak 3***		
Second/*Tweede* semester			**Second/ *Tweede* semester**			**Second/ *Tweede* semester**		
Module code/ *Modulekode*	**CORE/ *KERN***	**Cr/ *Kr***	**Module code/ *Modulekode***	**CORE/ *KERN***	**Cr/ *Kr***	**Module code/ *Modulekode***	**CORE/ *KERN***	**Cr/ *Kr***
ALDE122	X	12	GEOG221	H	16	NCHE321	H	16
NCHE121	H	12	NPHY221**&** NPHY222 **OR** MTHS221**&** MTHS222	X X X X	8 8 8 8	NCHE322	H	16
MTHS121	X	12	NCHE221	H	8	GEOG321	H	32
NPHY121	X	12	NCHE222	H	8			
GEOG121	H	12	WVNS221	X	12			
Total / *Totaal* 2nd semester		**60**	**Total / *Totaal* 2nd semester**		**60**	**Total / *Totaal* 2nd semester**		**64**
Total year level / *Totaal jaarvlak* 1		**120**	**Total year level / *Totaal jaarvlak* 2**		**120**	**Total year level / *Totaal jaarvlak* 3**		**128**
Total credits for the programme / *Totaal krediete vir die program*								**368**

NAS.1.20.4.1 **OLD PROGRAMME PHASING OUT (MC):**
Bachelor of Science in Chemistry and Geography

CODE: 200150 – N301M (Pipeline only)

CAMPUS: Mafikeng (ENGLISH)

DELIVERY MODE: Full Time

Compilation of programme:

Year level 1 / *Jaarvlak 1*			**Year level 2 / *Jaarvlak 2***			**Year level 3 / *Jaarvlak 3***		
First/*Eerste* semester			**First / *Eerste* semester**			**First/ *Eerste* semester**		
Module code/ *Modulekode*	**CORE/ *KERN***	**Cr/ *Kr***	**Module code/ *Modulekode***	**CORE/ *KERN***	**Cr/ *Kr***	**Module code/ *Modulekode***	**CORE/ *KERN***	**Cr/ *Kr***
GEOM113	H	12	WVNS211	X	12	GEOM316	H	16
MCHE114	H	12	GEOM214	H	8	GEOM317	H	16
MAYM117	X	12	GEOM215	H	8	MCHE315	H	16
PHYM118	X	12	MCHE215	H	8	MCHE316	H	16
AGLE111	X	12	MCHE216	H	8			
			PHYM215 **&** PHYM216 **OR** MAYM217	X	8 8 16			
Total / *Totaal* 1st semester		**60**	**Total / *Totaal* 1st semester**		**60**	**Total / *Totaal* 1st semester**		**64**

Year level 1 / *Jaarvlak 1*			**Year level 2 / *Jaarvlak 2***			**Year level 3 / *Jaarvlak 3***		
Second/*Tweede* semester			**Second/ *Tweede* semester**			**Second/ *Tweede* semester**		
Module code/ *Modulekode*	**CORE/ *KERN***	**Cr/ *Kr***	**Module code/ *Modulekode***	**CORE/ *KERN***	**Cr/ *Kr***	**Module code/ *Modulekode***	**CORE/ *KERN***	**Cr/ *Kr***
GEOM123	H	12	GEOM224	H	8	GEOM328	H	16
MCHE121	H	12	GEOM225	H	8	GEOM329	H	16
MAYM127	X	12	MCHE221	H	8	MCHE321	H	16
PHYM128	X	12	MCHE223	H	8	MCHE322	H	16
AGLE121	X	12	PHYM221 **&** PHYM222 **OR** MAYM227	X X X	8 8 16			
			WVNS222	X	12			
Total / *Totaal* 2nd semester		**60**	**Total / *Totaal* 2nd semester**		**60**	**Total / *Totaal* 2nd semester**		**64**
Total year level / *Totaal jaarvlak* 1		**120**	**Total year level / *Totaal jaarvlak* 2**		**120**	**Total year level / *Totaal jaarvlak* 3**		**128**
Total credits for the programme / *Totaal krediete vir die program*								**368**

NAS.1.20.5 PROGRAMME: BACHELOR OF SCIENCE IN ENVIRONMENTAL SCIENCES WITH BOTANY AND CHEMISTRY / *BACCALAUREUS SCIENTIAE IN OMGEWINGSWETENSKAPPE MET PLANTKUNDE EN CHEMIE*

NAS.1.20.5.1 Specific programme outcomes/ *Spesifieke programuitkomste*

This programme represents an aligned programme, which replaces the Biology containing programmes on the MC. To reflect the fields of expertise on the two campuses, the third year Botany modules are electives, which are campus specific. /

Hierdie program verteenwoordig 'n belynde program wat die Biologie-programme op die MC vervang. Om die vakkundigheid op die twee kampusse te weerspieël, is die derdejaar Plantkunde-modules keusemodules, wat kampusspesifiek is.

*Can only be taken on the Potchefstroom campus/ *Kan slegs op die Potchefstroomkampus geneem word.*

** Can only be taken on the Mafikeng campus/ *Kan slegs op die Mafikengkampus geneem word.*

NAS.1.20.6 **BACHELOR OF SCIENCE IN ENVIRONMENTAL SCIENCES WITH BOTANY AND CHEMISTRY/**
BACCALAUREUS SCIENTIAE IN OMGEWINGSWETENSKAPPE MET PLANTKUNDE EN CHEMIE

CODE/ *KODE*: 2DJ H03 - N302P; N301M
CAMPUS/ *KAMPUS:* Potchefstroom (AFRIKAANS, ENGLISH); Mafikeng (ENGLISH)
DELIVERY MODE/ *AFLEWERINGSMETODE:* Full Time / *Voltyds*
Compilation of programme / *Samestelling van program:*

Year level 1 / *Jaarvlak 1*			**Year level 2 / *Jaarvlak 2***			**Year level 3 / *Jaarvlak 3***		
First/*Eerste* semester			**First / *Eerste* semester**			**First/ *Eerste* semester**		
Module code/ *Modulekode*	**CORE/ *KERN***	**Cr/ *Kr***	**Module code/ *Modulekode***	**CORE/ *KERN***	**Cr/ *Kr***	**Module code/ *Modulekode***	**CORE/ *KERN***	**Cr/ *Kr***
PLKS111	H	12	PLKS211	H	16	PLKS314	H	32
NCHE111	H	12	NCHE211 **&** NCHE212	H	8 8	NCHE311	H	16
MTHS114	X	12	BCHN213	X	16	NCHE312	H	16
GLGN112* **OR/*OF*** DRKS111* **OR/*OF*** MCBN111**	X	12	WVNS211	X	12			
ALDE/A111	X	12						
Total / *Totaal* 1st semester		**60**	**Total / *Totaal* 1st semester**		**60**	**Total / *Totaal* 1st semester**		**64**

Year level 1 / *Jaarvlak 1*			**Year level 2 / *Jaarvlak 2***			**Year level 3 / *Jaarvlak 3***		
Second/*Tweede* semester			**Second/ *Tweede* semester**			**Second/ *Tweede* semester**		
Module code/ *Modulekode*	**CORE/ *KERN***	**Cr/ *Kr***	**Module code/ *Modulekode***	**CORE/ *KERN***	**Cr/ *Kr***	**Module code/ *Modulekode***	**CORE/ *KERN***	**Cr/ *Kr***
PLKS122	H	12	PLKS223	H	16	PLKS324	H	32
NCHE121	H	12	NCHE221 **&** NCHE222	H	16	NCHE321	H	16
MTHS124	X	12	BCHN222	X	16	NCHE322	H	16
GLGN122* **OR/*OF*** DRKS121* **OR/*OF*** MCBN121**	X	12	WVNS221	X	12			
ALDE/A122	X	12						
Total / *Totaal* 2nd semester		**60**	**Total / *Totaal* 2nd semester**		**60**	**Total / *Totaal* 2nd semester**		**64**
Total year level/ *Totaal jaarvlak* 1		**120**	**Total year level / *Totaal jaarvlak* 2**		**120**	**Total year level / *Totaal jaarvlak* 3**		**128**
Total credits for the programme / *Totaal krediete vir die program*								**368**

*Can only be taken on the Potchefstroom campus/ *Kan slegs op die Potchefstroomkampus geneem word.* ** Can only be taken on the Mafikeng campus/ *Kan slegs op die Mafikengkampus geneem word.*

NAS.1.20.6.1 **OLD PROGRAMME PHASING OUT / OU PROGRAM FASEER UIT (PC): Bachelor of Science in Environmental and Biological Sciences / *Baccalaureus Scientiae in Omgewings- en Biologiese Wetenskappe***

CODE/ *KODE*: 200118 – N149P (Pipeline only / *Slegs Pyplyn*)

CAMPUS/ *KAMPUS:* Potchefstroom (AFRIKAANS, ENGLISH)

DELIVERY MODE/ *AFLEWERINGSMETODE*: Full Time / *Voltyds*

Compilation of programme / *Samestelling van program:*

Year level 1 / *Jaarvlak 1*			**Year level 2 / *Jaarvlak 2***			**Year level 3 / *Jaarvlak 3***		
First/*Eerste* semester			**First / *Eerste* semester**			**First/ *Eerste* semester**		
Module code/ *Modulekode*	**CORE/ *KERN***	**Cr/ *Kr***	**Module code/ *Modulekode***	**CORE/ *KERN***	**Cr/ *Kr***	**Module code/ *Modulekode***	**CORE/ *KERN***	**Cr/ *Kr***
PLKS111	H	12	PLKN213	H	16	PLKS312	H	32
CHEM111	H	12	CHEN211 **&** CHEN212	H	8 8	CHEM311	H	16
WISN111	X	12	BCHN213	X	16	CHEN312	H	16
GLGN112 **OR/*OF*** DRKS111 **OR/*OF*** FSKS113	X	12	WVNS211	X	12			
AGLA/E111	X	12						
Total / *Totaal* 1st semester		**60**	**Total / *Totaal* 1st semester**		**60**	**Total / *Totaal* 1st semester**		**64**

Year level 1 / *Jaarvlak 1*			**Year level 2 / *Jaarvlak 2***			**Year level 3 / *Jaarvlak 3***		
Second/*Tweede* semester			**Second/ *Tweede* semester**			**Second/ *Tweede* semester**		
Module code/ *Modulekode*	**CORE/ *KERN***	**Cr/ *Kr***	**Module code/ *Modulekode***	**CORE/ *KERN***	**Cr/ *Kr***	**Module code/ *Modulekode***	**CORE/ *KERN***	**Cr/ *Kr***
PLKS121	H	12	PLKS221	H	16	PLKN323	H	32
CHEM121	H	12	CHEN222 **&** CHEN223	H	8 8	CHEN321	H	16
WISN121	X	12	BCHN222	X	16	CHEN322	H	16
GLGN122 **OR/*OF*** DRKS121 **OR/*OF*** FSKS123	X	12	WVNS221	X	12			
AGLA/E121	X	12						
Total / *Totaal* 2nd semester		**60**	**Total / *Totaal* 2nd semester**		**60**	**Total / *Totaal* 2nd semester**		**64**
Total year level / *Totaal jaarvlak* 1		**120**	**Total year level / *Totaal jaarvlak* 2**		**120**	**Total year level / *Totaal jaarvlak* 3**		**128**
Total credits for the programme / *Totaal krediete vir die program*								**368**

NAS.1.20.7 **PROGRAMME: BACHELOR OF SCIENCE IN ENVIRONMENTAL SCIENCES WITH ZOOLOGY AND CHEMISTRY / BACCALAUREUS SCIENTIAE IN OMGEWINGSWETENSKAPPE MET DIERKUNDE EN CHEMIE**

CODE/ *KODE* : 2DJ H04 - N302P

CAMPUS/ *KAMPUS:* Potchefstroom (AFRIKAANS, ENGLISH)

DELIVERY MODE/ *AFLEWERINGSMETODE:* Full Time / *Voltyds*

Compilation of programme / *Samestelling van program*:

Year level 1 / *Jaarvlak 1*			**Year level 2 / *Jaarvlak 2***			**Year level 3 / *Jaarvlak 3***		
First/*Eerste* semester			**First / *Eerste* semester**			**First/ *Eerste* semester**		
Module code/ *Modulekode*	**CORE/ *KERN***	**Cr/ *Kr***	**Module code/ *Modulekode***	**CORE/ *KERN***	**Cr/ *Kr***	**Module code/ *Modulekode***	**CORE/ *KERN***	**Cr/ *Kr***
DRKS111	H	12	DRKN211	H	16	DRKS311	H	32
NCHE111	H	12	NCHE211 **&** NCHE212	H	8 8	NCHE311	H	16
FLGX113 **OR/*OF*** MCBN111	X	12	BCHN213 **OR/*OF*** FLGX213	X	16	NCHE312	H	16
MTHS114	X	12	WVNS211	X	12			
ALDE/A111	X	12						
Total / *Totaal* 1st semester		**60**	**Total / *Totaal* 1st semester**		**60**	**Total / *Totaal* 1st semester**		**64**
Year level 1 / *Jaarvlak 1*			**Year level 2 / *Jaarvlak 2***			**Year level 3 / *Jaarvlak 3***		
Second/*Tweede* semester			**Second/ *Tweede* semester**			**Second/ *Tweede* semester**		
Module code/ *Modulekode*	**CORE/ *KERN***	**Cr/ *Kr***	**Module code/ *Modulekode***	**CORE/ *KERN***	**Cr/ *Kr***	**Module code/ *Modulekode***	**CORE/ *KERN***	**Cr/ *Kr***
DRKS121	H	12	DRKS221	H	16	DRKN321	H	16
NCHE121	H	12	NCHE221 **&** NCHE222	H	8 & 8	DRKS322	H	16
FLGX123 **OR/*OF*** MCBN121	X	12	BCHN222 **OR/*OF*** FLGX223 **&** FLGX224	X	16	NCHE321	H	16
MTHS124	X	12	WVNS221	X	12	NCHE322	H	16
ALDE/A122	X	12						
Total / *Totaal* 2nd semester		**60**	**Total / *Totaal* 2nd semester**		**60**	**Total / *Totaal* 2nd semester**		**64**
Total year level / *Totaal jaarvlak* 1		**120**	**Total year level / *Totaal jaarvlak* 2**		**120**	**Total year level / *Totaal jaarvlak* 3**		**128**
Total credits for the programme / *Totaal krediete vir die program*								**368**

*MCBN111 and MCBN121 must be taken in the 1st year if BCHN is to be taken in the 2nd year./ *MCBN 111 en MCBN121 moet in die 1ste jaar geneem word indien BCHN in die 2de jaar geneem wil word*.

NAS.1.20.8 PROGRAMME: BACHELOR OF SCIENCE IN ENVIRONMENTAL SCIENCES WITH GEOLOGY AND CHEMISTRY / BACCALAUREUS SCIENTIAE IN OMGEWINGSWETENSKAPPE MET GEOLOGIE EN CHEMIE

NAS.1.20.8.1 Faculty-specific rules for the programme / *Fakulteitspesifieke reëls vir die program*

A compulsory soil mapping camp takes place for second-year soil science students (i.e. students who have registered for GDKN 221) during the winter recess. Second-year students will hand in a soil map and a report, of which the mark will contribute to the practical mark for GDKN221. Third-year Geology students (i.e. students who have registered for GLGN 321) will attend a compulsory geology mapping camp in the spring recess period. A geological map and a report will be handed in during the second semester, of which the mark contributes to laboratory mark for GLGN 321. NO excuses for absence from the mapping camp will be accepted. In the event of illness, the onus is on the student to catch up with the work and to hand in the required assignments, maps and reports, as applicable, to be considered for admission to the examination. The practical examination of each Geology and Soil Science module is compulsory to be considered for admission to the examination.
This programme prepares the student for admission to the Honours in Environmental Sciences with specialisation in Environmental Geology. The programme is compiled for a niche market in South Africa in Environmental Geology, presented at the NWU. /

'n Grond-karteringskamp, wat tydens die winterreses plaasvind, is verpligtend vir tweedejaar Grondkundestudente (dit is studente wat geregistreer het vir GDKN221). Tweedejaarstudente moet 'n grondkaart en 'n verslag inhandig waarvan die punt deel sal uitmaak van die praktiese punt vir GDKN221. Derdejaar Geologiestudente (dit is studente wat geregistreer het vir GLGN321) moet in lente reses periode 'n verpligte geologie-karteringskamp bywoon. 'n Geologiekaart en verslag moet tydens die tweede semester ingehandig word en die punt daarvoor sal deel uitmaak van die praktiese punt vir GLGN321. GEEN verskonings vir afwesigheid van hierdie karteringskamp sal aanvaar word nie. In die geval van siekte, berus die onus op die student om die werk in te haal en die vereiste werkopdragte, kaarte en verslae, soos van toepassing, in te handig om in aanmerking te kom vir toelating tot die eksamen. Die praktiese eksamen in elke Geologie en Grondkunde module is verpligtend vir alle studente om in aanmerking te kom vir toelating tot die eksamen. Hierdie program berei die student vir toelating tot die Honneurs in Omgewingswetenskappe, met spesialisering in Omgewingsgeologie, voor. Die program is saamgestel vir 'n nismark in Suid-Afrika in Omgewingsgeologie, wat by die NWU aangebied word.

NAS.1.20.8.2 **Programme: Bachelor of Science in Environmental Sciences with Chemistry and Geology /**
Baccalaureus Scientiae in Omgewingswetenskappe met Chemie en Geologie

CODE/ *KODE:* 2DJ H07 - N302P

CAMPUS/ *KAMPUS:* Potchefstroom (Afrikaans, English)

DELIVERY MODE/ *AFLEWERINGSMETODE:* FULL TIME / *VOLTYDS*

Compilation of programme / *Samestelling van program:*

There will be a limited intake of students majoring in Geology due to capacity restrictions. The practical examination of each Geology and Soil Science module is compulsory to be considered for admission to the examination. **/**

Daar sal 'n beperkte inname wees van studente met Geologie as hoofvak vanweë kapasiteitsbeperkings. Die praktiese eksamen in elke Geologie en Grondkunde module is verpligtend vir alle studente om in aanmerking te kom vir toelating tot die eksamen.

Year level 1 / *Jaarvlak 1*			**Year level 2 / *Jaarvlak 2***			**Year level 3 / *Jaarvlak 3***		
First/*Eerste* semester			**First / *Eerste* semester**			**First/ *Eerste* semester**		
Module code/ *Modulekode*	**CORE/ *KERN***	**Cr/ *Kr***	**Module code/ *Modulekode***	**CORE/ *KERN***	**Cr/ *Kr***	**Module code/ *Modulekode***	**CORE/ *KERN***	**Cr/ *Kr***
GLGN112	H	12	GLGN211	H	16	GLGN311	H	32
NCHE111	H	12	NCHE211 **&** NCHE212	H	8 8	NCHE311	H	16
MTHS114	X	12	GDKN211	X	16	NCHE312	H	16
FSKS113	X	12	WVNS211	X	12			
ALDE/A111	X	12						
Total / *Totaal* 1st semester		**60**	**Total / *Totaal* 1st semester**		**60**	**Total / *Totaal* 1st semester**		**64**
Year level 1 / *Jaarvlak 1*			**Year level 2 / *Jaarvlak 2***			**Year level 3 / *Jaarvlak 3***		
Second/*Tweede* semester			**Second/ *Tweede* semester**			**Second/ *Tweede* semester**		
Module code/ *Modulekode*	**CORE/ *KERN***	**Cr/ *Kr***	**Module code/ *Modulekode***	**CORE/ *KERN***	**Cr/ *Kr***	**Module code/ *Modulekode***	**CORE/ *KERN***	**Cr/ *Kr***
GLGN122	H	12	GLGN221	H	16	GLGN321	H	32
NCHE121	H	12	NCHE221 **&** NCHE222	H	8 8	NCHE321	H	16
GDKN121	X	12	GDKN221	X	16	NCHE322	H	16
MTHS124	X	12	WVNS221	X	12			
ALDE/A122	X	12						
Total / *Totaal* 2nd semester		**60**	**Total / *Totaal* 2nd semester**		**60**	**Total / *Totaal* 2nd semester**		**64**
Total year level / *Totaal jaarvlak* 1		**120**	**Total year level / *Totaal jaarvlak* 2**		**120**	**Total year level / *Totaal jaarvlak* 3**		**128**
Total credits for the programme / *Totaal krediete vir die program*								**368**

NAS.1.20.8.3 **OLD PROGRAMME PHASING OUT / *OU PROGRAM FASEER UIT* (PC): Bachelor of Science in Environmental Sciences with Geology and Chemistry / *Baccalaureus Scientiae in Omgewingswetenskappe met Geologie en Chemie***

NAS.1.20.8.3.1 Faculty-specific rules for the programme / See NAS1.20.8.1 ***Fakulteitspesifieke reëls vir die program: / Sien NAS1.20.8.1***

CODE/ *KODE:* 2DJ H07 - N301P: (Pipeline only / *Slegs Pyplyn*)
BSc in Environmental Sciences with Geology and Chemistry / *BSc in Omgewingswetenskappe met Geologie en Chemie*

CODE/ *KODE:* 200118 - N180P: (Pipeline only / *Slegs Pyplyn*)
BSc in Environmental and Biological Sciences / *BSc in Omgewings- en Biologiese Wetenskappe*

CAMPUS/ *KAMPUS:* Potchefstroom (AFRIKAANS, ENGLISH)

DELIVERY MODE/ *AFLEWERINGSMETODE:* Full Time / *Voltyds*

Compilation of programme / *Samestelling van program:*

Year level 1 / *Jaarvlak 1*			**Year level 2 / *Jaarvlak 2***			**Year level 3 / *Jaarvlak 3***		
First/*Eerste* semester			**First / *Eerste* semester**			**First/ *Eerste* semester**		
Module code/ *Modulekode*	**CORE/ *KERN***	**Cr/ *Kr***	**Module code/ *Modulekode***	**CORE/ *KERN***	**Cr/ *Kr***	**Module code/ *Modulekode***	**CORE/ *KERN***	**Cr/ *Kr***
GLGN112	H	12	GLGN211	H	16	GLGN311	H	32
CHEM111		12	CHEN211 & CHEN212	H	8	CHEM311	H	16
WISN111	X	12	GDKN211	X	16	CHEN312	H	16
FSKS113	X	12	WVNS211	X	12			
AGLA111	X	12						
Total / *Totaal* 1st semester		**60**	**Total / *Totaal* 1st semester**		**60**	**Total / *Totaal* 1st semester**		**64**
Year level 1 / *Jaarvlak 1*			**Year level 2 / *Jaarvlak 2***			**Year level 3 / *Jaarvlak 3***		
Second/*T weede* semester			**Second/ *Tweede* semester**			**Second/ *Tweede* semester**		
Module code/ *Modulekode*	**CORE/ *KERN***	**Cr/ *Kr***	**Module code/ *Modulekode***	**CORE/ *KERN***	**Cr/ *Kr***	**Module code/ *Modulekode***	**CORE/ *KERN***	**Cr/ *Kr***
GLGN122	H	12	GLGN221	H	16	GLGN321	H	32
CHEM121	H	12	CHEN222 & CHEN223	H	8 8	CHEN321	H	16
GDKN121	X	12	GDKN221	X	16	CHEN322	H	16
WISN121	X	12	WVNS221	X	12			
AGLA121	X	12						
Total / *Totaal* 2nd semester		**60**	**Total / *Totaal* 2nd semester**		**60**	**Total / *Totaal* 2nd semester**		**64**
Total year level / *Totaal jaarvlak* 1		**120**	**Total year level / *Totaal jaarvlak* 2**		**120**	**Total year level / *Totaal jaarvlak* 3**		**128**
Total credits for the programme / *Totaal krediete vir die program*								**368**

NAS.1.20.9 **PROGRAMME: BACHELOR OF SCIENCE IN ENVIRONMENTAL SCIENCES WITH GEOLOGY AND MICROBIOLOGY /**
BACCALAUREUS SCIENTIAE IN OMGEWINGSWETENSKAPPE MET GEOLOGIE EN MIKROBIOLOGIE

There will be a limited intake of students majoring in Geology due to capacity restrictions. The practical examination of each Geology and Soil Science module is compulsory to be considered for admission to the examination. /

Daar sal 'n beperkte inname wees van studente met Geologie as hoofvak vanweë kapasiteitsbeperkings Die praktiese eksamen in elke Geologie en Grondkunde module is verpligtend vir alle studente om in aanmerking te kom vir toelating tot die eksamen.

CODE/ *KODE :* 2DJ H09 - N301P

CODE/ *KODE:* 200118 - N181P: (Pipeline only / *Slegs Pyplyn*)
BSc in Environmental and Biological Sciences / *BSc in Omgewings- en Biologiese Wetenskappe*

CAMPUS/ *KAMPUS:* Potchefstroom (AFRIKAANS, ENGLISH),

DELIVERY MODE/ *AFLEWERINGSMETODE*: Full Time / *Voltyds*

Compilation of programme / *Samestelling van program*:

Year level 1 / *Jaarvlak 1*			**Year level 2 / *Jaarvlak 2***			**Year level 3 / *Jaarvlak 3***		
First/*Eerste* semester			**First / *Eerste* semester**			**First/ *Eerste* semester**		
Module code/ *Modulekode*	**CORE/ *KERN***	**Cr/ *Kr***	**Module code/ *Modulekode***	**CORE/ *KERN***	**Cr/ *Kr***	**Module code/ *Modulekode***	**CORE/ *KERN***	**Cr/ *Kr***
GLGN112	H	12	GLGN211	H	16	GLGN311	H	32
NCHE111	X	12	GDKN211	X	16	MKBS313	H	16
FSKS113	X	12	MKBN211	H	16	MKBS314	H	16
PLKS111 **OR/*OF*** DRKS111	X	12	WVNS211	X	12			
ALDE/A111	X	12						
Total / *Totaal* 1st semester		**60**	**Total / *Totaal* 1st semester**		**60**	**Total / *Totaal* 1st semester**		**64**
Year level 1 / *Jaarvlak 1*			**Year level 2 / *Jaarvlak 2***			**Year level 3 / *Jaarvlak 3***		
Second/*Tweede* semester			**Second/ *Tweede* semester**			**Second/ *Tweede* semester**		
Module code/ *Modulekode*	**CORE/ *KERN***	**Cr/ *Kr***	**Module code/ *Modulekode***	**CORE/ *KERN***	**Cr/ *Kr***	**Module code/ *Modulekode***	**CORE/ *KERN***	**Cr/ *Kr***
GLGN122	H	12	GLGN221	H	16	GLGN321	H	32
GDKN121	X	12	GDKN221	X	16	MKBS325	H	32
NCHE121	X	12	MKBS221	H	16			
PLKS122 **OR/*OF*** DRKS121	X	12	WVNS221	X	12			
ALDE/A122	X	12						
Total / *Totaal* 2nd semester		**60**	**Total / *Totaal* 2nd semester**		**60**	**Total / *Totaal* 2nd semester**		**64**
Total year level / *Totaal jaarvlak* 1		**120**	**Total year level / *Totaal jaarvlak* 2**		**120**	**Total year level / *Totaal jaarvlak* 3**		**128**
Total credits for the programme / *Totaal krediete vir die program*								**368**

NAS.1.20.10 **PROGRAMME: BACHELOR OF SCIENCE IN ENVIRONMENTAL SCIENCES WITH GEOLOGY AND BOTANY /**
BACCALAUREUS SCIENTIAE IN OMGEWINGSWETENSKAPPE MET GEOLOGIE EN PLANTKUNDE

There will be a limited intake of students majoring in Geology due to capacity restrictions. The practical examination of each Geology and Soil Science module is compulsory to be considered for admission to the examination. /

Daar sal 'n beperkte inname wees van studente met Geologie as hoofvak vanweë kapasiteitsbeperkings Die praktiese eksamen in elke Geologie en Grondkunde module is verpligtend vir alle studente om in aanmerking te kom vir toelating tot die eksamen.

CODE/ *KODE*: 2DJ H02 - N301P

CODE/ *KODE*: 200118 - N148P: (Pipeline only / *Slegs Pyplyn*)
BSc in Environmental and Biological Sciences / *BSc in Omgewings- en Biologiese Wetenskappe*

CAMPUS/ *KAMPUS*: Potchefstroom (AFRIKAANS, ENGLISH)

DELIVERY MODE/ *AFLEWERINGSMETODE*: Full Time / *Voltyds*

Compilation of programme / *Samestelling van program:*

Year level 1 / *Jaarvlak 1*			**Year level 2 / *Jaarvlak 2***			**Year level 3 / *Jaarvlak 3***		
First/*Eerste* semester			**First / *Eerste* semester**			**First/ *Eerste* semester**		
Module code/ *Modulekode*	**CORE/ *KERN***	**Cr/ *Kr***	**Module code/ *Modulekode***	**CORE/ *KERN***	**Cr/ *Kr***	**Module code/ *Modulekode***	**CORE/ *KERN***	**Cr/ *Kr***
PLKS111	H	12	PLKS211	H	16	PLKS314	H	32
GLGN112	H	12	GLGN211	H	16	GLGN311	H	32
NCHE111	X	12	GDKN211	X	16			
FSKS113	X	12	WVNS211	X	12			
ALDE/A111	X	12						
Total / *Totaal* 1st semester		**60**	**Total / *Totaal* 1st semester**		**60**	**Total / *Totaal* 1st semester**		**64**
Year level 1 / *Jaarvlak 1*			**Year level 2 / *Jaarvlak 2***			**Year level 3 / *Jaarvlak 3***		
Second/*Tweede* semester			**Second/ *Tweede* semester**			**Second/ *Tweede* semester**		
Module code/ *Modulekode*	**CORE/ *KERN***	**Cr/ *Kr***	**Module code/ *Modulekode***	**CORE/ *KERN***	**Cr/ *Kr***	**Module code/ *Modulekode***	**CORE/ *KERN***	**Cr/ *Kr***
PLKS122	H	12	PLKS223	H	16	PLKS324	H	32
GLGN122	H	12	GLGN221	H	16	GLGN321	H	32
GDKN121	X	12	GDKN221	X	16			
NCHE121	X	12	WVNS221	X	12			
ALDE/A122	X	12						
Total / *Totaal* 2nd semester		**60**	**Total / *Totaal* 2nd semester**		**60**	**Total / *Totaal* 2nd semester**		**64**
Total year level / *Totaal jaarvlak* 1		**120**	**Total year level / *Totaal jaarvlak* 2**		**120**	**Total year level / *Totaal jaarvlak* 3**		**128**
Total credits for the programme / *Totaal krediete vir die program*								**368**

NAS.1.20.11 **PROGRAMME: BACHELOR OF SCIENCE IN ENVIRONMENTAL SCIENCES WITH ZOOLOGY AND GEOLOGY /**
BACCALAUREUS SCIENTIAE IN OMGEWINGSWETENSKAPPE MET DIERKUNDE EN GEOLOGIE

There will be a limited intake of students majoring in Geology due to capacity restrictions. The practical examination of each Geology and Soil Science module is compulsory to be considered for admission to the examination. /

Daar sal 'n beperkte inname wees van studente met Geologie as hoofvak vanweë kapasiteitsbeperkings Die praktiese eksamen in elke Geologie en Grondkunde module is verpligtend vir alle studente om in aanmerking te kom vir toelating tot die eksamen.

CODE/ *KODE:* 2DJ H08 - N301P

CAMPUS/ *KAMPUS:* Potchefstroom (AFRIKAANS, ENGLISH)

DELIVERY MODE/ *AFLEWERINGSMETODE:* Full Time / *Voltyds*

Compilation of programme / *Samestelling van program:*

Year level 1 / *Jaarvlak 1*			**Year level 2 / *Jaarvlak 2***			**Year level 3 / *Jaarvlak 3***		
First/*Eerste* semester			**First / *Eerste* semester**			**First/ *Eerste* semester**		
Module code/ *Modulekode*	**CORE/ *KERN***	**Cr/ *Kr***	**Module code/ *Modulekode***	**CORE/ *KERN***	**Cr/ *Kr***	**Module code/ *Modulekode***	**CORE/ *KERN***	**Cr/ *Kr***
DRKS111	H	12	DRKN211	H	16	DRKS311	H	32
GLGN112	H	12	GLGN211	H	16	GLGN311	H	32
NCHE111	X	12	GDKN211	X	16			
PLKS111 **OR/*OF*** FSKS113	X	12	WVNS211	X	12			
ALDE/A111	X	12						
Total / *Totaal* 1st semester		**60**	**Total / *Totaal* 1st semester**		**60**	**Total / *Totaal* 1st semester**		**64**
Year level 1 / *Jaarvlak 1*			**Year level 2 / *Jaarvlak 2***			**Year level 3 / *Jaarvlak 3***		
Second/*Tweede* semester			**Second/ *Tweede* semester**			**Second/ *Tweede* semester**		
Module code/ *Modulekode*	**CORE/ *KERN***	**Cr/ *Kr***	**Module code/ *Modulekode***	**CORE/ *KERN***	**Cr/ *Kr***	**Module code/ *Modulekode***	**CORE/ *KERN***	**Cr/ *Kr***
DRKS121	H	12	DRKS221	H	16	DRKN321	H	16
GLGN122	H	12	GLGN221	H	16	DRKS322	H	16
GDKN121	X	12	GDKN221	X	16	GLGN321	H	32
NCHE121	X	12	WVNS221	X	12			
ALDE/A122	X	12						
Total / *Totaal* 2nd semester		**60**	**Total / *Totaal* 2nd semester**		**60**	**Total / *Totaal* 2nd semester**		**64**
Total year level / *Totaal jaarvlak* 1		**120**	**Total year level / *Totaal jaarvlak* 2**		**120**	**Total year level / *Totaal jaarvlak* 3**		**128**
Total credits for the programme / *Totaal krediete vir die program*								**368**

NAS.1.20.12 **PROGRAMME: BACHELOR OF SCIENCE IN ENVIRONMENTAL SCIENCES WITH ZOOLOGY AND GEOGRAPHY /**
BACCALAUREUS SCIENTIAE IN OMGEWINGSWETENSKAPPE MET DIERKUNDE EN GEOGRAFIE

CODE/ *KODE:* 2DJ H05 - N302P

CAMPUS/ *KAMPUS*: Potchefstroom (AFRIKAANS, ENGLISH)

DELIVERY MODE/ *AFLEWERINGSMETODE:* Full Time / *Voltyds*

Compilation of programme / *Samestelling van program:*

Year level 1 / *Jaarvlak 1*			**Year level 2 / *Jaarvlak 2***			**Year level 3 / *Jaarvlak 3***		
First/*Eerste* semester			**First / *Eerste* semester**			**First/ *Eerste* semester**		
Module code/ *Modulekode*	**CORE/ *KERN***	**Cr/ *Kr***	**Module code/ *Modulekode***	**CORE/ *KERN***	**Cr/ *Kr***	**Module code/ *Modulekode***	**CORE/ *KERN***	**Cr/ *Kr***
DRKS111	H	12	DRKN211	H	16	DRKS311	H	32
GEOG111	H	12	GEOG211	H	16	GEOG311	H	32
NCHE111	X	12	PLKS211 **OR/*OF*** FLGX213	X	16			
FLGX113 **OR/*OF*** PLKS111	X	12	WVNS211	X	12			
ALDE/A111	X	12						
Total / *Totaal* 1st semester		**60**	**Total / *Totaal* 1st semester**		**60**	**Total / *Totaal* 1st semester**		**64**
Year level 1 / *Jaarvlak 1*			**Year level 2 / *Jaarvlak 2***			**Year level 3 / *Jaarvlak 3***		
Second/*Tweede* semester			**Second/ *Tweede* semester**			**Second/ *Tweede* semester**		
Module code/ *Modulekode*	**CORE/ *KERN***	**Cr/ *Kr***	**Module code/ *Modulekode***	**CORE/ *KERN***	**Cr/ *Kr***	**Module code/ *Modulekode***	**CORE/ *KERN***	**Cr/ *Kr***
DRKS121	H	12	DRKS221	H	16	DRKN321	H	16
GEOG121	H	12	GEOG221	H	16	DRKS322	H	16
NCHE121	X	12	PLKS223 **OR/*OF*** FLGX223 **&** FLGX224	X	16	GEOG321	H	32
FLGX123 **OR/*OF*** PLKS122	X	12	WVNS221	X	12			
ALDE/A122	X	12						
Total / *Totaal* 2nd semester		**60**	**Total / *Totaal* 2nd semester**		**60**	**Total / *Totaal* 2nd semester**		**64**
Total year level / *Totaal jaarvlak* 1		**120**	**Total year level / *Totaal jaarvlak* 2**		**120**	**Total year level / *Totaal jaarvlak* 3**		**128**
Total credits for the programme / *Totaal krediete vir die program*								**368**

NAS.1.20.12.1 **OLD PROGRAMME PHASING OUT / OU PROGRAM FASEER UIT (PC):**
Bachelor of Science in Environmental Sciences with Zoology and Geography/
Baccalaureus Scientiae in Omgewingswetenskappe met Dierkunde en Geografie

CODE/ *KODE:* 2DJ H05 - N301P (Pipeline only / *Slegs Pyplyn*):
BSc in Environmental Sciences with Zoology and Geography/ *BSc in Omgewingswetenskappe met Dierkunde en Geografie*

CODE/ *KODE:* 200118 – N162P (Pipeline only / *Slegs Pyplyn*):
BSc in Environmental and Biological Sciences / *BSc in Omgewings- en Biologiese Wetenskappe*

CAMPUS/ *KAMPUS:* Potchefstroom (AFRIKAANS, ENGLISH)

DELIVERY MODE/ *AFLEWERINGSMETODE:* Full Time / *Voltyds*

Compilation of programme / *Samestelling van program:*

Year level 1 / *Jaarvlak 1*			**Year level 2 / *Jaarvlak 2***			**Year level 3 / *Jaarvlak 3***		
First/*Eerste* semester			**First / *Eerste* semester**			**First/ *Eerste* semester**		
Module code/ *Modulekode*	**CORE/ *KERN***	**Cr/ *Kr***	**Module code/ *Modulekode***	**CORE/ *KERN***	**Cr/ *Kr***	**Module code/ *Modulekode***	**CORE/ *KERN***	**Cr/ *Kr***
DRKS111	H	12	DRKN211	H	16	DRKS311	H	32
GGFS112	H	12	GGFS212	H	16	GGFS312	H	32
CHEM111	X	12	PLKN213 **OR/*OF*** FLGX213	X	16			
FLGX113 **OR/*OF*** PLKS111 **OR/*OF*** *FSKS113	X	12	WVNS211	X	12			
AGLA111	X	12						
Total / *Totaal* 1st semester		**60**	**Total / *Totaal* 1st semester**		**60**	**Total / *Totaal* 1st semester**		**64**

Year level 1 / *Jaarvlak 1*			**Year level 2 / *Jaarvlak 2***			**Year level 3 / *Jaarvlak 3***		
Second/*Tweede* semester			**Second/ *Tweede* semester**			**Second/ *Tweede* semester**		
Module code/ *Modulekode*	**CORE/ *KERN***	**Cr/ *Kr***	**Module code/ *Modulekode***	**CORE/ *KERN***	**Cr/ *Kr***	**Module code/ *Modulekode***	**CORE/ *KERN***	**Cr/ *Kr***
DRKS121	H	12	DRKS221	H	16	DRKN321	H	16
GGFS121	H	12	GGFS222	H	16	DRKS322	H	16
CHEM121	X	12	PLKS221 **OR/*OF*** FLGX223 **&** FLGX224	X	16	GGFS322	H	32
FLGX123 **OR/*OF*** PLKS121 **OR/*OF*** *FSKS123	X	12	WVNS221	X	12			
AGLA121	X	12						
Total / *Totaal* 2nd semester		**60**	**Total / *Totaal* 2nd semester**		**60**	**Total / *Totaal* 2nd semester**		**64**
Total year level / *Totaal jaarvlak* 1		**120**	**Total year level / *Totaal jaarvlak* 2**		**120**	**Total year level / *Totaal jaarvlak* 3**		**128**
Total credits for the programme / *Totaal krediete vir die program*								**368**

NAS.1.20.13 **PROGRAMME: BACHELOR OF SCIENCE IN ENVIRONMENTAL SCIENCES WITH GEOLOGY AND GEOGRAPHY /**
BACCALAUREUS SCIENTIAE IN OMGEWINGSWETENSKAPPE MET GEOLOGIE EN GEOGRAFIE

NAS.1.20.13.1 Faculty-specific rules for the programme / ***Fakulteitspesifieke reëls vir die program*** **(See also/** ***Sien ook*** **NAS1.20.8.1)**

There will be a limited intake of students majoring in Geology due to capacity restrictions. The practical examination of each Geology and Soil Science module is compulsory to be considered for admission to the examination. /

Daar sal 'n beperkte inname wees van studente met Geologie as hoofvak vanweë kapasiteitsbeperkings Die praktiese eksamen in elke Geologie en Grondkunde module is verpligtend vir alle studente om in aanmerking te kom vir toelating tot die eksamen.

CODE/ ***KODE:*** **2DJ H01 - N302P**

CAMPUS/ ***KAMPUS:*** Potchefstroom (AFRIKAANS, ENGLISH)

DELIVERY MODE/ AFLEWERINGSMETODE: Full Time / *Voltyds*

Compilation of programme / ***Samestelling van program:***

Year level 1 / ***Jaarvlak 1***			**Year level 2 /** ***Jaarvlak 2***			**Year level 3 /** ***Jaarvlak 3***		
First/*Eerste* semester			**First /** ***Eerste*** **semester**			**First/** ***Eerste*** **semester**		
Module code/ ***Modulekode***	**CORE/** ***KERN***	**Cr/** ***Kr***	**Module code/** ***Modulekode***	**CORE/** ***KERN***	**Cr/** ***Kr***	**Module code/** ***Modulekode***	**CORE/** ***KERN***	**Cr/** ***Kr***
GLGN112	H	12	GLGN211	H	16	GLGN311	H	32
GEOG111	H	12	GEOG211	H	16	GEOG311	H	32
NCHE111	X	12	GDKN211	X	16			
FSKS113	X	12	WVNS211	X	12			
ALDE/A111	X	12						
Total / ***Totaal*** **1st semester**		**60**	**Total /** ***Totaal*** **1st semester**		**60**	**Total /** ***Totaal*** **1st semester**		**64**
Year level 1 / ***Jaarvlak 1***			**Year level 2 /** ***Jaarvlak 2***			**Year level 3 /** ***Jaarvlak 3***		
Second/*Tweede* semester			**Second/** ***Tweede*** **semester**			**Second/** ***Tweede*** **semester**		
Module code/ ***Modulekode***	**CORE/** ***KERN***	**Cr/** ***Kr***	**Module code/** ***Modulekode***	**CORE/** ***KERN***	**Cr/** ***Kr***	**Module code/** ***Modulekode***	**CORE/** ***KERN***	**Cr/** ***Kr***
GLGN122	H	12	GLGN221	H	16	GLGN321	H	32
GEOG121	H	12	GEOG221	H	16	GEOG321	H	32
GDKN121	X	12	GDKN221	X	16			
NCHE121	X	12	WVNS221	X	12			
ALDE/A122	X	12						
Total / ***Totaal*** **2nd semester**		**60**	**Total /** ***Totaal*** **2nd semester**		**60**	**Total /** ***Totaal*** **2nd semester**		**64**
Total year level / ***Totaal jaarvlak*** **1**		**120**	**Total year level /** ***Totaal jaarvlak*** **2**		**120**	**Total year level /** ***Totaal jaarvlak*** **3**		**128**
Total credits for the programme / ***Totaal krediete vir die program***								**368**

NAS.1.20.13.2 **OLD PROGRAMME PHASING OUT / OU PROGRAM FASEER UIT (PC):**
Bachelor of Science in Environmental Sciences with Geology and Geography/
Baccalaureus Scientiae in Omgewingswetenskappe met Geologie en Geografie

There will be a limited intake of students majoring in Geology due to capacity restrictions. The practical examination of each Geology and Soil Science module is compulsory to be considered for admission to the examination. /

Daar sal 'n beperkte inname wees van studente met Geologie as hoofvak vanweë kapasiteitsbeperkings Die praktiese eksamen in elke Geologie en rondkunde module is verpligtend vir alle studente om in aanmerking te kom vir toelating tot die eksamen.

CODE/ *KODE:* 2DJ H01- N301P: (Pipeline only / *Slegs Pyplyn*)
BSc in Environmental Sciences with Geology and Geography/ *BSc in Omgewingswetenskappe met Geologie en Geografie*

CODE/ *KODE*: 200118 – N147P: (Pipeline only / *Slegs Pyplyn*)
BSc in Environmental and Biological Sciences / *BSc in Omgewings- en Biologiese Wetenskappe*

CAMPUS/ *KAMPUS:* Potchefstroom (AFRIKAANS, ENGLISH)

DELIVERY MODE/ *AFLEWERINGSMETODE:* Full Time / *Voltyds*

Compilation of programme / *Samestelling van program:*

Year level 1 / *Jaarvlak 1*			**Year level 2 / *Jaarvlak 2***			**Year level 3 / *Jaarvlak 3***		
First/*Eerste* semester			**First / *Eerste* semester**			**First/ *Eerste* semester**		
Module code/ *Modulekode*	**CORE/ *KERN***	**Cr/ *Kr***	**Module code/ *Modulekode***	**CORE/ *KERN***	**Cr/ *Kr***	**Module code/ *Modulekode***	**CORE/ *KERN***	**Cr/ *Kr***
GLGN112	H	12	GLGN211	H	16	GLGN311	H	32
GGFS112	H	12	GGFS212	H	16	GGFS312	H	32
CHEM111	X	12	GDKN211	X	16			
FSKS113	X	12	WVNS211	X	12			
AGLA111	X	12						
Total / *Totaal* 1st semester		**60**	**Total / *Totaal* 1st semester**		**60**	**Total / *Totaal* 1st semester**		**64**

Year level 1 / *Jaarvlak 1*			**Year level 2 / *Jaarvlak 2***			**Year level 3 / *Jaarvlak 3***		
Second/*Tweede* semester			**Second/ *Tweede* semester**			**Second/ *Tweede* semester**		
Module code/ *Modulekode*	**CORE/ *KERN***	**Cr/ *Kr***	**Module code/ *Modulekode***	**CORE/ *KERN***	**Cr/ *Kr***	**Module code/ *Modulekode***	**CORE/ *KERN***	**Cr/ *Kr***
GLGN122	H	12	GLGN221	H	16	GLGN321	H	32
GGFS121	H	12	GGFS222	X	16	GGFS322	H	32
GDKN121	X	12	GDKN221	H	16			
CHEM121	X	12	WVNS221	X	12			
AGLA121	X	12						
Total / *Totaal* 2nd semester		**60**	**Total / *Totaal* 2nd semester**		**60**	**Total / *Totaal* 2nd semester**		**64**
Total year level / *Totaal jaarvlak* 1		**120**	**Total year level / *Totaal jaarvlak* 2**		**120**	**Total year level / *Totaal jaarvlak* 3**		**128**
Total credits for the programme / *Totaal krediete vir die program*								**368**

NAS.1.20.14 **PROGRAMME: BACHELOR OF SCIENCE IN ENVIRONMENTAL SCIENCES WITH GEOGRAPHY AND BOTANY /**
BACCALAUREUS SCIENTIAE IN OMGEWINGSWETENSKAPPE MET GEOGRAFIE EN PLANTKUNDE

CODE/ *KODE:* 2DJ H06 - N302P; N301M
CAMPUS/ *KAMPUS:* Potchefstroom (AFRIKAANS, ENGLISH) and Mafikeng (ENGLISH)
DELIVERY MODE/ *AFLEWERINGSMETODE:* Full Time / *Voltyds*
Compilation of programme: See NAS1.20.7.1/ ***Samestelling van program:*** *Sien NAS1.20.8.1:*

Year level 1 / *Jaarvlak 1*			**Year level 2 / *Jaarvlak 2***			**Year level 3 / *Jaarvlak 3***		
First/*Eerste* semester			**First / *Eerste* semester**			**First/ *Eerste* semester**		
Module code/ *Modulekode*	**CORE/ *KERN***	**Cr/ *Kr***	**Module code/ *Modulekode***	**CORE/ *KERN***	**Cr/ *Kr***	**Module code/ *Modulekode***	**CORE/ *KERN***	**Cr/ *Kr***
GEOG111	H	12	GEOG211	H	16	GEOG311	H	32
PLKS111	H	12	PLKS211	H	16	PLKS314	H	32
NCHE111	X	12	DRKN211 **OR/*OF*** **MKBN211 ***GDKN211	X	16			
*DRKS111 **OR/*OF*** *GLGN112 **OR/*OF*** **MCBN111	X	12	WVNS211	X	12			
ALDE/A111	X	12						
Total / *Totaal* 1st semester		**60**	**Total / *Totaal* 1st semester**		**60**	**Total / *Totaal* 1st semester**		**64**
Year level 1 / *Jaarvlak 1*			**Year level 2 / *Jaarvlak 2***			**Year level 3 / *Jaarvlak 3***		
Second/*Tweede* semester			**Second/ *Tweede* semester**			**Second/ *Tweede* semester**		
Module code/ *Modulekode*	**CORE/ *KERN***	**Cr/ *Kr***	**Module code/ *Modulekode***	**CORE/ *KERN***	**Cr/ *Kr***	**Module code/ *Modulekode***	**CORE/ *KERN***	**Cr/ *Kr***
GEOG121	H	12	GEOG221	H	16	GEOG321	H	32
PLKS122	H	12	PLKS223	H	16	PLKS324	H	32
NCHE121	X	12	DRKS221 **OR/*OF*** **MKBS221 ***GDKN221	X	16			
*DRKS121 **OR/*OF*** *GLGN122 ***GDKN121 **OR/*OF*** **MCBN121	X	12	WVNS221	X	12			
ALDE/A122	X	12						
Total / *Totaal* 2nd semester		**60**	**Total / *Totaal* 2nd semester**		**60**	**Total / *Totaal* 2nd semester**		**64**
Total year level/ *Totaal jaarvlak* 1		**120**	**Total year level/ *Totaal jaarvlak* 2**		**120**	**Total year level / *Totaal jaarvlak* 3**		**128**
Total credits for the programme / *Totaal krediete vir die program*								**368**

* DRKS/GLGN Can only be taken at the Potchefstroom campus/ *Kan slegs op die Potchefstroomkampus geneem word.* / *GLGN112/122 No elective is available at level 2./ *GLGN112/122 -daar is nie 'n keusemodule op vlak 2 nie.* ***MCBN;MKBN/S;*** Can only be taken at the Mafikeng campus/ *Kan slegs op MAFIKENG geneem word.* ***GDKN(PC) can be taken as elective due to timetable clashes with MKBS. / ****GDKN (PC) kan as keusemodule geneem word a.g.v. roosterbotsings met MKBS.*

NAS.1.20.14.1 **OLD PROGRAMME PHASING OUT / OU PROGRAM FASEER UIT (PC): Bachelor of Science in Environmental and Biological Sciences / Baccalaureus Scientiae in Omgewings- en Biologiese Wetenskappe**

See also NAS1.20.7.1 / *Sien ook NAS1.20.7.1*

CODE/ *KODE:* 200118 - N165P (Pipeline only / *Slegs Pyplyn*)
BSc in Environmental and Biological Sciences / *BSc in Omgewings- en Biologiese Wetenskappe*

CAMPUS/ *KAMPUS:* Potchefstroom (AFRIKAANS, ENGLISH)

DELIVERY MODE/ *AFLEWERINGSMETODE:* Full Time / *Voltyds*

Year level 1 / *Jaarvlak 1*			**Year level 2 / *Jaarvlak 2***			**Year level 3 / *Jaarvlak 3***		
First/*Eerste* semester			**First / *Eerste* semester**			**First/ *Eerste* semester**		
Module code/ *Modulekode*	**CORE/ *KERN***	**Cr/ *Kr***	**Module code/ *Modulekode***	**CORE/ *KERN***	**Cr/ *Kr***	**Module code/ *Modulekode***	**CORE/ *KERN***	**Cr/ *Kr***
GGFS112	H	12	GGFS212	H	16	GGFS312	H	32
PLKS111	H	12	PLKN213	H	16	PLKS312	H	32
CHEM111	X	12	DRKN211 **OR/OF** **MKBN211 GDKN211	X	16			
DRKS111 **OR/*OF*** *FSKS113 **OR/OF** *GLGN112	X	12	WVNS211	X	12			
AGLA111	X	12						
Total / *Totaal* 1st semester		**60**	**Total / *Totaal* 1st semester**		**60**	**Total / *Totaal* 1st semester**		**64**

Year level 1 / *Jaarvlak 1*			**Year level 2 / *Jaarvlak 2***			**Year level 3 / *Jaarvlak 3***		
Second/*Tweede* semester			**Second/ *Tweede* semester**			**Second/ *Tweede* semester**		
Module code/ *Modulekode*	**CORE/ *KERN***	**Cr/ *Kr***	**Module code/ *Modulekode***	**CORE/ *KERN***	**Cr/ *Kr***	**Module code/ *Modulekode***	**CORE/ *KERN***	**Cr/ *Kr***
GGFS121	H	12	GGFS222	H	16	GGFS322	H	32
PLKS121	H	12	PLKS221	H	16	PLKN323	H	32
CHEM121	X	12	DRKS221 **OR/*OF*** **MKBS221 GDKN221	X	16			
DRKS121 **OR/*OF*** *FSKS123 **OR/*OF*** *GLGN122 **GDKN121	X	12	WVNS221	X	12			
Total / *Totaal* 2nd semester		**60**	**Total / *Totaal* 2nd semester**		**60**	**Total / *Totaal* 2nd semester**		**64**
Total year level / *Totaal jaarvlak* 1		**120**	**Total year level / *Totaal jaarvlak* 2**		**120**	**Total year level / *Totaal jaarvlak* 3**		**128**
Total credits for the programme / *Totaal krediete vir die program*								**368**

**GDKN can be taken as elective due to timetable clashes with MKBS211/221. / *GDKN kan geneem word as keuse opsie agv roosterbotsings met MKBS211/22*

NAS.1.20.15 **Programme: Bachelor of Science in Environmental Sciences with Geography and Computer Science /**
Baccalaureus Scientiae in Omgewingswetenskappe met Geografie en Rekenaarwetenskap

CODE/ *KODE:* 2DJ H14 - N301P; N301M

CAMPUS/ *KAMPUS*: Potchefstroom (AFRIKAANS, ENGLISH), Mafikeng (ENGLISH)

DELIVERY MODE/ *AFLEWERINGSMETODE*: Full Time / *Voltyds*

Compilation of programme / *Samestelling van program:* *(*See also*/sien ook* NAS1.20.8.1)

Year level 1 / *Jaarvlak 1*			**Year level 2 / *Jaarvlak 2***			**Year level 3 / *Jaarvlak 3***		
First/*Eerste* semester			**First / *Eerste* semester**			**First/ *Eerste* semester**		
Module code/ *Modulekode*	**CORE/ *KERN***	**Cr/ *Kr***	**Module code/ *Modulekode***	**CORE/ *KERN***	**Cr/ *Kr***	**Module code/ *Modulekode***	**CORE/ *KERN***	**Cr/ *Kr***
GEOG111	H	12	GEOG211	H	16	GEOG311	H	32
CMPG111	H	12	CMPG211	H	16	CMPG311	H	16
GLGN112* **OR/*OF*** MTHS114**	X	12	PLKS211 **OR/*OF*** GLGN211*	X	16	CMPG313** **OR/*OF*** CMPG315*	H	16
*STTN111 **OR/*OF*** PLKS111	X	12	WVNS211	X	12			
ALDE/A111	X	12						
Total / *Totaal* 1st semester		**60**	**Total / *Totaal* 1st semester**		**60**	**Total / *Totaal* 1st semester**		**64**
Year level 1 / *Jaarvlak 1*			**Year level 2 / *Jaarvlak 2***			**Year level 3 / *Jaarvlak 3***		
Second/*Tweede* semester			**Second/ *Tweede* semester**			**Second/ *Tweede* semester**		
Module code/ *Modulekode*	**CORE/ *KERN***	**Cr/ *Kr***	**Module code/ *Modulekode***	**CORE/ *KERN***	**Cr/ *Kr***	**Module code/ *Modulekode***	**CORE/ *KERN***	**Cr/ *Kr***
GEOG121	H	12	GEOG221	H	16	GEOG321	H	32
CMPG121	H	12	CMPG221	H	8	CMPG324	H	16
GLGN122* **OR/*OF*** MTHS124**	X	12	CMPG222* **OR/*OF*** CMPG224**	H	8	CMPG321* **OR/*OF*** CMPG325**	H	16
*STTN121 **OR/*OF*** PLKS122	X	12	PLKS223 **OR/*OF*** GLGN221*	X	16			
ALDE/A122	X	12	WVNS221	X	12			
Total / *Totaal* 2nd semester		**60**	**Total / *Totaal* 2nd semester**		**60**	**Total / *Totaal* 2nd semester**		**64**
Total year level / *Totaal jaarvlak* 1		**120**	**Total year level/ *Totaal jaarvlak* 2**		**120**	**Total year level/ *Totaal jaarvlak* 3**		**128**
Total credits for the programme / *Totaal krediete vir die program*								**368**

Take note: *=PC and **=MC

* STTN111/121 only for PC students - No elective is available at level 2 for STTN.

**MTHS114/124 Only for MC students and *GLGN (Geology) only for PC students
CMPG222*/224**- PC does 222* and MC does 224**.

* CMPG315 and *CMPG313 are electives on PC, but MC should take **CMPG313
In the 2nd semester of the 3rd yr PC does CMPG321* and MC does CMPG325**

NAS.1.20.15.1 **OLD PROGRAMME PHASING OUT / *OU PROGRAM FASEER UIT* (PC): Bachelor of Science in Environmental and Biological Sciences / *Baccalaureus Scientiae in Omgewings- en Biologiese Wetenskappe***

CODE/ KODE: 200118 – N166P (Pipeline only)

CAMPUS/ *KAMPUS*: Potchefstroom (AFRIKAANS, ENGLISH)

DELIVERY MODE/ *AFLEWERINGSMETODE*: Full Time / *Voltyds*

Compilation of programme / *Samestelling van program:* (See also/*sien ook* NAS1.20.8.1)

Year level 1 / *Jaarvlak 1*			**Year level 2 / *Jaarvlak 2***			**Year level 3 / *Jaarvlak 3***		
First/*Eerste* semester			**First / *Eerste* semester**			**First/ *Eerste* semester**		
Module code/ *Modulekode*	**CORE/ *KERN***	**Cr/ *Kr***	**Module code/ *Modulekode***	**CORE/ *KERN***	**Cr/ *Kr***	**Module code/ *Modulekode***	**CORE/ *KERN***	**Cr/ *Kr***
AGLE/A111	X	12	GGFS212	H	16	GGFS312	H	32
GGFS112	H	12	ITRW212	H	16	ITRW311	H	16
ITRW112	H	12	PLKN213 **OR** GLGN211	X	16	ITRW316	H	16
GLGN112	X	12	WVNS211	X	12			
*STTN111 **OR/*OF*** PLKS111	X	12						
Total / *Totaal* 1st semester		**60**	**Total / *Totaal* 1st semester**		**60**	**Total / *Totaal* 1st semester**		**64**
Year level 1 / *Jaarvlak 1*			**Year level 2 / *Jaarvlak 2***			**Year level 3 / *Jaarvlak 3***		
Second/*Tweede* semester			**Second/ *Tweede* semester**			**Second/ *Tweede* semester**		
Module code/ *Modulekode*	**CORE/ *KERN***	**Cr/ *Kr***	**Module code/ *Modulekode***	**CORE/ *KERN***	**Cr/ *Kr***	**Module code/ *Modulekode***	**CORE/ *KERN***	**Cr/ *Kr***
AGLE/A121	X	12	GGFS222	H	16	GGFS322	H	32
GGFS121	H	12	ITRW222	H	16	ITRW321	H	16
ITRW124	H	12	PLKS221 **OR/*OF*** GLGN221	X	16	ITRW322	H	16
GLGN122	X	12	WVNS221	X	12			
*STTN121 **OR** PLKS121	X	12						
Total / *Totaal* 2nd semester		**60**	**Total / *Totaal* 2nd semester**		**60**	**Total / *Totaal* 2nd semester**		**64**
Total year level / *Totaal jaarvlak* 1		**120**	**Total year level / *Totaal jaarvlak* 2**		**120**	**Total year level / *Totaal jaarvlak* 3**		**128**
Total credits for the programme / *Totaal krediete vir die program*								**368**

*Take note STTN111/121 no elective is available at level 2 for STTN.

NAS.1.20.15.2 **OLD PROGRAMME PHASING OUT (MC):**
Bachelor of Science in Geography and Computer Science

CODE: 200178 – N301M (Pipeline only)

CAMPUS: Mafikeng (ENGLISH)

DELIVERY MODE: Full Time

Compilation of programme:

Year level 1			Year level 2			Year level 3		
First semester			First semester			First semester		
Module code	CORE	Cr	Module code	CORE	Cr	Module code	CORE	Cr
GEOM113	H	12	GEOM214	H	8	GEOM316	H	16
CISM112	H	12	GEOM215	H	8	GEOM317	H	16
MAYM117	X	12	CISM213	H	8	CISM313	H	16
STFM111	X	12	CISM214	H	8	CISM314	H	16
AGLE111	X	12	MAYM217	X	16			
			WVNS211	X	12			
Total 1st Semester		60	Total 1st semester		60	Total 1st semester		64
Year level 1			Year level 2			Year level 3		
Second semester			Second semester			Second semester		
Module code	CORE	Cr	Module code	CORE	Cr	Module code	CORE	Cr
GEOM123	H	12	GEOM224	H	8	GEOM328	H	16
CISM124	H	12	GEOM225	H	8	GEOM329	H	16
MAYM127	X	12	CISM225	H	8	CISM326	H	16
STFM121	X	12	CISM226	H	8	CISM327	H	16
AGLE121	X	12	MAYM227	X	16			
			WVNS222	X	12			
Total 2nd semester		60	Total 2nd semester		60	Total 2nd semester		64
Total year level 1		120	Total year level 2		120	Total year level 3	128	
Total credits for the programme								368

***Core modules are indicated with (H) and ancillary modules with (X)**

NAS.1.20.16 PROGRAMME: BACHELOR OF SCIENCE IN ENVIRONMENTAL SCIENCES WITH TOURISM AND ZOOLOGY /
BACCALAUREUS SCIENTIAE IN OMGEWINGSWETENSKAPPE MET TOERISME EN DIERKUNDE

CODE/ *KODE:* 2DJ H15 - N301P

CAMPUS/ *KAMPUS*: Potchefstroom (AFRIKAANS, ENGLISH)

DELIVERY MODE/ *AFLEWERINGSMETODE*: Full Time / *Voltyds*

Compilation of programme / *Samestelling van program:*

Year level 1 / *Jaarvlak 1*			**Year level 2 / *Jaarvlak 2***			**Year level 3 / *Jaarvlak 3***		
First/*Eerste* semester			**First / *Eerste* semester**			**First/ *Eerste* semester**		
Module code/ *Modulekode*	**CORE/ *KERN***	**Cr/ *Kr***	**Module code/ *Modulekode***	**CORE/ *KERN***	**Cr/ *Kr***	**Module code/ *Modulekode***	**CORE/ *KERN***	**Cr/ *Kr***
DRKS111	H	12	DRKN211	H	16	DRKS311	H	32
TMBP111	H	12	TMBP211	H	16	TMBP311	H	16
GEOG111 **OR/*OF*** PLKS111	X	12	GEOG 211 **OR/*OF*** PLKS211	X	16	TMBP312	H	16
NCHE111	X	12	WVNS211	X	12			
ALDE/A111	X	12						
Total / *Totaal* 1st semester		**60**	**Total / *Totaal* 1st semester**		**60**	**Total / *Totaal* 1st semester**		**64**
Year level 1 / *Jaarvlak 1*			**Year level 2 / *Jaarvlak 2***			**Year level 3 / *Jaarvlak 3***		
Second/*Tweede* semester			**Second/ *Tweede* semester**			**Second/ *Tweede* semester**		
Module code/ *Modulekode*	**CORE/ *KERN***	**Cr/ *Kr***	**Module code/ *Modulekode***	**CORE/ *KERN***	**Cr/ *Kr***	**Module code/ *Modulekode***	**CORE/ *KERN***	**Cr/ *Kr***
BMAN121	H	12	TMBP221	H	16	TMBP321	H	16
GEOG 121 **OR/*OF*** PLKS122	X	12	GEOG 221 **OR/*OF*** PLKS223	X	16	TMBP322	H	16
DRKS121	H	12	DRKS221	H	16	DRKN321	H	16
NCHE121	X	12	WVNS221	X	12	DRKS322	H	16
ALDE/A122	X	12						
Total / *Totaal* 2nd semester		**60**	**Total / *Totaal* 2nd semester**		**60**	**Total / *Totaal* 2nd semester**		**64**
Total year level / *Totaal jaarvlak* 1		**120**	**Total year level / *Totaal jaarvlak* 2**		**120**	**Total year level / *Totaal jaarvlak* 3**		**128**
Total credits for the programme / *Totaal krediete vir die program*								**368**

NAS.1.20.16.1 **OLD PROGRAMME PHASING OUT / *OU PROGRAM FASEER UIT* (PC): Bachelor of Science in Tourism (Geography and Zoology) / *Baccalaureus Scientiae in Toerisme (Geografie-Dierkunde)***

CODE/ *KODE*: 200119 - N173P (Pipeline only)

CAMPUS/ *KAMPUS:* Potchefstroom (AFRIKAANS, ENGLISH)

DELIVERY MODE/ *AFLEWERINGSMETODE:* Full Time / *Voltyds*

Compilation of programme / *Samestelling van program:*

Year level 1 / *Jaarvlak 1*			**Year level 2 / *Jaarvlak 2***			**Year level 3 / *Jaarvlak 3***		
First/*Eerste* semester			**First / *Eerste* semester**			**First/ *Eerste* semester**		
Module code/ *Modulekode*	**CORE/ *KERN***	**Cr/ *Kr***	**Module code/ *Modulekode***	**CORE/ *KERN***	**Cr/ *Kr***	**Module code/ *Modulekode***	**CORE/ *KERN***	**Cr/ *Kr***
TMBP111	H	12	TMBP211	H	16	TMBP311	H	16
GGFS112	H	12	GGFS212	H	16	TMBP312 **OR/*OF*** DRTS311**	H	16
DRKS111	H	12	DRKN211	H	16	GGFS312	H	32
CHEM111	X	12	WVNS211	X	12			
AGLE111	X	12						
Total / *Totaal* 1st semester		**60**	**Total / *Totaal* 1st semester**		**60**	**Total / *Totaal* 1st semester**		**64**
Year level 1 / *Jaarvlak 1*			**Year level 2 / *Jaarvlak 2***			**Year level 3 / *Jaarvlak 3***		
Second/*Tweede* semester			**Second/ *Tweede* semester**			**Second/ *Tweede* semester**		
Module code/ *Modulekode*	**CORE/ *KERN***	**Cr/ *Kr***	**Module code/ *Modulekode***	**CORE/ *KERN***	**Cr/ *Kr***	**Module code/ *Modulekode***	**CORE/ *KERN***	**Cr/ *Kr***
BMAN121	H	12	TMBP221	H	16	TMBP321	H	16
GGFS121	H	12	GGFS222	H	16	GGFS322	H	32
DRKS121	H	12	DRKS221	H	16	TMBP322 **OR/*OF*** DRKS322	H	16
CHEM121	X	12	WVNS221	X	12			
AGLE121	X	12						
Total / *Totaal* 2nd semester		**60**	**Total / *Totaal* 2nd semester**		**60**	**Total / *Totaal* 2nd semester**		**64**
Total year level / *Totaal jaarvlak* 1		**120**	**Total year level / *Totaal jaarvlak* 2**		**120**	**Total year level / *Totaal jaarvlak* 3**		**128**
Total credits for the programme / *Totaal krediete vir die program*								**368**

****Selection possibilities depend on the student's choice for postgraduate studies: Zoology/Tourism. If students consider postgraduate study in Environmental Sciences, DRKS311 should be selected.**

Students who fail GGFS211 in 2013 will have to pass GGFS222.
Students who fail GGFS221 in 2013 will have to pass GGFS212. /

*****Keuse wat uitgeoefen kan word na gelang van student se keuse vir nagraadse studie: Dierkunde / Toerisme. Indien student nagraadse studies in Omgewingswetenskappe oorweeg, moet DRKS311 geneem word.***

Studente wat nie GGFS211 in 2013 geslaag het nie, moet GGFS222 slaag.
Studente wat nie GGFS221 in 2013 geslaag het nie, moet GGFS212 slaag

NAS.1.20.17 **PROGRAMME: BACHELOR OF SCIENCE IN ENVIRONMENTAL SCIENCES WITH TOURISM AND GEOGRAPHY /**
BACCALAUREUS SCIENTIAE IN OMGEWINGSWETENSKAPPE MET TOERISME EN GEOGRAFIE

CODE/ *KODE*: 2DJ H16 - N301P

CAMPUS/ *KAMPUS*: Potchefstroom (AFRIKAANS, ENGLISH)

DELIVERY MODE/ *AFLEWERINGSMETODE:* Full Time / *Voltyds*

Compilation of programme / *Samestelling van program:*

Year level 1 / *Jaarvlak 1*			**Year level 2 / *Jaarvlak 2***			**Year level 3 / *Jaarvlak 3***		
First/*Eerste* semester			**First / *Eerste* semester**			**First/ *Eerste* semester**		
Module code/ *Modulekode*	**CORE/ *KERN***	**Cr/ *Kr***	**Module code/ *Modulekode***	**CORE/ *KERN***	**Cr/ *Kr***	**Module code/ *Modulekode***	**CORE/ *KERN***	**Cr/ *Kr***
TMBP111	H	12	TMBP211	H	16	TMBP311	H	16
GEOG111	H	12	GEOG211	H	16	TMBP312	H	16
PLKS111 **OR/*OF*** DRKS111	X	12	PLKS211 **OR/*OF*** DRKN211	X	16	GEOG311	H	32
NCHE111	X	12	WVNS211	X	12			
ALDE/A111	X	12						
Total / *Totaal* 1st semester		**60**	**Total / *Totaal* 1st semester**		**60**	**Total / *Totaal* 1st semester**		**64**
Year level 1 / *Jaarvlak 1*			**Year level 2 / *Jaarvlak 2***			**Year level 3 / *Jaarvlak 3***		
Second/*Tweede* semester			**Second/ *Tweede* semester**			**Second/ *Tweede* semester**		
Module code/ *Modulekode*	**CORE/ *KERN***	**Cr/ *Kr***	**Module code/ *Modulekode***	**CORE/ *KERN***	**Cr/ *Kr***	**Module code/ *Modulekode***	**CORE/ *KERN***	**Cr/ *Kr***
BMAN121	H	12	TMBP221	H	16	TMBP321	H	16
GEOG121	H	12	GEOG221	H	16	TMBP322	H	16
PLKS122 **OR/*OF*** DRKS121	X	12	PLKS223 **OR/*OF*** DRKS221	X	16	GEOG321	H	32
NCHE121	X	12	WVNS221	X	12			
ALDE/A122	X	12						
Total / *Totaal* 2nd semester		**60**	**Total / *Totaal* 2nd semester**		**60**	**Total / *Totaal* 2nd semester**		**64**
Total year level / *Totaal jaarvlak* 1		**120**	**Total year level / *Totaal jaarvlak* 2**		**120**	**Total year level / *Totaal jaarvlak 3***		**128**
Total credits for the programme / *Totaal krediete vir die program*								**368**

NAS.1.20.17.1 **OLD PROGRAMME PHASING OUT / *OU PROGRAM FASEER UIT* (PC): Bachelor of Science Tourism (Geography and Botany) / *Baccalaureus Scientiae Toerisme (Geografie en Plantkunde)***

CODE/ *KOD*E: 200119 - N172P (Pipeline only)

CAMPUS/ *KAMPUS*: Potchefstroom (AFRIKAANS, ENGLISH)

DELIVERY MODE/ *AFLEWERINGSMETODE*: Full Time / *Voltyds*

Compilation of programme / *Samestelling van program:*

Year level 1 / *Jaarvlak 1*			**Year level 2 / *Jaarvlak 2***			**Year level 3 / *Jaarvlak 3***		
First/*Eerste* semester			**First / *Eerste* semester**			**First/ *Eerste* semester**		
Module code/ *Modulekode*	**CORE/ *KERN***	**Cr/ *Kr***	**Module code/ *Modulekode***	**CORE/ *KERN***	**Cr/ *Kr***	**Module code/ *Modulekode***	**CORE/ *KERN***	**Cr/ *Kr***
TMBP111	H	12	TMBP211	H	16	TMBP311	H	16
GGFS112	H	12	GGFS212	H	16	TMBP312	H	16
PLKS111	H	12	PLKN213	H	16	GGFS312	H	32
CHEM111	X	12	WVNS211	X	12			
AGLE111	X	12						
Total / *Totaal* 1st semester		**60**	**Total / *Totaal* 1st semester**		**60**	**Total / *Totaal* 1st semester**		**64**
Year level 1 / *Jaarvlak 1*			**Year level 2 / *Jaarvlak 2***			**Year level 3 / *Jaarvlak 3***		
Second/*Tweede* semester			**Second/ *Tweede* semester**			**Second/ *Tweede* semester**		
Module code/ *Modulekode*	**CORE/ *KERN***	**Cr/ *Kr***	**Module code/ *Modulekode***	**CORE/ *KERN***	**Cr/ *Kr***	**Module code/ *Modulekode***	**CORE/ *KERN***	**Cr/ *Kr***
BMAN121	H	12	TMBP221	H	16	TMBP321	H	16
GGFS121	H	12	GGFS222	H	16	GGFS322	H	32
PLKS121	H	12	PLKS221	H	16	PLTN323	H	24
CHEM121	X	12	WVNS221	X	12			
AGLE121	X	12						
Total / *Totaal* 2nd semester		**60**	**Total / *Totaal* 2nd semester**		**60**	**Total / *Totaal* 2nd semester**		**72**
Total year level / *Totaal jaarvlak* 1		**120**	**Total year level / *Totaal jaarvlak* 2**		**120**	**Total year level / *Totaal jaarvlak* 3**		**136**
Total credits for the programme / *Totaal krediete vir die program*								**376**

NAS.1.20.18 **PROGRAMME: BACHELOR OF SCIENCE IN ENVIRONMENTAL SCIENCES WITH TOURISM AND BOTANY /**
BACCALAUREUS SCIENTIAE IN OMGEWINGSWETENSKAPPE MET TOERISME EN PLANTKUNDE

CODE/ *KODE* 2DJ H17 - N301P

CAMPUS/ *KAMPUS*: Potchefstroom (AFRIKAANS, ENGLISH)

DELIVERY MODE/ *AFLEWERINGSMETODE*: Full Time / *Voltyds*

Compilation of programme / *Samestelling van program*:

Year level 1 / *Jaarvlak 1*			**Year level 2 / *Jaarvlak 2***			**Year level 3 / *Jaarvlak 3***		
First/*Eerste* semester			**First / *Eerste* semester**			**First/ *Eerste* semester**		
Module code/ *Modulekode*	**CORE/ *KERN***	**Cr/ *Kr***	**Module code/ *Modulekode***	**CORE/ *KERN***	**Cr/ *Kr***	**Module code/ *Modulekode***	**CORE/ *KERN***	**Cr/ *Kr***
TMBP111	H	12	TMBP211	H	16	TMBP311	H	16
DRKS111 **OR/*OF*** GEOG111	X	12	DRKN211 **OR/*OF*** GEOG211	X	16	TMBP312	H	16
PLKS111	H	12	PLKS211	H	16	PLKS314	H	32
NCHE111	X	12	WVNS211	X	12			
ALDE/A111	X	12						
Total / *Totaal* 1st semester		**60**	**Total / *Totaal* 1st semester**		**60**	**Total / *Totaal* 1st semester**		**64**
Year level 1 / *Jaarvlak 1*			**Year level 2 / *Jaarvlak 2***			**Year level 3 / *Jaarvlak 3***		
Second/*Tweede* semester			**Second/ *Tweede* semester**			**Second/ *Tweede* semester**		
Module code/ *Modulekode*	**CORE/ *KERN***	**Cr/ *Kr***	**Module code/ *Modulekode***	**CORE/ *KERN***	**Cr/ *Kr***	**Module code/ *Modulekode***	**CORE/ *KERN***	**Cr/ *Kr***
BMAN121	H	12	TMBP221	H	16	TMBP321	H	16
DRKS121/ **OR/*OF*** GEOG121	X	12	DRKS221 **OR/*OF*** GEOG221	X	16	TMBP322	H	16
PLKS122	H	12	PLKS223	H	16	PLKS324	H	32
NCHE121	X	12	WVNS221	X	12			
ALDE/A122	X	12						
Total / *Totaal* 2nd semester		**60**	**Total / *Totaal* 2nd semester**		**60**	**Total / *Totaal* 2nd semester**		**64**
Total year level / *Totaal jaarvlak* 1		**120**	**Total year level / *Totaal jaarvlak* 2**		**120**	**Total year level / *Totaal jaarvlak* 3**		**128**
Total credits for the programme / *Totaal krediete vir die program*								**368**

NAS.1.20.18.1 **OLD PROGRAMME PHASING OUT / *OU PROGRAM FASEER UIT* (PC): Bachelor of Science in Tourism (Zoology and Botany) / *Baccalaureus Scientiae in Toerisme (Dierkunde and Plantkunde)***

CODE/ *KODE*: 200119 - N171P (Pipeline only)

CAMPUS/ *KAMPUS*: Potchefstroom (AFRIKAANS, ENGLISH)

DELIVERY MODE/ *AFLEWERINGSMETODE*: Full Time / *Voltyds*

Compilation of programme / *Samestelling van program:*

Year level 1 / *Jaarvlak 1*			**Year level 2 / *Jaarvlak 2***			**Year level 3 / *Jaarvlak 3***		
First/*Eerste* semester			**First / *Eerste* semester**			**First/ *Eerste* semester**		
Module code/ *Modulekode*	**CORE/ *KERN***	**Cr/ *Kr***	**Module code/ *Modulekode***	**CORE/ *KERN***	**Cr/ *Kr***	**Module code/ *Modulekode***	**CORE/ *KERN***	**Cr/ *Kr***
TMBP111	H	12	TMBP211	H	16	TMBP311	H	16
DRKS111	H	12	DRKN211	H	16	TMBP312	H	16
PLKS111	H	12	PLKN213	H	16	DRKS311	H	32
CHEM111	X	12	WVNS211	X	12			
AGLE111	X	12						
Total / *Totaal* 1st semester		**60**	**Total / *Totaal* 1st semester**		**60**	**Total / *Totaal* 1st semester**		**64**
Year level 1 / *Jaarvlak 1*			**Year level 2 / *Jaarvlak 2***			**Year level 3 / *Jaarvlak 3***		
Second/*Tweede* semester			**Second/ *Tweede* semester**			**Second/ *Tweede* semester**		
Module code/ *Modulekode*	**CORE/ *KERN***	**Cr/ *Kr***	**Module code/ *Modulekode***	**CORE/ *KERN***	**Cr/ *Kr***	**Module code/ *Modulekode***	**CORE/ *KERN***	**Cr/ *Kr***
BMAN121	H	12	TMBP221	H	16	TMBP321	H	16
DRKS121	H	12	DRKS221	H	16	TMBP322	H	16
PLKS121	H	12	PLKS221	H	16	DRKS322	H	16
CHEM121	X	12	WVNS221	X	12	PLTN323	H	24
AGLE121	X	12						
Total / *Totaal* 2nd semester		**60**	**Total / *Totaal* 2nd semester**		**60**	**Total / *Totaal* 2nd semester**		**72**
Total year level / *Totaal jaarvlak* 1		**120**	**Total year level / *Totaal jaarvlak* 2**		**120**	**Total year level / *Totaal jaarvlak* 3**		**136**
Total credits for the programme / *Totaal krediete vir die program*								**376**

NAS.1.21 BACHELOR OF SCIENCE IN THE CENTRE FOR BUSINESS MATHEMATICS AND INFORMATICS / *BACCALAUREUS SCIENTIAE IN DIE SENTRUM VIR BEDRYFSWISKUNDE EN INFORMATIKA*

NAS.1.21.1 ARTICULATION POSSIBILITIES / *ARTIKULASIEMOONTLIKHEDE*

The programme grants admission to postgraduate studies in Hons BSc(BMI) programmes, and may also grant admission to honours studies in Economics, Statistics or Computer Science. The honours BSc(BMI) programmes are subject to the following requirements: /

Die program gee toelating tot nagraadse studie in die Honneurs BSc (BWI)-programme, en kan ook toelating gee tot honneursstudie in Ekonomie, Statistiek of Rekenaarwetenskap. Die Honneurs BSc (BWI) programme is onderhewig aan die volgende vereistes:

Honours curriculum / *Honneurs kurrikulum*	**Graduate curriculum / *Voorgraadse kurrikulum***
BSc Hons in Actuarial Science / *Aktuariële Wetenskap*	Actuarial Science / *Aktuariële Wetenskap* (with five exemptions / *met vyf vrystellings)*
BSc Hons in Quantitative Risk Management / *Kwantitatiewe Risikobestuur*	Quantitative Risk Management / *Kwantitatiewe Risikobestuur* **or/*of*** Financial Mathematics / *Finansiële Wiskunde* **or/*of*** Actuarial Science / *Aktuariële Wetenskap*
BSc Hons in Financial Mathematics / *Finansiële Wiskunde*	Financial Mathematics / *Finansiële Wiskunde*
BSc Hons in Business Analytics / *Besigheidsanalise*	Quantitative Risk Management / *Kwantitatiewe Risikobestuur* **or/*of*** Financial Mathematics / *Finansiële Wiskunde* **or/*of*** Business Analytics/ *Besigheidsanalise* **or/*of*** Actuarial Science / *Aktuariële Wetenskap*

NAS.1.21.2 ADMISSION REQUIREMENTS OF THE QUALIFICATION / *TOELATINGSVEREISTES VIR DIE KWALIFIKASIE*

See paragraph *NAS.1.16.3* / *Kyk paragraaf NAS.1.16.3*

Mathematics Refresher course / *Wiskunde Opknapkursus*

Before the classes start in the beginning of the year, there will be a refresher course for Mathematics. All students that enrol for curriculums where the module MTHS111 appears, are strongly recommended to complete the refresher course./

Voor die aanvang van klasse aan die begin van die jaar, word 'n opknapkursus vir Wiskunde aangebied. Alle studente wat inskryf vir kurrikulums waarin die module MTHS111 *voorkom, word sterk aanbeveel om die opknapkursus te voltooi.*

Permission requirements for all Business Mathematics and Informatics courses (Actuarial Science, Financial Mathematics, Business Analytics, Quantitative Risk Management), Mathematics 70-79% (level 6), APS Score 32. /

Toelatingsvereistes vir alle Bedryfswiskunde en Informatika-programme (Akruariële Wetenskap, Finansiële Wetenskap, Bedryfsanalise, Kwantitatiewe Risikobestuur): Wiskunde 70% - 79% (vlak 6), APS Telling 32.

The following is only relevant to students in the Actuarial Science programme/ ***Die volgende het slegs betrekking op studente in die Aktuariële Wetenskapprogram:***

- If a student does not pass all first year modules AND obtain a final mark of at least 60% for both BWIA121 and STTN125 in the first year of registration, then the student may not continue with the Actuarial Sciences, 2nd year curriculum./ *Indien 'n student nie alle eerstejaar modules slaag EN 'n finale punt van ten minste 60% vir beide BWIA121 en STTN125 in die eerste jaar van studie behaal nie, mag 'n student nie voortgaan met die 2de jaar kurrikulum van Aktuariële Wetenskap nie.*
- If a 2nd year student does not pass BWIA272 in the first year of registration, then the student may not continue with the Actuarial Sciences, 3rd year curriculum. /
  Indien 'n 2e jaar student nie BWIA272 in die eerste jaar van registrasie slaag nie, mag die student nie voortgaan met die 3de jaar kurrikulum van Aktuariële Wetenskap nie.
- If a 3rd year student has 2 or more 1st and 2nd year modules outstanding at the start of his/her 3rd year, the student may not continue with the Actuarial Sciences, 3rd year curriculum./
  Indien 'n 3e jaar student 2 of meer 1e en 2e jaar modules uitstaande het aan die begin van sy/haar 3e jaar, mag die student nie voortgaan met die 3de jaar kurrikulum van Aktuariële Wetenskap nie.
- If a 3rd year student fails or discontinues any of the following modules: BWIA313, BWIA314, BWIA324, BWIA371 in the first year of registration, then the student may not continue with the Actuarial Sciences curriculum./
  Indien 'n 3e jaar student enige van die volgende modules: BWIA313, BWIA314, BWIA324, BWIA371 in die eerste jaar van registrasie staak of nie slaag nie, mag die student nie voortgaan met die Aktuariële Wetenskap kurrikulum nie.

In any of the above events the student must discuss the matter with either the Nominated Accreditation Actuary or Director of the Centre for BMI. /
In enige van bogenoemde gevalle, moet die student die Direkteur of die Genomineerde Akkreditasie Aktuaris van die Sentrum vir BWI, oor die saak spreek.

NAS.1.21.3 **PROGRAMME: BACHELOR OF SCIENCE IN QUANTITATIVE RISK MANAGEMENT /**
BACCALAUREUS SCIENTIAE IN KWANTITATIEWE RISIKOBESTUUR

CODE/ *KODE:* 2FT H01 - N301P; N301V

CAMPUS/ *KAMPUS:* Potchefstroom (AFRIKAANS, ENGLISH),
Vaaltriangle (ENGLISH - See NAS 1.7)

DELIVERY MODE/ *AFLEWERINGSMETODE*: Full Time / *Voltyds*

Compilation of programme / *Samestelling van program:*

Year level 1 / *Jaarvlak 1*			**Year level 2 / *Jaarvlak 2***			**Year level 3 / *Jaarvlak 3***		
First/*Eerste* semester			**First / *Eerste* semester**			**First/ *Eerste* semester**		
Module code/ *Modulekode*	**CORE/ *KERN***	**Cr/ *Kr***	**Module code/ *Modulekode***	**CORE/ *KERN***	**Cr/ *Kr***	**Module code/ *Modulekode***	**CORE/ *KERN***	**Cr/ *Kr***
ACCF111	H	16	ECON211	H	16	BWIA313	H	24
BWIA111	X	12	EKRP211	H	16	EKRP311	H	16
ECON112	H	12	STTN215	H	16	STTN316	H	24
CMPG111	X	12	MTHS211	X	8	STTN317	H	8
STTN115	H	12	MTHS212	X	8	WVES311	X	12
MTHS111	X	12						
Total / *Totaal* 1st semester		**76**	**Total / *Totaal* 1st semester**		**64**	**Total / *Totaal* 1st semester**		**84**
Year level 1 / *Jaarvlak 1*			**Year level 2 / *Jaarvlak 2***			**Year level 3 / *Jaarvlak 3***		
Second/*Tweede* semester			**Second/ *Tweede* semester**			**Second/ *Tweede* semester**		
Module code/ *Modulekode*	**CORE/ *KERN***	**Cr/ *Kr***	**Module code/ *Modulekode***	**CORE/ *KERN***	**Cr/ *Kr***	**Module code/ *Modulekode***	**CORE/ *KERN***	**Cr/ *Kr***
ACCF121	H	16	EKRP221	H	16	BWIN321	H	16
ALDE122 / ALDA112*	X	12	STTN225	H	16	EKRP321	H	16
BWIA121	H	12	APPM222	X	8	STTN326	H	16
ECON122	H	12	MTHS222	X	8	STTN327	H	16
CMPG122	X	12	WVES221	X	12			
STTN125	H	12						
MTHS121	X	12						
Total / *Totaal* 2nd semester		**88**	**Total / *Totaal* 2nd semester**		**60**	**Total / *Totaal* 2nd semester**		**64**
Year level 1 / *Jaarvlak 1*			**Year level 2 / *Jaarvlak 2***			**Year level 3 / *Jaarvlak 3***		
			BWIA273	H	16			
			FINM271	H	18			
Total year level / *Totaal jaarvlak* 1		**164**	**Total year level / *Totaal jaarvlak* 2**		**158**	**Total year level / *Totaal jaarvlak* 3**		**148**
Total credits for the programme / *Totaal krediete vir die program*								**470**

*****Afrikaans-speaking students take ALDA112 in the 1st semester, if TALL test is passed /
Afrikaanse studente neem ALDA112 in die 1st semester, as TAG toets geslaag is.

NAS.1.21.3.1 **OLD PROGRAMME PHASING OUT / OU PROGRAM FASEER UIT**
Programme: Bachelor of Science in Quantitative Risk Management /
Baccalaureus Scientiae in Kwantitatiewe Risikobestuur

CODE/ *KODE:* 200166 - N134P; N134V (Pipeline only)

CAMPUS/ *KAMPUS:* Potchefstroom (AFRIKAANS, ENGLISH),
Vaaltriangle (ENGLISH - See NAS1.7)

DELIVERY MODE/ *AFLEWERINGSMETODE:* Full Time / *Voltyds*

Compilation of programme / *Samestelling van program:*

Year level 1 / *Jaarvlak 1*			**Year level 2 / *Jaarvlak 2***			**Year level 3 / *Jaarvlak 3***		
First/*Eerste* semester			**First / *Eerste* semester**			**First/ *Eerste* semester**		
Module code/ *Modulekode*	**CORE/ *KERN***	**Cr/ *Kr***	**Module code/ *Modulekode***	**CORE/ *KERN***	**Cr/ *Kr***	**Module code/ *Modulekode***	**CORE/ *KERN***	**Cr/ *Kr***
ACCF111 **OR** ACCC111	H	16	ECON211	H	16	BWIA313	H	24
BWIA111	X	12	EKRP211	H	16	EKRP311	H	16
ECON111	H	12	STTN215	H	16	STTN316	H	24
ITRW112	X	12	WISN211	X	8	STTN317		8
STTN115	H	12	WISN212	X	8			
WISN111	X	12	WVES311	X	12			
Total / *Totaal* 1st semester		**76**	**Total / *Totaal* 1st semester**		**76**	**Total / *Totaal* 1st semester**		**72**
Year level 1 / *Jaarvlak 1*			**Year level 2 / *Jaarvlak 2***			**Year level 3 / *Jaarvlak 3***		
Second/*Tweede* semester			**Second/ *Tweede* semester**			**Second/ *Tweede* semester**		
Module code/ *Modulekode*	**CORE/ *KERN***	**Cr/ *Kr***	**Module code/ *Modulekode***	**CORE/ *KERN***	**Cr/ *Kr***	**Module code/ *Modulekode***	**CORE/ *KERN***	**Cr/ *Kr***
ACCF121 **OR** ACCC121	H	16	EKRP221	H	16	BWIN321	H	16
AGLE121	X	12	STTN225	H	16	EKRP321	H	16
BWIA121	H	12	TGWN223	X	8	STTN326	H	16
ECON121	H	12	WISN226	X	8	STTN327	H	16
ITRW123	X	12	WVES221	X	12	FINM221	H	16
STTN125	H	12						
WISN121	X	12						
Total / *Totaal* 2nd semester		**88**	**Total / *Totaal* 2nd semester**		**60**	**Total / *Totaal* 2nd semester**		**80**
Year Module / *Jaarmodule*			**Year Module / *Jaarmodule***			**Year Module / *Jaarmodule***		
			BWIA271	H	32			
Total year level / *Totaal jaarvlak* 1		**164**	**Total year level / *Totaal jaarvlak* 2**		**168**	**Total year level / *Totaal jaarvlak 3***		**152**
Total credits for the programme / *Totaal krediete vir die program*								**484**

NAS.1.21.4 **PROGRAMME: BACHELOR OF SCIENCE IN FINANCIAL MATHEMATICS / BACCALAUREUS SCIENTIAE IN FINANSIËLE WISKUNDE**

CODE/ *KODE*: 2FS H01 - N301P; N301V

CAMPUS/ *KAMPUS*: Potchefstroom (AFRIKAANS, ENGLISH),
Vaaltriangle (ENGLISH – See NAS1.7)

DELIVERY MODE/ *AFLEWERINGSMETODE*: Full Time / *Voltyds*

Compilation of programme / *Samestelling van program:*

Year level 1 / *Jaarvlak 1*			**Year level 2 / *Jaarvlak 2***			**Year level 3 / *Jaarvlak 3***		
First/*Eerste* semester			**First / *Eerste* semester**			**First/ *Eerste* semester**		
Module code/ *Modulekode*	**CORE/ *KERN***	**Cr/ *Kr***	**Module code/ *Modulekode***	**CORE/ *KERN***	**Cr/ *Kr***	**Module code/ *Modulekode***	**CORE/ *KERN***	**Cr/ *Kr***
ACCS111 **OR/*OF*** ACCF111	H	16	ECON211	H	16	BWIA313	H	24
ECON112	H	12	EKRP211	H	16	STTN316	H	24
CMPG111	X	12	STTN215	H	16	STTN317	H	8
STTN115	H	12	MTHS211	H	8	MTHS311	H	16
MTHS111	H	12	MTHS212	H	8	WVES311	X	12
BWIA111	H	12						
Total / *Totaal* 1st semester		**76**	**Total / *Totaal* 1st semester**		**64**	**Total / *Totaal* 1st semester**		**84**
Year level 1 / *Jaarvlak 1*			**Year level 2 / *Jaarvlak 2***			**Year level 3 / *Jaarvlak 3***		
Second/*Tweede* semester			**Second/ *Tweede* semester**			**Second/ *Tweede* semester**		
Module code/ *Modulekode*	**CORE/ *KERN***	**Cr/ *Kr***	**Module code/ *Modulekode***	**CORE/ *KERN***	**Cr/ *Kr***	**Module code/ *Modulekode***	**CORE/ *KERN***	**Cr/ *Kr***
ACCS121 **OR/*OF*** ACCF121	H	16	EKRP221	H	16	BWIN321	H	16
ALDE122 / ALDA112*	X	12	STTN225	H	16	STTN326	H	16
BWIA121	H	12	APPM222	X	8	STTN327	H	16
ECON122	H	12	MTHS221	H	8	EKRP321	H	16
CMPG122	X	12	MTHS222	H	8			
STTN125	H	12	WVES221	X	12			
MTHS121	H	12						
Total / *Totaal* 2nd semester		**88**	**Total / *Totaal* 2nd semester**		**68**	**Total / *Totaal* 2nd semester**		**64**
Year Module / Jaarmodule								
			BWIA273	H	16			
Total year level / *Totaal jaarvlak* 1		**164**	**Total year level / *Totaal jaarvlak* 2**		**148**	**Total year level / *Totaal jaarvlak* 3**		**148**
Total credits for the programme / *Totaal krediete vir die program*								**460**

*****Afrikaans-speaking students take ALDA112 in the 1st semester, if TALL test is passed /
Afrikaanse studente neem ALDA112 in die 1st semester, as TAG toets geslaag is

NAS.1.21.5 **OLD PROGRAMME PHASING OUT / *OU PROGRAM FASEER UIT (PC & VTC):***
Bachelor of Science in Financial Mathematics /
Baccalaureus Scientiae in Finansiële Wiskunde

CODE/ *KODE:* 200167 - N135P; N135V (Pipeline only)

CAMPUS/ *KAMPUS:* Potchefstroom (AFRIKAANS, ENGLISH);
Vaaltriangle (ENGLISH – See NAS1.7)

DELIVERY MODE/ AFLEWERINGSMETODE: Full Time / *Voltyds*

Compilation of programme / *Samestelling van program:*

Year level 1 / *Jaarvlak 1*			**Year level 2 / *Jaarvlak 2***			**Year level 3 / *Jaarvlak 3***		
First/*Eerste* semester			**First / *Eerste* semester**			**First/ *Eerste* semester**		
Module code/ *Modulekode*	**CORE/ *KERN***	**Cr/ *Kr***	**Module code/ *Modulekode***	**CORE / *KERN***	**Cr/ *Kr***	**Module code/ *Modulekode***	**CORE/ *KERN***	**Cr/ *Kr***
ACCS111 **OR** ACCF111	H	16	ECON211	H	16	BWIA313	H	24
ECON111	H	12	EKRP211	H	16	STTN316	H	24
ITRW112	X	12	STTN215	H	16	STTN317	H	8
STTN115	H	12	WISN211	H	8	WISN314		16
WISN111	H	12	WISN212	H	8			
BWIA111	H	12	WVES311	X	12			
Total / *Totaal* 1st semester		**76**	**Total / *Totaal* 1st semester**		**76**	**Total / *Totaal* 1st semester**		**72**
Year level 1 / *Jaarvlak 1*			**Year level 2 / *Jaarvlak 2***			**Year level 3 / *Jaarvlak 3***		
Second/*Tweede* semester			**Second/ *Tweede* semester**			**Second/ *Tweede* semester**		
Module code/ *Modulekode*	**CORE/ *KERN***	**Cr/ *Kr***	**Module code/ *Modulekode***	**CORE / *KERN***	**Cr/ *Kr***	**Module code/ *Modulekode***	**CORE/ *KERN***	**Cr/ *Kr***
ACCS121 **OR** ACCF121	H	16	EKRP221	H	16	BWIN321	H	16
AGLE121	X	12	STTN225	H	16	STTN326	H	16
BWIA121	H	12	TGWN223	X	8	STTN327	H	16
ECON121	H	12	WISN224	H	8	EKRP321	H	16
ITRW123	X	12	WISN226	H	8			
STTN125	H	12	WVES221	X	12			
WISN121	H	12						
Total / *Totaal* 2nd semester		**88**	**Total / *Totaal* 2nd semester**		**68**	**Total / *Totaal* 2nd semester**		**64**
Year Module / *Jaarmodule*								
			BWIA271	H	32			
Total year level / Totaal jaarvlak 1		**164**	**Total year level / Totaal jaarvlak 2**		**176**	**Total year level / Totaal jaarvlak 3**		**136**
Total credits for the programme / *Totaal krediete vir die program*								**476**

NAS.1.21.6 **PROGRAMME: BACHELOR OF SCIENCE IN BUSINESS ANALYTICS / BACCALAUREUS SCIENTIAE IN BESIGHEIDSANALISE**

CODE/ *KODE*: 2FR H01 - N301P; N301V

CAMPUS/ *KAMPUS:* Potchefstroom (AFRIKAANS, ENGLISH),
Vaaltriangle (ENGLISH – See NAS1.7)

DELIVERY MODE/ *AFLEWERINGSMETODE:* Full Time / *Voltyds*

Compilation of programme / *Samestelling van program:*

Year level 1 / *Jaarvlak 1*			**Year level 2 / *Jaarvlak 2***			**Year level 3 / *Jaarvlak 3***		
First/*Eerste* semester			**First / *Eerste* semester**			**First/ *Eerste* semester**		
Module code/ *Modulekode*	**CORE/ *KERN***	**Cr/ *Kr***	**Module code/ *Modulekode***	**CORE/ *KERN***	**Cr/ *Kr***	**Module code/ *Modulekode***	**CORE/ *KERN***	**Cr/ *Kr***
ACCS111 **OR/*OF*** ACCF111	H	16	CMPG211	H	16	CMPG311	H	16
BWIA111	H	12	CMPG213	H	16	CMPG312	H	16
ECON112	H	12	STTN215	H	16	CMPG313	H	16
CMPG111	H	12	MTHS211	X	8	STTN316	H	24
STTN115	H	12	MTHS212	X	8	STTN317	H	8
MTHS111	X	12				WVES311	X	12
Total / *Totaal* 1st semester		**76**	**Total / *Totaal* 1st semester**		**64**	**Total / *Totaal* 1st semester**		**92**
Year level 1 / *Jaarvlak 1*			**Year level 2 / *Jaarvlak 2***			**Year level 3 / *Jaarvlak 3***		
Second/*Tweede* semester			**Second/ *Tweede* semester**			**Second/ *Tweede* semester**		
Module code/ *Modulekode*	**CORE/ *KERN***	**Cr/ *Kr***	**Module code/ *Modulekode***	**CORE/ *KERN***	**Cr/ *Kr***	**Module code/ *Modulekode***	**CORE/ *KERN***	**Cr/ *Kr***
ACCS121 **OR/*OF*** ACCF121	H	16	CMPG221	H	8	CMPG321	H	16
ALDE122 / ALDA112*	X	12	STTN225	H	16	CMPG322	H	16
BWIA121	H	12	APPM222	X	8	STTN326	H	16
CMPG121	H	12	MTHS222	X	8	STTN327	H	16
CMPG122	H	12	WVES221	X	12			
STTN125	H	12						
MTHS121	X	12						
Total / *Totaal* 2nd semester		**88**	**Total / *Totaal* 2nd semester**		**52**	**Total / *Totaal* 2nd semester**		**64**
Year Module / *Jaarmodule*								
			BWIA273	H	16			
Total year level / *Totaal jaarvlak* 1		**164**	**Total year level / *Totaal jaarvlak* 2**		**132**	**Total year level / *Totaal jaarvlak* 3**		**156**
Total credits for the programme / *Totaal krediete vir die program*								**452**

*****Afrikaans-speaking students take ALDA112 in the 1st semester, if TALL test is passed / *Afrikaanse studente neem ALDA112 in die 1st semester, as TAG toets geslaag is*

NAS.1.21.7 **OLD PROGRAMME PHASING OUT / *OU PROGRAM FASEER UIT* :**
Bachelor of Science in Data Mining /
Baccalaureus Scientiae in Data-ontginning

CODE/ *KODE:* 200168 - N136P; N136V (Pipeline only)

CAMPUS/ *KAMPUS:* Potchefstroom (AFRIKAANS, ENGLISH),
Vaaltriangle (ENGLISH see also NAS1.7)

DELIVERY MODE/ *AFLEWERINGSMETODE:* Full Time / *Voltyds*

Compilation of programme / *Samestelling van program:*

Year level 1 / *Jaarvlak 1*			**Year level 2 / *Jaarvlak 2***			**Year level 3 / *Jaarvlak 3***		
First/*Eerste* semester			**First / *Eerste* semester**			**First/ *Eerste* semester**		
Module code/ *Modulekode*	**CORE/ *KERN***	**Cr/ *Kr***	**Module code/ *Modulekode***	**CORE/ *KERN***	**Cr/ *Kr***	**Module code/ *Modulekode***	**CORE/ *KERN***	**Cr/ *Kr***
ACCS111 **OR/*OF*** ACCF111	H	16	ITRW212	H	16	ITRW311	H	16
BWIA111	H	12	ITRW213	H	16	ITRW317	H	16
ECON111	H	12	ITRW214	H	16	STTN316	H	24
ITRW112	X	12	STTN215	H	16	STTN317	H	8
STTN115	H	12	WISN211	H	8			
WISN111	X	12	WISN212	H	8			
			WVES311	X	12			
Total / *Totaal* 1st semester		**76**	**Total / *Totaal* 1st semester**		**92**	**Total / *Totaal* 1st semester**		**64**
Year level 1 / *Jaarvlak 1*			**Year level 2 / *Jaarvlak 2***			**Year level 3 / *Jaarvlak 3***		
Second/*Tweede* semester			**Second/ *Tweede* semester**			**Second/ *Tweede* semester**		
Module code/ *Modulekode*	**CORE/ *KERN***	**Cr/ *Kr***	**Module code/ *Modulekode***	**CORE/ *KERN***	**Cr/ *Kr***	**Module code/ *Modulekode***	**CORE/ *KERN***	**Cr/ *Kr***
ACCS121 **OR/*OF*** ACCF121	H	16	ITRW123	H	12	ITRW325	H	16
AGLA121	X	12	ITRW222	H	16	ITRW321	H	16
BWIA121	H	12	STTN225	H	16	STTN326	H	16
ECON121	H	12	TGWN223	X	8	STTN327	H	16
ITRW124	X	12	WISN226	H	8			
STTN125	H	12	WVES221	X	12			
WISN121	X	12						
Total / *Totaal* 2nd semester		**88**	**Total / *Totaal* 2nd semester**		**72**	**Total / *Totaal* 2nd semester**		**64**
Total year level / *Totaal jaarvlak* 1		**164**	**Total year level / *Totaal jaarvlak* 2**		**164**	**Total year level / *Totaal jaarvlak* 3**		**128**
Total credits for the programme / *Totaal krediete vir die program*								**456**

NAS.1.21.8 **PROGRAMME: BACHELOR OF SCIENCE IN ACTUARIAL SCIENCE/ *BACCALAUREUS SCIENTIAE IN AKTUARIËLE WETENSKAP***

NAS.1.21.8.1 Faculty-specific rules for the programme / *Fakulteitspesifieke reëls vir die program* (see / *sien* 1.21.1)

CODE/ *KODE:* 2FQ H01 - N301P

CAMPUS/ *KAMPUS*: Potchefstroom (AFRIKAANS, ENGLISH)

DELIVERY MODE/ *AFLEWERINGSMETODE*: Full Time / *Voltyds*

Compilation of programme / *Samestelling van program:*

Year level 1 / *Jaarvlak 1*			**Year level 2 / *Jaarvlak 2***			**Year level 3 / *Jaarvlak 3***		
First/*Eerste* semester			**First / *Eerste* semester**			**First/ *Eerste* semester**		
Module code/ *Modulekode*	**CORE/ *KERN***	**Cr/ *Kr***	**Module code/ *Modulekode***	**CORE/ *KERN***	**Cr/ *Kr***	**Module code/ *Modulekode***	**CORE/ *KERN***	**Cr/ *Kr***
ACCF111	H	16	ECON211	H	16	BWIA313	H	24
BWIA111	H	12	EKRP211	H	16	BWIA314	H	12
ECON112	H	12	STTN215	H	16	STTN316	H	24
CMPG111	X	12	MTHS211	X	8	STTN317	H	8
STTN115	H	12	MTHS212	X	8	WVES311	X	12
MTHS111	X	12						
Total / *Totaal* 1st semester		**76**	**Total / *Totaal* 1st semester**		**64**	**Total / *Totaal* 1st semester**		**80**
Year level 1 / *Jaarvlak 1*			**Year level 2 / *Jaarvlak 2***			**Year level 3 / *Jaarvlak 3***		
Second/*Tweede* semester			**Second/ *Tweede* semester**			**Second/ *Tweede* semester**		
Module code/ *Modulekode*	**CORE/ *KERN***	**Cr/ *Kr***	**Module code/ *Modulekode***	**CORE/ *KERN***	**Cr/ *Kr***	**Module code/ *Modulekode***	**CORE/ *KERN***	**Cr/ *Kr***
ACCF121	H	16	EKRP221	H	16	BWIN321	H	16
ALDE122 / ALDA112*	X	12	STTN225	H	16	STTN326	H	16
BWIA121	H	12	APPM222	X	8	STTN327	H	16
ECON122	H	12	MTHS222	X	8	BWIA324	H	12
CMPG122	X	12	WVES221	X	12			
STTN125	H	12						
MTHS121	X	12						
Total / *Totaal* 2nd semester		**88**	**Total / *Totaal* 2nd semester**		**60**	**Total / *Totaal* 2nd semester**		**60**
Year Module / *Jaarmodule*								
			BWIA272	H	24	BWIA371	H	32
			FINM271	H	18			
Total year level / *Totaal jaarvlak* 1		**164**	**Total year level / *Totaal jaarvlak* 2**		**166**	**Total year level / *Totaal jaarvlak* 3**		**172**
Total credits for the programme / *Totaal krediete vir die program*								**502**

*****Afrikaans-speaking students take ALDA112 in the 1st semester, if TALL test is passed / *Afrikaanse studente neem ALDA112 in die 1st semester, as TAG toets geslaag is*

NAS.1.21.9 **OLD PROGRAMME PHASING OUT / *OU PROGRAM FASEER UIT (PC*)**
Bachelor of Science in Actuarial Science /
Baccalaureus Scientiae in Aktuariële Wetenskap

CODE/ *KODE:* **200123 - N137P** (Pipeline only)

CAMPUS/ *KAMPUS:* Potchefstroom (AFRIKAANS, ENGLISH)

DELIVERY MODE/ *AFLEWERINGSMETODE*: Full Time / *Voltyds*

Compilation of programme / *Samestelling van program:*

Year level 1 / *Jaarvlak 1*			**Year level 2 / *Jaarvlak 2***			**Year level 3 / *Jaarvlak 3***		
First/*Eerste* semester			**First / *Eerste* semester**			**First/ *Eerste* semester**		
Module code/ *Modulekode*	**CORE/ *KERN***	**Cr/ *Kr***	**Module code/ *Modulekode***	**CORE/ *KERN***	**Cr/ *Kr***	**Module code/ *Modulekode***	**CORE/ *KERN***	**Cr/ *Kr***
ACCF111 **OR** ACCC111	H	16	ECON211	H	16	BWIA313	H	24
BWIA111	H	12	EKRP211	H	16	BWIA314	H	12
ECON111	H	12	STTN215	H	16	STTN316	H	24
ITRW112	X	12	WISN211	X	8	STTN317	H	8
STTN115	H	12	WISN212	X	8			
WISN111	X	12	WVES311	X	12			
Total / *Totaal* 1st semester		**76**	**Total / *Totaal* 1st semester**		**76**	**Total / *Totaal* 1st semester**		**68**
Year level 1 / *Jaarvlak 1*			**Year level 2 / *Jaarvlak 2***			**Year level 3 / *Jaarvlak 3***		
Second/*Tweede* semester			**Second/ *Tweede* semester**			**Second/ *Tweede* semester**		
Module code/ *Modulekode*	**CORE/ *KERN***	**Cr/ *Kr***	**Module code/ *Modulekode***	**CORE/ *KERN***	**Cr/ *Kr***	**Module code/ *Modulekode***	**CORE/ *KERN***	**Cr/ *Kr***
ACCC121	H	16	EKRP221	H	16	BWIN321	H	16
AGLA121	X	12	STTN225	H	16	STTN326	H	16
BWIA121	H	12	TGWN223	X	8	STTN327	H	16
ECON121	H	12	WISN226	X	8	BWIA324	H	12
ITRW123	X	12	WVES221	X	12			
STTN125	H	12	FINM221	H	16			
WISN121	X	12						
Total / *Totaal* 2nd semester		**88**	**Total / *Totaal* 2nd semester**		**76**	**Total / *Totaal* 2nd semester**		**60**
Year Module / *Jaarmodule*								
			BWIA271	H	32	BWIA371	H	32
Total year level / *Totaal jaarvlak* 1		**164**	**Total year level / *Totaal jaarvlak* 2**		**184**	**Total year level / *Totaal jaarvlak* 3**		**160**
Total credits for the programme / *Totaal krediete vir die program*								**508**

NAS.1.22 PROGRAMME: RULES FOR THE DEGREE BACHELOR OF SCIENCE IN URBAN AND REGIONAL PLANNING / BACCALAUREUS SCIENTIAE IN STADS- EN STREEKBEPLANNING

NAS.1.22.1 PROGRAMME OUTCOMES / *PROGRAMUITKOMSTE*

The Faculty Board of Natural and Agricultural Sciences has approved this programme, that offers professional training in urban and regional planning. In compiling this programme, possible career opportunities and our country's demand for human resources were also considered. This programme also conforms to the requirements of the South African Council for Planners (SACPLAN) and prepares the student for admission to the degree MSc Urban and Regional Planning./

Die Fakulteitsraad Natuur- en Landbouwetenskappe het hierdie program goedgekeur, wat professionele opleiding in stads- en streekbeplanning bied. Met die samestelling van hierdie kurrikulum is beroepsmoontlikhede asook ons land se behoefte aan menslike hulpbronne oorweeg. Hierdie program voldoen ook aan die vereistes van die Suid-Afrikaanse Raad vir Beplanners (SACPLAN) en berei die student voor vir toelating tot die graad MSc Stads- en Streekbeplanning.

On completing this programme, the student should be able to/
Na voltooiing van hierdie program behoort die student:

- demonstrate a broad and systematic knowledge of, and engagement in, urban and regional planning, as well as an understanding of the practical application of relevant urban and regional planning techniques and other subject-specific content presented in the programme; /
  'n breë en sistematiese kennis van en betrokkenheid in stads- en streekbeplanning te demonstreer, asook 'n begrip van die praktiese toepassing van relevante stads- en streekbeplanningtegnieke en ander vakspesifieke inhoud wat in die program aangebied is, ten einde volhoubare ontwikkeling in stedelike en landelike omgewings te bewerkstellig;

- demonstrate the ability to use a range of specialised skills to identify, analyse and argue complex and abstract planning problems by systematically drawing on an appropriate body of knowledge, theoretically-driven arguments and applying proven solutions in an ethically responsible manner; /
  die vermoë te demonstreer om verskeie gespesialiseerde vaardighede te gebruik om komplekse en abstrakte beplanningsprobleme te identifiseer, te analiseer en te beredeneer deur sistematies gebruik te maak van 'n gepaste kennisbasis, teorie-gedrewe argumente en die toepassing van bewese oplossings op 'n eties verantwoordelike wyse;

- demonstrate skills in gathering, critically evaluating, accurately interpreting and managing research, professional or occupational ideas and literature in urban and regional planning, as well as to present and communicate creative findings, recommendations and solutions to problems, graphically, in writing and orally to peers and professionals by making use of appropriate computer-aided software; and
  die vaardighede te demonstreer om navorsing, professionele of beroepsidees en -literatuur op die gebied van stads- en streekbeplanning, te versamel, krities te evalueer, akkuraat te interpreteer en te bestuur, asook om kreatiewe bevindinge, voorstelle en probleemoplossings grafies, skriftelik en mondeling aan die hand van gepaste rekenaargesteunde sagteware aan eweknieë en professionele persone te kommunikeer;

- demonstrate the ability to identify and address ethical issues based on a critical reflection on the applicability of different ethical value systems within the context of urban and regional planning and planning consultation.Duration (minimum and maximum duration) /
  die vermoë te demonstreer om etiese kwessies en die toepaslikheid van verskillende etiese waardesisteme binne die konteks van stads- en streekbeplanning en beplanningskonsultasie, te identifiseer en aan te spreek by wyse van kritiese refleksie.

The minimum duration of the studies for this degree is four years and the maximum duration for completing the degree is six years. / (A-Rule 1.14)

Die minimum duur van die studie vir hierdie graad is vier jaar en die maksimum duur vir die voltooiing van die graad is ses jaar. (A-Reël 1.14)

NAS.1.22.2 ADMISSION REQUIREMENTS OF THE QUALIFICATION / *TOELATINGSVEREISTES VAN DIE PROGRAM*

The requirements of this qualification with regard to prior learning are described in NAS.1.1.1. Students are only admitted to the BSc in Urban and Regional Planning degree if they have been selected for admission. **A maximum of 25 candidates**, i.e. first-time university students, will be selected annually.

Die vereistes van hierdie kwalifikasie met betrekking tot vorige leer word in NAS.1.1.1 beskryf. Studente word slegs toegelaat tot die BSc in Stads- en Streekbeplanning-graad na aanleiding van keuring. ***'n Maksimum van 25 kandidate****, dws eerstejaarstudente, sal jaarliks gekeur word.*

NAS.1.22.3 LANGUAGE MEDIUM / *TAALMEDIUM*

The language of instruction for contact students in this curriculum is Afrikaans. Lectures are interpreted into English for students who are not proficient in Afrikaans. In certain modules the language of instruction is English and the lectures are interpreted into Afrikaans if requested. /

Die onderrigtaal vir kontakstudente in hierdie kurrikulum is Afrikaans. Lesings word in Engels getolk vir studente wat nie Afrikaans vaardig is nie. In sekere modules is die onderrigtaal Engels en die lesings word in Afrikaans getolk, indien dit verlang word.

NAS.1.22.4 COMPLETION OF RESEARCH PROJECT / *VOLTOOIING VAN NAVORSINGSPROJEK*

In the final year students must complete a research project (SBES 472) fulltime during the first and second semester, under supervision of personnel in the respective subject group. This research project is supported by the Research Methodology module (SGSS414) as well as other core modules of the Urban and Regional Planning programme. /

In die finale jaar moet studente gedurende die eerste en tweede semester 'n navorsingsprojek (SBES 472) onder toesig van personeel in die onderskeie vakgroep voltooi. Hierdie navorsingsprojek word ondersteun deur die Navorsingsmetodologie module (SGSS414) asook ander kernmodules van die Stads- en Streekbeplanningsprogram.

Take note: The 2017 program has phased out. All pipeline (senior) students must register on the 2018 program. Recognitions will be handled by the Subject Group./

Neem kennis: Die 2017 program het uitfaseer. Alle pyplyn- (senior-) studente moet op die 2018 program registreer. Erkennings sal deur die Vakgroep hanteer word.

Replacement of modules: 2017 modules merged, will not be lectured as core modules in 2018. For transition arrangements, these identified 2018 modules will be recognised in place of 2017 modules:

- SBRS211 to be replaced by SANL225**.**
- SSBP221 to be replaced by SRSK323 or SBSS323.
- SBRS321 to be replaced by SRSK323 or SBSS323.
- SBSS471 to be replaced by SBSS472 and SGSS414. .

GGFS222/GEOG221 prerequisite requirement does not apply to GGFS312/GEOG311, for all students enrolled for the BSc Urban and Regional Planning programme. /

Vervanging van modules: 2017-modules wat saamgesmelt het, sal nie in 2018 as kernmodules aangebied word nie. *Vir oorgangs-reëlings word hierdie 2018-modules erken in plaas van 2017 modules.*

- *SBRS211 word vervang deur SANL225.*
- *SSBP221 word vervang deur SRSK323 of SBSS323.*
- *SBRS321 word vervang deur SRSK323 of SBSS323.*
- *SBSS471 word vervang deur SBSS472 en SGSS414.*

GGFS222/GEOG221 voorvereistes is nie van toepassing vir GGFS312/GEOG311, vir alle studente ingeskryf vir die BSc Stads- en Streekbeplanning program.

NAS.1.22.5 PROGRAMME: BACHELOR OF SCIENCE IN URBAN AND REGIONAL PLANNING /
BACCALAUREUS SCIENTIAE IN STADS- EN STREEKBEPLANNING

Take note / *Neem kennis*: All the students (1st – 4th yr) will register for this programme (no pipeline students on old programme) / *Al die studente (1ste – 4de jaar) sal vir hierdie program registreer (geen pyplynstudente op die ou program).*

CODE/ *KODE:* 2FE K01 - N401P

CAMPUS/ *KAMPUS:* Potchefstroom (AFRIKAANS, ENGLISH)

DELIVERY MODE/ *AFLEWERINGSMETODE:* Full Time / *Voltyds*

Compilation of programme / *Samestelling van program:*

Year level /*Jaarvlak 1*			**Year level / *Jaarvlak 2***			**Year level / *Jaarvlak 3***			**Year level/*Jaarvlak 4***		
First / *Eerste* semester			**First / *Eerste* semester**			**First / *Eerste* semester**			**First / *Eerste* semester**		
Module code/ *Modulekode*	**Core /*Kern***	**Cr/ *Kr***	**Module code/ *Modulekode***	**Core /*Kern***	**Cr/ *Kr***	**Module code/ *Modulekode***	**Core /*Kern***	**Cr/ *Kr***	**Module code/ *Modulekode***	**Core /*Kern***	**Cr/ *Kr***
SBSS111	H	12	SBES212	H	16	SBES313	H	16	SGSS414	H	16
GEOG111	H	12	GEOG211	H	16	SBRS313	H	16	SBRS411	H	16
ECON112	X	12	ECON211	X	16	SBSS313	H	16	SBSS412	H	16
MTHS114	X	12	WVNS211	X	12	GEOG311	H	32	SBSS414	H	16
STTN111	X	12									
Total / *Totaal* 1st semester		**60**	**Total / *Totaal* 1st semester**		**60**	**Total / *Totaal* 1st semester**		**80**	**Total / *Totaal* 1st semester**		**64**
Year level /*Jaarvlak 1*			**Year level / *Jaarvlak 2***			**Year level / *Jaarvlak 3***			**Year level/*Jaarvlak 4***		
Second semester / *Tweede* semester			**Second semester / *Tweede* semester**			**Second semester / *Tweede* semester**			**Second semester / *Tweede* semester**		
Module code/ *Modulekode*	**Core /*Kern***	**Cr/ *Kr***	**Module code**	**Core /*Kern***	**Cr/ *Kr***	**Module Code**	**Core /*Kern***	**Cr/ *Kr***	**Module code**	**Core /*Kern***	**Cr/ *Kr***
SBSS121	H	12	SBSS223	H	16	SBSS323	H	16	SBSS424	H	16
GEOG121	H	12	SBRS221	H	16	ECON322	X	16	SSBP421	H	16
ECON122	X	12	SANL225	H	16	SBSS321	H	16	**Year module / *Jaarmodule***		
STTN124	X	12	ECON325	X	16	SECO321	H	16			
ALDE122/ ALDA112*	X	12	WVNS221	X	12	SRSK323	H	16	SBSS472	H	32
Total / *Totaal* 2nd semester		**60**	**Total / *Totaal* 2nd semester**		**76**	**Total / *Totaal* 2nd semester**		**80**	**Total / *Totaal* 2nd semester**		**64**
Total year level / *Totaal jaarvlak* 1		**120**	**Total year level / *Totaal jaarvlak* 2**		**136**	**Total year level / *Totaal jaarvlak* 3**		**160**	**Total year level / *Totaal jaarvlak* 4**		**128**
Credit Total of the curriculum / *Totaal krediete vir die program*											**544**

*****Afrikaans-speaking students take ALDA112 in the 1st semester, if TALL test is passed / *Afrikaanse studente neem ALDA112 in die 1st semester, as TAG toets geslaag is.*

NAS.1.23 PROGRAMMES: BACHELOR OF SCIENCE IN AGRICULTURE

NAS.1.23.1 BACHELOR OF SCIENCE IN AGRICULTURE WITH AGRICULTURAL ECONOMICS

NAS.1.23.2 PROGRAMME OUTCOMES

To provide the country with qualified personnel who can work as agricultural economists and are competent in research, appraising, developing, managing and evaluating agricultural development programmes and projects towards the development of the agricultural sector, agricultural business and rural communities.

CODE: 2FD K01 – N401M

CAMPUS: Mafikeng (ENGLISH)

DELIVERY MODE: Full Time

Compilation of programme : Agricultural Economics

Year Level 1			Year level 2			Year level 3			Year level 4		
First semester			First semester			First semester			First semester		
Module code	Core	Cr	Module code	Core	Cr	Module code	Core	Cr	Module code	Core	Cr
MCBN111	X	12	AEXM211	H	16	AECM311	H	16	AECM411	H	08
NCHE111	X	12	AEXM212	H	08	CSPM313	X	16	AECM412	H	16
ALDE111	X	12	CSPM211	X	16	AECM313	H	16	AECM413	H	16
AECM111	H	12	ANSM211	X	16	AECM314	H	08	AECM414	H	16
MTHS114	X	12	WVNS211	X	12	AECM315	H	08	AECM415	H	16
						AECM316	H	16			
Total 1st semester		**60**	**Total 1st semester**		**68**	**Total 1st semester**		**80**	**Total 1st semester**		**72**
Year Level 1			**Year level 2**			**Year level 3**			**Year level 4**		
Second semester			**Second semester**			**Second semester**			**Second semester**		
Module code	**Core**	**Cr**	**Module code**	**Core**	**Cr**	**Module code**	**Core**	**Cr**	**Module code**	**Core**	**Cr**
MCBN121	X	12	AECM221	H	08	AECM321	H	16	AECM421	H	08
NCHE121	X	12	AEXM222	H	08	AECM323	H	08	AECM422	H	16
ALDE122	X	12	CSPM221	X	16	AEXM324	X	08	AECM424	H	08
NPHY123	X	12	ANSM223	X	16	AECM325	H	08	AECM425	H	16
ANSM121	X	12	AECM223	H	08	AECM326	H	08			
			WVAS221	X	12	AECM327	H	08			
Total 2nd semester		**60**	**Total 2nd semester**		**68**	**Total 2nd semester**		**56**	**Total 2nd semester**		**48**
Total year level 1		**120**	**Total year level 2**		**136**	**Total year level 3**		**136**	**Total year level 4**		**120**
Credit Total of the curriculum											**512**

NAS.1.23.3 OLD PROGRAMME PHASING OUT (MC): BACHELOR OF SCIENCE IN AGRICULTURAL WITH AGRICULTURAL ECONOMICS

CODE: 267100- N401M (4th yr & Pipeline students may register for this programme)

CAMPUS: Mafikeng (ENGLISH)

DELIVERY MODE: Full Time

Compilation of programme: Agricultural Economics

Year level *1*			**Year level *2***			**Year level *3***			**Year level *4***		
First semester			**First semester**			**First semester**			**First semester**		
Module code/	**Core**	**Cr**	**Module code**	**Core**	**Cr**	**Module code**	**Core**	**Cr**	**Module code**	**Core**	**Cr**
BGYM113	X	12	AEXM211	H	16	AECM311	H	16	AECM411	H	8
MCHE114	X	12	AEXM212	H	8	AECM312	H	8	AECM412	H	16
AGLE111	X	12	AECM213	H	8	CSPM313	X	16	AECM413	H	16
AECM111	H	12	CSPM211	X	16	AECM313	H	16	AECM414	H	16
MAYM116	X	12	ANSM211	X	16	AECM314	H	8	AECM415	H	16
			WVNS211	X	12						
Total 1st semester		**60**	**Total 1st semester**		**76**	**Total 1st semester**		**64**	**Total 1st semester**		**72**

Year level *1*			**Year level *2***			**Year level *3***			**Year level *4***		
Second semester			**Second semester**			**Second semester**			**Second semester**		
Module code	**Core**	**Cr**	**Module code**	**Core**	**Cr**	**Module Code**	**Core**	**Cr**	**Module code**	**Core**	**Cr**
MCHE121	X	12	AECM221	H	8	AECM321	H	16	AECM421	H	8
BGYM123	X	12	AEXM222	H	8	AECM322	H	16	AECM422	H	16
PHYM129	X	12	CSPM221	X	16	AECM323	H	8	AECM423	H	8
ANSM121	X	12	ANSM223	X	16	AEXM324	H	8	AECM424	H	8
AGLE121	X	12	AECM223	H	8	AECM325	H	8	AECM425	H	16
			WVAS221	X	12						
Total 2nd semester		**60**	**Total 2nd semester**		**68**	**Total 2nd semester**		**56**	**Total 2nd semester**		**56**
Total year level 1		**120**	**Total year level 2**		**144**	**Total year level 3**		**120**	**Total year level 4**		**128**
Credit Total of the curriculum											**512**

NAS.1.23.4 BACHELOR OF SCIENCE IN AGRICULTURE WITH ANIMAL HEALTH

NAS.1.23.4.1 Programme outcomes:

Animal health technicians will be able to utilize their sound, research-based knowledge of disease surveillance, farm animals and production systems, and be able to identify problems related to the health, breeding, feeding, management and economics of livestock production, thus contributing to animal production whilst maintaining the animals' health and welfare, protecting humans from zoonosis and ensuring high-quality food products of animal origin for human consumption.

CODE: 267101- N402M

CAMPUS: Mafikeng (ENGLISH)

DELIVERY MODE: Full Time

Compilation of programme: Animal Health

Year Level 1			Year level 2			Year level 3			Year level 4		
First semester			First semester			First semester			First semester		
Module code	Core	Cr	Module code	Core	Cr	Module code	Core	Cr	Module code	Core	Cr
ALDE111	X	12	AHPM213	H	12	AHPM311	H	16	AHPM411	H	16
MCBN111	X	12	AHPM214	H	12	AHPM313	H	16	AHPM412	H	16
NCHE111	X	12	AHPM216	H	12	AHPM315	H	08	AHPM415	H	16
MTHS114	X	12	ANSM214	X	08	AHPM317	H	08	AHPM416	H	08
AECM111	X	12	AEXM211	X	16	AHPM318	H	08	AHPM417	H	08
			WVNS211	X	12	AHPM319	H	08			
						ANSM311	H	16			
Total 1st semester		60	Total 1st semester		72	Total 1st semester		80	Total 1st semester		64
Year Level 1			Year level 2			Year level 3			Year level 4		
Second semester			Second semester			Second semester			Second semester		
Module code	Core	Cr	Module code	Core	Cr	Module code	Core	Cr	Module code	Core	Cr
ALDE122	X	12	AHPM223	H	12	AHPM321	H	16	AHPM421	H	16
ANSM121	X	12	AHPM224	H	12	AHPM322	H	16	AHPM422	H	16
MCBN121	X	12	AHPM225	H	12	AHPM323	H	16	AHPM424	H	08
NCHE121	X	12	ANSM226	X	12	AHPM325	H	08	AHPM425	H	16
NPHY123	X	12	ANSM223	X	16	AHPM327	H	12	AHPM426	H	08
			ANSM224	X	08	AHPM329	H	12	AHPM427	H	08
			WVAS221	X	12	AHBM321	H	08			
Total 2nd semester		60	Total 2nd semester		84	Total 2nd semester		88	Total 2nd semester		72
Total year level 1		120	Total year level 2		156	Total year level 3		168	Total year level 4		136
Total credits for the curriculum											580

NAS.1.23.4.2 OLD PROGRAMME PHASING OUT (MC):
Bachelor of Science in Agriculture with Animal Health

CODE: 267101- N401M (4th yr and Pipeline students may register for this programme)

CAMPUS: Mafikeng (ENGLISH)

DELIVERY MODE: Full Time

Compilation of programme : Animal Health

Year level *1*			**Year level *2***			**Year level *3***			**Year level *4***		
First semester			**First semester**			**First semester**			**First semester**		
Module code	**Core**	**Cr**	**Module code**	**Core**	**Cr**	**Module code**	**Core**	**Cr**	**Module code**	**Core**	**Cr**
AGLE111	X	12	AHPM213	H	12	AHPM311	H	16	AHPM411	H	16
BGYM113	X	12	AHPM214	H	12	AHPM312	H	8	AHPM412	H	16
MCHE114	X	12	ANSM214	X	8	AHPM313	H	16	AHPM413	H	8
MAYM116	X	12	AEXM211	X	16	AHPM316	H	12	AHPM414	H	8
AECM111	X	12	WVNS211	X	12	ANSM311	X	16	AHPM415	H	16
			AHPM215	H	12	AHPM315	H	**8**			
Total 1st semester		**60**			**72**			**76**	**Total 1st semester**		**64**
Year level *1*			**Year level *2***			**Year level *3***			**Year level *4***		
Second semester			**Second semester**			**Second semester**			**Second semester**		
Module code	**Core**	**Cr**	**Module code**	**Core**	**Cr**	**Module Code**	**Core**	**Cr**	**Module code**	**Core**	**Cr**
AGLE121	X	12	AHPM224	H	12	AHPM321	H	16	AHPM421	H	16
ANSM121	X	12	AHPM223	H	12	AHPM322	H	16	AHPM422	H	16
BGYM123	X	12	ANSM222	X	8	AHPM323	H	16	AHPM423	H	8
MCHE121	X	12	ANSM223	X	16	AHPM328	H	8	AHPM424	H	8
PHYM129	X	12	ANSM224	X	8	AHPM325	H	8	AHPM425	H	16
			WVAS221	X	12	AHPM327	H	12	AHPM426	H	8
Total /2nd semester		**60**	**Total 2nd semester**		**68**	**Total 2nd semester**		**76**	**Total 2nd semester**		**72**
Total year level 1		**120**	**Total year level 2**		**140**	**Total year level 3**		**152**	**Total year level 4**		**136**
Credit Total of the curriculum											**548**

NAS.1.23.5 BACHELOR OF SCIENCE IN AGRICULTURE WITH ANIMAL SCIENCE

The main aim of this programme is to offer an opportunity to students from different educational backgrounds to become Professional Animal Scientists within the Agricultural Sector and related industries.

CODE: 2FD K03 - N401M

CAMPUS: Mafikeng (ENGLISH)

DELIVERY MODE: Full Time

Compilation of programme: Animal Science

Year Level 1			Year level 2			Year level 3			Year level 4		
First semester			First semester			First semester			First semester		
Module code	Core	Cr	Module code	Core	Cr	Module code	Core	Cr	Module code	Core	Cr
NCHE111	X	12	ANSM211	H	16	AECM314	X	08	ANSM412	H	16
MCBN111	X	12	AHPM212	X	16	ANSM311	H	16	ANSM415	H	12
MTHS114	X	12	CSPM211	X	16	ANSM312	H	16	ANSM416	H	16
AECM111	X	12	AHPM211	X	16	ANSM313	H	08	ANSM479	H	32
ALDE111	X	12	WVNS211	X	12	ANSM314	H	16			
Total 1st semester		**60**	**Total 1st semester**		**76**			**64**	**Total 1st semester**		**76**
Year Level 1			**Year level 2**			**Year level 3**			**Year level 4**		
Second semester			**Second semester**			**Second semester**			**Second semester**		
Module code	**Core**	**Cr**	**Module code**	**Core**	**Cr**	**Module code**	**Core**	**Cr**	**Module code**	**Core**	**Cr**
NCHE121	X	12	ANSM223	H	16	ANMS321	H	16	ANSM423	H	08
MCBN121	X	12	AHPM221	X	08	ANSM322	H	08	ANSM426	H	12
NPHY124	X	12	ANSM226	H	12	ANSM323	H	16	ANSM427	H	12
ANSM121	H	12	CSPM221	X	16	ANSM326	H	12	ANSM428	H	12
ALDE122	X	12	WVAS221	X	12	AHPM326	X	08			
						AEXM324	X	08			
Total 2nd semester		**60**	**Total 2nd semester**		**64**	**Total 2nd semester**		**68**	**Total 2nd semester**		**44**
Total year level 1		**120**	**Total year level 2**		**140**	**Total year level 3**		**132**	**Total year level 4**		**120**
Total credits for the curriculum											**512**

NAS.1.23.5.1 **OLD PROGRAMME PHASING OUT (MC):**
Bachelor of Science in Agriculture with Animal Science

CODE: 267102 - N401M (4th yr & Pipeline students may register for this programme)

CAMPUS: Mafikeng (ENGLISH)

DELIVERY MODE: Full Time

Compilation of programme: Animal Science

Year level *1*			Year level *2*			Year level *3*			Year level *4*		
First semester			**First semester**			**First semester**			**First semester**		
Module code	**Core**	**Cr**	**Module code**	**Core**	**Cr**	**Module code**	**Core**	**Cr**	**Module code**	**Core**	**Cr**
MCHE114	X	12	ANSM211	H	16	AECM314	X	8	ANSM411	H	16
BGYM113	X	12	AHPM212	X	16	ANSM311	H	16	ANSM412	H	16
MAYM116	X	12	CSPM211	X	16	ANSM312	H	16	ANSM413	H	16
AECM111	X	12	AHPM211	X	16	ANSM313	H	8	ANSM414	H	8
AGLE111		12	WVNS211	X	12	ANSM314	H	16			
Total 1st semester		**60**	**Total /1st semester**		**76**	**Total 1st semester**		**64**	**Total 1st semester**		**56**

Year level *1*			Year level *2*			Year level *3*			Year level *4*		
Second semester			**Second semester**			**Second semester**			**Second semester**		
Module code	**Core**	**Cr**	**Module code**	**Core**	**Cr**	**Module Code**	**Core**	**Cr**	**Module code**	**Core**	**Cr**
MCHE121	X	12	ANSM223	H	16	ANSM321	H	16	ANSM421	H	16
BGYM123	X	12	AHPM221	X	8	ANSM322	H	8	ANSM422	H	8
PHYM129	X	12	ANSM222	H	8	ANSM323	H	16	ANSM423	H	8
ANSM121	H	12	CSPM221	X	16	ANSM324	H	16	ANSM424	H	16
AGLE121	X	12	WVAS221	X	12	AHPM326	X	8	ANSM425	H	16
						AEXM324	X	8			
Total /2nd semester		**60**	**Total 2nd semester**		**60**	**Total 2nd semester**		**72**	**Total 2nd semester**		**64**
Total year level 1		**120**	**Total year level 2**		**136**	**Total year level 3**		**136**	**Total year level 4**		**120**
Credit Total of the curriculum											**512**

NAS.1.23.6 BACHELOR OF SCIENCE IN AGRICULTURE WITH AGRONOMY AND HORTICULTURE

CODE: 2FD K04 - N401M

CAMPUS: Mafikeng (ENGLISH)

DELIVERY MODE: Full Time

Compilation of programme:

Year Level 1			Year level 2			Year level 3			Year level 4		
First semester			First semester			First semester			First semester		
Module code	Core	Cr	Module code	Core	Cr	Module code	Core	Cr	Module code	Core	Cr
MCBN111	X	12	CSPM211	H	16	CSPM311	H	08	CSPM411 **or** CSPM416	H	08
NCHE111	X	12	AEXM211	X	16	CSPM313	H	16	CSMP411 **or** CSPM415	H	16
MTHS114	X	12	ANSM211	X	16	CSPM317	H	08	CSMP412 **or** CSPM419	H	12
ALDE111	X	12	CSPM212	H	12	CSPM319	H	08			
AECM111	X	12	CSPM213	H	08	ANSM312	X	16			
			WVNS211	X	12	AECM314	X	08			
Total 1st semester		**60**	**Total 1st semester**		**80**	**Total 1st semester**		**64**	**Total 1st semester**		**36**
Year Level 1			**Year level 2**			**Year level 3**			**Year level 4**		
Second semester			**Second semester**			**Second semester**			**Second semester**		
Module code	**Core**	**Cr**	**Module code**	**Core**	**Cr**	**Module code**	**Core**	**Cr**	**Module code**	**Core**	**Cr**
MCBN121	X	12	CSPM 221	H	16	CSPM321	H	08	CSPM421	H	16
NCHE121	X	12	CSPM 222	H	16	CSPM322	H	16	CSPM425 **or** CSPM426	H	12
NPHY123	X	12	CSPM 223	H	12	CSPM323	H	16	**Total 2nd semester**		**28**
ALDE122	X	12	CSPM 225	H	12	CSPM324	H	16			
ANSM121	X	12	WVAS221	X	12	CSPM325	H	08	**Year modules**		
						CSPM326 **or** CSPM327	H	08	CSPM479	H	12
Total 2nd semester		**60**	**Total 2nd semester**		**68**	**Total 2nd semester**		**72**	CSPM474	H	32
									Total yr mod		**44**
Total year level 1		**120**	**Total year level 2**		**148**	**Total year level 3**		**136**	**Total year level 4**		**108**
Total credits for the curriculum											**512**

NAS.1.23.7 OLD PROGRAMME PHASING OUT (MC):
BACHELOR OF SCIENCE IN AGRICULTURE WITH CROP SCIENCE

Purpose:

To provide formal education and research training in Plant Sciences and related fields such as Horticulture, Soil Science, and Environmental and Land Management towards the improvement of the agricultural sector regionally, nationally and internationally.

CODE: 267103 - N401M (4th yr & Pipeline students may register for this programme)

CAMPUS: Mafikeng (ENGLISH)

DELIVERY MODE: Full Time

Compilation of programme:

Year level 1			Year level 2			Year level 3			Year level 4		
First semester			First semester			First semester			First semester		
Module code	Core	Cr	Module code	Core	Cr	Module code	Core	Cr	Module code	Core	Cr
BGYM113	X	12	CSPM211	H	16	CSPM311	H	8	CSPM411	H	8
MCHE114	X	12	AEXM211	X	16	CSPM312	H	16	CSMP412/ CSPM415	H	16
MAYM116	X	12	ANSM211	X	16	CSPM313	H	16	CSPM413/ CSPM414	H	8
AGLE111	X	12	CSPM212	H	12	AECM314	X	8	CSPM417	H	8
AECM111	X	12	CSPM213	H	8	ANSM312	X	16	CSPM418	H	16
			WVNS211	X	12						
Total 1st semester		60	Total 1st semester		80	Total 1st semester		64	Total 1st semester		56

Year level 1			Year level 2			Year level 3			Year level 4		
Second semester			Second semester			Second semester			Second semester		
Module code	Core	Cr	Module code	Core	Cr	Module Code	Core	Cr	Module code	Core	Cr
BGYM123	12	X	CSPM221	H	16	CSPM321	H	8	CSPM421	H	16
MCHE121	12	X	CSPM222	H	16	CSPM322	H	16	CSPM422/ CSPM424	H	16
PHYM129	12	X	CSPM223	H	12	CSPM323	H	16	CSPM427	H	8
AGLE121	12	X	CSPM224	H	16	CSPM324	H	16	CSPM428	H	16
ANSM121	12	X	WVAS221	X	12	CSPM325	H	8			
Total 2nd semester		60	Total 2nd semester		72	Total 2nd semester		64	Total 2nd semester		56
Total year level 1		120	Total year level 2		152	Total year level 3		128	Total year level 4		112
Credit Total of the curriculum											512

NAS.1.23.8 BACHELOR OF SCIENCE IN AGRICULTURE WITH AGRICULTURAL ECONOMICS AND AGRONOMY/
BACCALAUREUS SCIENTIAE IN LANDBOU MET LANDBOU-EKONOMIE EN AGRONOMIE

Take note that in 2020, only year level 1 and 2, will be active for registration/
Neem kennis *dat slegs jaarvlak 1 en 2, in 2020, aktief sal wees vir registrasie.*

CODE/ *KODE:* 2FD K05 - N401P

CAMPUS/ *KAMPUS:* Potchefstroom (AFRIKAANS, ENGLISH)

DELIVERY MODE/ *AFLEWERINGSMETODE:* Full Time / *Voltyds*

Compilation of programme / *Samestelling van program:*

Year level /*Jaarvlak 1*			**Year level / *Jaarvlak 2***			**Year level / *Jaarvlak 3***			***Year level/*Jaarvlak 4**		
First / *Eerste* semester			**First / *Eerste* semester**			**First / *Eerste* semester**			**First / *Eerste* semester**		
Module code/ *Modulekode*	**Core /*Kern***	**Cr/ *Kr***	**Module code/ *Modulekode***	**Core /*Kern***	**Cr/ *Kr***	**Module code/ *Modulekode***	**Core /*Kern***	**Cr/ *Kr***	**Module code/ *Modulekode***	**Core /*Kern***	**Cr/ *Kr***
ECON112	H	12	CSPM212	H	12	AECP211	H	16	CSPM411	H	8
FSKS113	X	12	GDKN211	H	16	AECP311	H	16	ECOH611	H	16
NCHE111	X	12	STTK214	X	16	CSPM311	H	8	ECOH617 **OR/*OF*** OMWP411	H	16
PLKS111	X	12	WVNS211	X	12	CSPM313	H	16			
ALDE/ ALDA111	X	12	CSPM315	X	8	GDKN311	H	16			
Total / *Totaal* 1st semester		**60**	**Total / *Totaal* 1st semester**		**64**	**Total / *Totaal* 1st semester**		**72**	**Total / *Totaal* 1st semester**		**40**
Year level /*Jaarvlak 1*			**Year level / *Jaarvlak 2***			**Year level / *Jaarvlak 3***			**Year level/*Jaarvlak 4***		
Second semester / *Tweede* semester			**Second semester / *Tweede* semester**			**Second semester / *Tweede* semester**			**Second semester / *Tweede* semester**		
Module code/ *Modulekode*	**Core /*Kern***	**Cr/ *Kr***	**Module code/ *Modulekode***	**Core /*Ker***	**Cr/ *Kr***	**Module code/ *Modulekode***	**Core /*Kern***	**Cr/ *Kr***	**Module Code/ *Module-kode***	**Core /*Kern***	**Cr/ *Kr***
FSKS123	X	12	AECP121	H	12	AECP321	H	16	GDKN421	H	24
GDKN121	H	12	AECP223	H	16	AECP322	H	16	OMSA422	X	16
NCHE121	X	12	CSPM221	H	16	CSPM321	H	8	OMSA423	X	16
MTHS123	X	12	GDKN221	H	16	CSPM324	H	16	**Total / *Totaal* 2nd semester**	**56**	
ALDE/ ALDA122	X	12	WVNS221	X	12				**Year module / *Jaarmodule***		
									OMSE474	H	32
Total / *Totaal* 2nd semester		**60**	**Total / *Totaal* 2nd semester**		**72**	**Total / *Totaal* 2nd semester**		**56**	**Total/*Totaal* Yr/*Jr* module**	**32**	
Total year level / *Totaal jaarvlak* 1		**120**	**Total year level / *Totaal jaarvlak* 2**		**136**	**Total year level / *Totaal jaarvlak* 3**		**128**	**Total year level / *Totaal jaarvlak* 4**	**128**	
Credit Total of the curriculum / *Totaal krediete vir die program*										**512**	

NB: FIELD MAPPING DURING THE DECEMBER HOLIDAY OF THE 3rd YEAR IS A PREREQUISITE FOR 4TH YEAR REGISTRATION

NAS.1.23.9 BACHELOR OF SCIENCE IN AGRICULTURE WITH SOIL SCIENCES AND AGRONOMY/
BACCALAUREUS SCIENTIAE IN LANDBOU MET GRONDKUNDE EN AGRONOMIE

Take note that in 2020, only year level 1 and 2, will be active for registration/
Neem kennis *dat slegs jaarvlak 1 en 2, in 2020, aktief sal wees vir registrasie.*

CODE/ *KODE:* 2FD K06 - N401P

CAMPUS/ *KAMPUS:* Potchefstroom (AFRIKAANS, ENGLISH)

DELIVERY MODE/ *AFLEWERINGSMETODE:* Full Time / *Voltyds*

Compilation of programme / *Samestelling van program:*

Year level /*Jaarvlak 1*			**Year level / *Jaarvlak 2***			**Year level / *Jaarvlak 3***			**Year level/*Jaarvlak 4***		
First / *Eerste* semester			**First / *Eerste* semester**			**First / *Eerste* semester**			**First / *Eerste* semester**		
Module code/ *Modulekode*	**Core /*Kern***	**Cr/ *Kr***	**Module code/ *Modulekode***	**Core /*Kern***	**Cr/ *Kr***	**Module code/ *Modulekode***	**Core /*Kern***	**Cr/ *Kr***	**Module code/ *Modulekode***	**Core /*Kern***	**Cr/ *Kr***
ECON112	H	12	CSPM212	H	12	AECP211	X	16	CSPM411	H	8
FSKS113	X	12	GDKN211	H	16	CSPM311	H	8	OMSE415	X	16
NCHE111	X	12	STTK214	X	16	CSPM313	H	16	OMWP411	H	16
PLKS111	X	12	WVNS211	X	12	GDKN311	H	16			
ALDE/ ALDA111	X	12	CSPM315	X	8						
Total / *Totaal* 1st semester		**60**	**Total / *Totaal* 1st semester**		**64**	**Total / *Totaal* 1st semester**		**56**	**Total / *Totaal* 1st semester**		**40**
Year level /*Jaarvlak 1*			**Year level / *Jaarvlak 2***			**Year level / *Jaarvlak 3***			**Year level/*Jaarvlak 4***		
Second semester / *Tweede* semester			**Second semester / *Tweede* semester**			**Second semester / *Tweede* semester**			**Second semester / *Tweede* semester**		
Module code/ *Modulekode*	**Core /*Kern***	**Cr/ *Kr***	**Module code/ *Modulekode***	**Core /*Kern***	**Cr/ *Kr***	**Module code/ *Modulekode***	**Core /*Kern***	**Cr/ *Kr***	**Module Code/ *Modulekode***	**Core /*Kern***	**Cr/ *Kr***
FSKS123	X	12	AECP121	X	12	AECP321	X	16	GDKN421	H	24
GDKN121	H	12	AECP223	X	16	AECP322	X	16	OMSA422	X	16
NCHE121	X	12	CSPM221	H	16	CSPM321	H	8	OMSA423	X	16
MTHS123	X	12	GDKN221	H	16	GDKN322	H	16	**Total / *Totaal* 2nd semester**		**56**
ALDE/ ALDA122	X	12	WVNS221	X	12	CSPM324	H	16	**Year module / *Jaarmodule***		
									OMSE474	H	32
Total / *Totaal* 2nd semester		**60**	**Total / *Totaal* 2nd semester**		**72**	**Total / *Totaal* 2nd semester**		**72**	**Total/*Totaal* Yr/*Jr* module**		**32**
Total year level / *Totaal jaarvlak* 1		**120**	**Total year level / *Totaal jaarvlak* 2**		**136**	**Total year level / *Totaal jaarvlak* 3**		**128**	**Total year level / *Totaal jaarvlak* 4**		**128**
Credit Total of the curriculum / *Totaal krediete vir die program*											**512**

NAS.1.24 PROGRAMME: BACHELOR OF INDIGENOUS KNOWLEDGE SYSTEMS

NAS.1.24.1 PROGRAMME OUTCOMES

This is a multi-disciplinary qualification which has been designed to prepare students with the necessary knowledge, skills and values of Indigenous Knowledge Systems (IKS), in order to enable them to pursue careers as practitioners in various fields and contexts.

The qualification is based on a holistic approach to understanding IKS and lays a solid foundation for learners to gain academic and practical competencies, which will enable them to apply theoretical knowledge and understanding in a range of contexts which, including but not limited to: health sciences, traditional leadership, tourism, communication, agriculture, nature conservation, arts and culture, heritage, education, law, human and social sciences, physical planning and construction.

The multi-disciplinary nature of this qualification will enable learners to promote IKS within various communities of practice, through being conversant with the concepts, theories, philosophies and values of IKS. In addition, the structure of the qualification provides scope for electives in a domain of IKS, relevant to the student`s area of interest or research. The qualification will also equip learners with sufficient research competencies to undertake postgraduate studies.

NAS.1.24.2 PROGRAMME: BACHELOR OF INDIGENOUS KNOWLEDGE SYSTEMS (BIKS)

CODE: 2HB K01 N401M (1st yr - 2nd yrs)

3rd – 4th yrs are phasing out on old code: 287 100 N402M

CAMPUS: Mafikeng (ENGLISH)

DELIVERY MODE: Full Time

Compilation of programme:

Year Level 1			**Year level 2**			**Year level 3**			**Year level 4**		
First semester			**First semester**			**First semester**			**First semester**		
Module code	**Core**	**Cr**	**Module code**	**Core**	**Cr**	**Module code**	**Core**	**Cr**	**Module code**	**Core**	**Cr**
ALDE111	A	12	IKSM211	H	12	WVCS315	X	16	IKSM 411	H	16
IKSM111	H	12	IKSM212	H	12	Select 3 modules from the following:			IKSM412	H	16
IKSM112	H	12	IKSM213	H	12	IKSS311	H	16	Select 1 module from the following:		
IKSM114	H	12	IKSM215	H	12	IKSA311	H	16	IKSS413	H	16
IKSM115	H	12				IKSC311	H	16	IKSA413	H	16
						IKSC312	H	16	IKSC413	H	16
						IKSH311	H	16	IKSH411	H	16
						IKSH312	H	16			
						IKSH313	H	16			
						IKSH314	H	16			
						IKSM311	H	16			
						IKSM312	H	16			
						IKSM313	H	16			
IKSM113	H	12	IKSM214	H	12	IKSS312	H	16	IKSM413	H	16
Total 1st semester		**72**	**Total 1st semester**		**60**	**Total 1st semester**		**64**	**Total 1st semester**		**48**

Year Level 1			Year level 2			Year level 3			Year level 4		
Second semester			Second semester			Second semester			Second semester		
Module code	**Core**	**Cr**	**Module code**	**Core**	**Cr**	**Module code**	**Core**	**Cr**	**Module code**	**Core**	**Cr**
ALDE122	X	12	IKSM221	H	12	Select 4 modules from the following:			IKSM421	H	64
IKSM121	H	12	IKSM222	H	12	IKSM321	H	16			
IKSM122	H	12	IKSM223	H	12	IKSM322	H	16			
IKSM123	H	12	IKSM224	H	12	IKSM323	H	16			
IKSM124	H	12	IKSM225	H	12	IKSM324	H	16			
IKSM125	H	12	WVCS221	X	12	IKSS321	H	16			
						IKSS322	H	16			
						IKSS323	H	16			
						IKSS324	H	16			
						IKSA321	H	16			
						IKSA322	H	16			
						IKSA323	H	16			
						IKSH321	H	16			
						IKSH322	H	16			
						IKSH323	H	16			
						IKSC321	H	16			
						IKSC322	H	16			
						IKSC323	H	16			
Total 2nd semester		**72**	**Total 2nd semester**		**72**	**Total 2nd semester**		**64**	**Total 2nd semester**		**64**
Total year level 1		**144**	**Total year level 2**		**132**	**Total year level 3**		**128**	**Total year level 4**		**112**
Total credits for the curriculum											**516**

NAS.1.25 EXTENDED PROGRAMMES: BACHELOR OF SCIENCE

NAS.1.25.1 FACULTY-SPECIFIC RULES FOR THE PROGRAMME

Students who have not achieved the minimum requirements for entry into BSc may be admitted into the BSc Programme (Extended).

NAS.1.25.2 EXTENDED PROGRAMME: BACHELOR OF SCIENCE WITH APPLIED MATHEMATICS AND CHEMISTRY

CODE: 2XF H13 – N301M

CAMPUS: Mafikeng (ENGLISH)

DELIVERY MODE: Full Time

Compilation of programme:

Year Level 1			Year level 2			Year level 3			Year level 4		
Year modules			Year modules			First semester			First semester		
Module code	Core	Cr	Module code	Core	Cr	Module code	Core	Cr	Module code	Core	Cr
APPM171	H	12	APPM172	H	12	APPM212	H	8	APPM311	H	16
MTHS171	X	12	MTHS172	X	12	APPM213	H	8	APPM313	H	16
NCHE171	H	12	NCHE172	H	12	MTHS211	X	8	NCHE311	H	16
NPHY171	X	12	NPHY172	X	12	MTHS212	X	8	NCHE312	H	16
ALDE111	X	12				NCHE211	H	8			
						NCHE212	H	8			
						WVNS211	X	12			
						Total 1st semester		**60**	**Total 1st semester**		**64**
Year Level 1			**Year level 2**			**Year level 3**			**Year level 4**		
Second semester			**Second semester**			**Second semester**			**Second semester**		
Module code	**Core**	**Cr**	**Module code**	**Core**	**Cr**	**Module code**	**Core**	**Cr**	**Module code**	**Core**	**Cr**
ALDE122	X	12				APPM222	H	8	APPM322	H	16
						APPM223	H	8	APPM323	H	16
						MTHS221	X	8	NCHE321	H	16
						MTHS222	X	8	NCHE322	H	16
						NCHE221	H	8			
						NCHE222	H	8			
						WVNS221	X	12			
						Total 2nd semester		**60**	**Total 2nd semester**		**64**
Total year level 1		**72**	**Total year level 2**		**48**	**Total year level 3**		**120**	**Total year level 4**		**128**
Total credits for the curriculum											**368**

NAS.1.25.2.1 OLD PROGRAMME PHASING OUT (MC):
Extended: Bachelor of Science with Applied Mathematics and Chemistry

CODE: 200192 - N302M (Pipeline only)

CAMPUS: Mafikeng (ENGLISH)

DELIVERY MODE: Full Time

Compilation of programme:

Year Level 1			Year level 2			Year level 3			Year level 4		
First semester			First semester			First semester			First semester		
Module code	Core	Cr	Module code	Core	Cr	Module code	Core	Cr	Module code	Core	Cr
SFCM171	H	06	SFCM172	H	06	WVNS211	X	12	APMM317	H	16
SFMM171	X	06	SFMM172	X	06	APMM217	H	16	APMM318	H	16
SFPM171	X	06	SFPM172	X	06	MCHE215	H	8	MCHE315	H	16
SFAM171	H	06	SFAM172	H	06	MCHE216	H	8	MCHE316	H	16
AGLE111	X	12				MAYM217	X	16			
Total 1st semester		**36**	**Total 1st semester**		**24**			**60**	**Total 1st semester**		**64**
Year Level 1			**Year level 2**			**Year level 3**			**Year level 4**		
Second semester			**Second semester**			**Second semester**			**Second semester**		
Module code	**Core**	**Cr**	**Module code**	**Core**	**Cr**	**Module code**	**Core**	**Cr**	**Module code**	**Core**	**Cr**
SFCM171	H	06	SFCM172	H	06	WVNS221	X	12	APMM327	H	16
SFMM171	X	06	SFMM172	X	06	APMM227	H	16	APMM328	H	16
SFPM171	X	06	SFPM172	X	06	MCHE221	H	8	MCHE321	H	16
SFAM171	H	06	SFAM172	H	06	MCHE223	H	8	MCHE322	H	16
			AGLE121	X	12	MAYM227	X	16			
Total 2nd semester		**24**	**Total 2nd semester**		**36**	**Total 2nd semester**		**60**	**Total 2nd semester**		**64**
Total year level 1		**60**	**Total year level 1**		**60**	**Total year level 2**		**120**	**Total year level 3**		**128**
Total credits for the curriculum											**368**

NAS.1.25.3 EXTENDED PROGRAMME: BACHELOR OF SCIENCE WITH APPLIED MATHEMATICS AND ELECTRONICS

CODE*:* 2XF H14 - N301M

CAMPUS: Mafikeng (ENGLISH)

DELIVERY MODE: Full Time

Compilation of programme:

Year Level 1			Year level 2			Year level 3			Year level 4		
Year modules			Year modules			First semester			First semester		
Module code	Core	Cr	Module code	Core	Cr	Module code	Core	Cr	Module code	Core	Cr
APPM171	H	12	APPM172	H	12	APPM212	H	8	APPM311	H	16
MTHS171	X	12	MTHS172	X	12	APPM213	H	8	APPM313	H	16
SFEM171	H	12	SFEM172	H	12	MTHS211	X	8	ELYM315	H	16
CMPG171	X	12	CMPG172	X	12	MTHS212	X	8	ELYM316	H	16
ALDE111	X	12				ELYM215	H	16			
						WVNS211	X	12			
Total 1st semester		60				Total 1st semester		60	Total 1st semester		64
Year Level 1			Year level 2			Year level 3			Year level 4		
Second semester			Second semester			Second semester			Second semester		
Module code	Core	Cr	Module code	Core	Cr	Module code	Core	Cr	Module code	Core	Cr
ALDE122	X	12				APPM222	H	8	APPM322	H	16
						APPM223	H	8	APPM323	H	16
						MTHS221	X	8	ELYM327	H	16
						MTHS222	X	8	ELYM328	H	16
						ELYM227	H	16			
						WVNS221	X	12			
						Total 2nd semester		60	Total 2nd semester		64
Total year level 1		72	Total year level 1		48	Total year level 2		120	Total year level 3		128
Total credits for the curriculum											368

NAS.1.25.3.1 **OLD PROGRAMME PHASING OUT (MC):**
Extended Curriculum: Bachelor of Science with Applied Mathematics and Electronics

CODE: 200193 - N302M (Pipeline only)

CAMPUS: Mafikeng (ENGLISH)

DELIVERY MODE: Full Time

Compilation of programme:

Year Level 1			Year level 2			Year level 3			Year level 4		
First semester			First semester			First semester			First semester		
Module code	Core	Cr	Module code	Core	Cr	Module code	Core	Cr	Module code	Core	Cr
SFEM171	H	06	SFEM172	H	06	WVNS211	X	12	APMM317	H	16
SFMM171	X	06	SFMM172	X	06	APMM217	H	16	APMM318	H	16
SFIM171	X	06	SFIM172	X	06	ELYM215	H	16	ELYM315	H	16
SFAM171	H	06	SFAM172	H	06	MAYM217	X	16	ELYM316	H	16
AGLE111	X	12									
Total 1st semester		**36**	**Total 1st semester**		**24**			**60**	**Total 1st semester**		**64**
Year Level 1			**Year level 2**			**Year level 3**			**Year level 4**		
Second semester			**Second semester**			**Second semester**			**Second semester**		
Module code	**Core**	**Cr**	**Module code**	**Core**	**Cr**	**Module code**	**Core**	**Cr**	**Module code**	**Core**	**Cr**
SFEM171	H	06	SFEM172	H	06	WVNS221	X	12	APMM327	H	16
SFMM171	X	06	SFMM172	X	06	APMM227	H	16	APMM328	H	16
SFPM171	X	06	SFPM172	X	06	ELYM227	H	16	ELYM327	H	16
SFAM171	H	06	SFAM172	H	06	MAYM227	X	16	ELYM328	H	16
			AGLE121	X	12						
Total 2nd semester		**24**	**Total 2nd semester**		**36**	**Total 2nd semester**		**60**	**Total 2nd semester**		**64**
Total year level 1		**60**	**Total year level 1**		**60**	**Total year level 2**		**120**	**Total year level 3**		**128**
Total credits for the curriculum											**368**

NAS.1.25.4 EXTENDED PROGRAMME: BACHELOR OF SCIENCE IN MATHEMATICAL SCIENCES WITH APPLIED MATHEMATICS AND MATHEMATICS

CODE: 2XG H03 - N301M

CAMPUS: Mafikeng (ENGLISH)

DELIVERY MODE: Full Time

Compilation of programme:

Year Level 1			Year level 2			Year level 3			Year level 4		
Year modules			Year modules			First semester			First semester		
Module code	Core	Cr	Module code	Core	Cr	Module code	Core	Cr	Module code	Core	Cr
APPM171	H	12	APPM172	H	12	APPM212	H	8	APPM311	H	16
MTHS171	H	12	MTHS172	H	12	APPM213	H	8	APPM313	H	16
NPHY171	X	12	NPHY172	X	12	MTHS211	H	8	MTHS311	H	16
CMPG171	X	12	CMPG172	X	12	MTHS212	H	8	MTHS312	H	16
ALDE111	X	12				NPHY211	X	8			
						NPHY212	X	8			
						WVNS211	X	12			
						Total 1st semester		**60**	**Total 1st semester**		**64**
Year Level 1			**Year level 2**			**Year level 3**			**Year level 4**		
Second semester			**Second semester**			**Second semester**			**Second semester**		
Module code	**Core**	**Cr**	**Module code**	**Core**	**Cr**	**Module code**	**Core**	**Cr**	**Module code**	**Core**	**Cr**
ADLE122	X	12				APPM222	H	8	APPM322	H	16
						APPM223	H	8	APPM323	H	16
						MTHS221	H	8	MTHS321	H	16
						MTHS222	H	8	MTHS322	H	16
						NPHY221	X	8			
						NPHY222	X	8			
						WVNS221	X	12			
						Total 2nd semester		**60**	**Total 2nd semester**		**64**
Total year level 1		**72**	**Total year level 1**		**48**	**Total year level 2**		**120**	**Total year level 3**		**128**
Total credits for the curriculum:											**368**

NAS.1.25.4.1 **OLD PROGRAMME PHASING OUT (MC):**
Extended Curriculum: Bachelor of Science with Applied Mathematics and Mathematics

CODE: 200158 - N303M (Pipeline only)

CAMPUS: Mafikeng (ENGLISH)

DELIVERY MODE: Full Time

Compilation of programme:

Year Level 1			Year level 2			Year level 3			Year level 4		
First semester			First semester			First semester			First semester		
Module code	Core	Cr	Module code	Core	Cr	Module code	Core	Cr	Module code	Core	Cr
SFAM171	H	06	SFAM172	H	06	WVNS211	X	12	APMM317	H	16
SFMM171	H	06	SFMM172	H	06	APMM217	H	16	APMM318	H	16
SFPM171	X	06	SFPM172	X	06	PHYM215	X	08	MAYM317	H	16
SFIM171	X	06	SFIM172	X	06	PHYM216	X	08	MAYM318	H	16
AGLE111	X	12				MAYM217	H	16			
Total 1st semester		**36**	**Total 1st semester**		**24**			**60**	**Total 1st semester**		**64**
Year Level 1			**Year level 2**			**Year level 3**			**Year level 4**		
Second semester			**Second semester**			**Second semester**			**Second semester**		
Module code	**Core**	**Cr**	**Module code**	**Core**	**Cr**	**Module code**	**Core**	**Cr**	**Module code**	**Core**	**Cr**
SFAM171	H	06	SFAM172	H	06	WVNS221	X	12	APMM327	H	16
SFMM171	H	06	SFMM172	H	06	APMM227	H	16	APMM328	H	16
SFPM171	X	06	SFPM172	X	06	PHYM221	X	08	MAYM327	H	16
SFIM171	X	06	SFIM172	X	06	PHYM222	X	08	MAYM328	H	16
			AGLE121	X	12	MAYM227	H	16			
Total 2nd semester		**24**	**Total 2nd semester**		**36**	**Total 2nd semester**		**60**	**Total 2nd semester**		**64**
Total year level 1		**60**	**Total year level 1**		**60**	**Total year level 2**		**120**	**Total year level 3**		**128**
Total credits for the curriculum											**368**

NAS.1.25.5 EXTENDED PROGRAMME: BACHELOR OF SCIENCE WITH PHYSICS AND APPLIED MATHEMATICS

CODE: 2XF H24 - N301M

CAMPUS: Mafikeng (ENGLISH)

DELIVERY MODE: Full Time

Compilation of programme:

Year Level 1			Year level 2			Year level 3			Year level 4		
Year modules			Year modules			First semester			First semester		
Module code	Core	Cr	Module code	Core	Cr	Module code	Core	Cr	Module code	Core	Cr
APPM171	H	12	APPM172	H	12	APPM212	H	8	APPM311	H	16
MTHS171	X	12	MTHS172	X	12	APPM213	H	8	APPM313	H	16
NPHY171	H	12	NPHY172	H	12	MTHS211	X	8	NPHY311	H	16
CMPG171	X	12	CMPG172	X	12	MTHS212	X	8	NPHY312	H	16
ALDE111	X	12				NPHY211	H	8			
						NPHY212	H	8			
						WVNS211	X	12			
						Total 1st semester		**60**	**Total 1st semester**		**64**
Year Level 1			**Year level 2**			**Year level 3**			**Year level 4**		
Second semester & Year Mod			**Second semester**			**Second semester**			**Second semester**		
Module code	**Core**	**Cr**	**Module code**	**Core**	**Cr**	**Module code**	**Core**	**Cr**	**Module code**	**Core**	**Cr**
ALDE122	X	12				APPM222	H	8	APPM322	H	16
						APPM223	H	8	APPM323	H	16
						MTHS221	X	8	NPHY321	H	16
						MTHS222	X	8	NPHY322	H	16
						NPHY221	H	8			
						NPHY222	H	8			
						WVNS221	X	12			
						Total 2nd semester		**60**	**Total 2nd semester**		**64**
Total year level 1		**72**	**Total year level 1**		**48**	**Total year level 2**		**120**	**Total year level 3**		**128**
Total credits for the curriculum											**368**

NAS.1.25.5.1 **OLD PROGRAMME PHASING OUT (MC):**
Extended Curriculum: Bachelor of Science with Applied Mathematics and Physics

CODE: 200194 - N302M (Pipeline only)

CAMPUS: Mafikeng (ENGLISH)

DELIVERY MODE: Full Time

Compilation of programme:

Year Level 1			Year level 2			Year level 3			Year level 4		
First semester			First semester			First semester			First semester		
Module code	Core	Cr	Module code	Core	Cr	Module code	Core	Cr	Module code	Core	Cr
SFAM171	H	06	SFAM172	H	06	WVNS211	X	12	APMM317	H	16
SFMM171	X	06	SFMM172	X	06	APMM217	H	16	APMM318	H	16
SFPM171	H	06	SFPM172	H	06	PHYM215	H	08	PHYM315	H	08
SFIM171	X	06	SFIM172	X	06	PHYM216	H	08	PHYM316	H	08
AGLE111	X	12				MAYM217	X	16	PHYM317	H	08
									PHYM318	H	08
Total 1st semester		**36**	**Total 1st semester**		**24**	**Total 1st semester**		**60**	**Total 1st semester**		**64**
Year Level 1			**Year level 2**			**Year level 3**			**Year level 4**		
Second semester			**Second semester**			**Second semester**			**Second semester**		
Module code	**Core**	**Cr**	**Module code**	**Core**	**Cr**	**Module code**	**Core**	**Cr**	**Module code**	**Core**	**Cr**
SFAM171	H	06	SFAM172	H	06	WVNS221	X	12	APMM327	H	16
SFMM171	X	06	SFMM172	X	06	APMM227	H	16	APMM328	H	16
SFPM171	H	06	SFPM172	H	06	PHYM221	H	08	PHYM321	H	08
SFIM171	X	06	SFIM172	X	06	PHYM222	H	08	PHYM322	H	08
			AGLE121	X	12	MAYM227	X	16	PHYM323	H	08
									PHYM324	H	08
Total 2nd semester		**24**	**Total 2nd semester**		**36**	**Total 2nd semester**		**60**	**Total 2nd semester**		**64**
Total year level 1		**60**	**Total year level 1**		**60**	**Total year level 2**		**120**	**Total year level 3**		**128**
Total credits for the curriculum											**368**

NAS.1.25.6 EXTENDED PROGRAMME: BACHELOR OF SCIENCE WITH BIOCHEMISTRY AND CHEMISTRY

CODE: 2XF H06 - N301M

CAMPUS: Mafikeng (ENGLISH)

DELIVERY MODE: Full Time

Compilation of programme:

Year Level 1			Year level 2			Year level 3			Year level 4		
Year modules			Year modules			First semester			First semester		
Module code	Core	Cr	Module code	Core	Cr	Module code	Core	Cr	Module code	Core	Cr
MCBN171	H	12	MCBN172	H	12	BCHN213	H	16	BCHS316	H	16
MTHS173	X	12	MTHS174	X	12	NCHE211	H	08	BCHS317	H	16
NPHY171	H	12	NPHY172	H	12	NCHE212	H	08	NCHE311	H	16
NCHE171	X	12	NCHE172	X	12	MKBN211	X	16	NCHE312	H	16
ALDE111	X	12				WVNS211	X	12			
						Total 1st semester		**60**	**Total 1st semester**		**64**
Year Level 1			**Year level 2**			**Year level 3**			**Year level 4**		
Second semester			**Second semester**			**Second semester**			**Second semester**		
Module code	**Core**	**Cr**	**Module code**	**Core**	**Cr**	**Module code**	**Core**	**Cr**	**Module code**	**Core**	**Cr**
ALDE122	X	12				BCHN222	H	16	BCHS321	H	16
						NCHE221	H	08	BCHS322	H	16
						NCHE222	H	08	NCHE321	H	16
						MKBS221	X	16	NCHE322	H	16
						WVNS221	X	12			
						Total 2nd semester		**60**	**Total 2nd semester**		**64**
Total year level 1		**72**	**Total year level 1**		**48**	**Total year level 2**		**120**	**Total year level 3**		**128**
Total credits for the curriculum											**368**

NAS.1.25.6.1 **OLD PROGRAMME PHASING OUT (MC):**
Extended Curriculum: Bachelor of Science with Biochemistry and Chemistry

CODE: 200201 - N301M (Pipeline only)

CAMPUS: Mafikeng (ENGLISH)

DELIVERY MODE: Full Time

Compilation of programme:

Year Level 1			Year level 2			Year level 3			Year level 4		
First semester			First semester			First semester			First semester		
Module code	Core	Cr	Module code	Core	Cr	Module code	Core	Cr	Module code	Core	Cr
SFBM171	H	06	SFBM172	H	06	WVNS211	X	12	BCHS314	H	16
SFCM171	H	06	SFCM172	H	06	MKBS211	X	08	BCHS315	H	16
SFMM171	X	06	SFMM172	X	06	MKBS212	X	08	MCHE315	H	16
SFPM171	X	06	SFPM172	X	06	MCHE215	H	08	MCHE316	H	16
AGLE111	X	12				MCHE216	H	08			
						BCHS211	H	08			
						BCHS212	H	08			
Total 1st semester		**36**	**Total 1st semester**		**24**	**Total 1st semester**		**60**	**Total 1st semester**		**64**
Year Level 1			**Year level 2**			**Year level 3**			**Year level 4**		
Second semester			**Second semester**			**Second semester**			**Second semester**		
Module code	**Core**	**Cr**	**Module code**	**Core**	**Cr**	**Module code**	**Core**	**Cr**	**Module code**	**Core**	**Cr**
SFBM171	H	06	SFBM172	H	06	WVNS221	X	12	BCHS324	H	16
SFCM171	H	06	SFCM172	H	06	MKBS222	X	08	BCHS325	H	16
SFMM171	H	06	SFMM172	H	06	MKBS223	X	08	MCHE321	H	16
SFPM171	X	06	SFPM172	X	06	MCHE221	H	08	MCHE322	H	16
			AGLE121	X	12	MCHE223	H	08			
						BCHS221	H	08			
						BCHS223	H	08			
Total 2nd semester		**24**	**Total 2nd semester**		**36**	**Total 2nd semester**		**60**	**Total 2nd semester**		**64**
Total year level 1		**60**	**Total year level 1**		**60**	**Total year level 2**		**120**	**Total year level 3**		**128**
Total credits for the curriculum											**368**

NAS.1.25.7 EXTENDED PROGRAMME: BACHELOR OF SCIENCE IN ENVIRONMENTAL SCIENCES WITH BOTANY AND CHEMISTRY

CODE: 2XJ H03 - N301M

CAMPUS: Mafikeng (ENGLISH)

DELIVERY MODE: Full Time

Compilation of programme:

Year Level 1			**Year level 2**			**Year level 3**			**Year level 4**		
Year modules			**Year modules**			**First semester**			**First semester**		
Module code	**Core**	**Cr**	**Module code**	**Core**	**Cr**	**Module code**	**Core**	**Cr**	**Module code**	**Core**	**Cr**
MCBN171	H	12	MCBN172	H	12	BCHN213	H	16	PLKS314	H	32
MTHS173	X	12	MTHS172	X	12	NCHE211	H	08	NCHE311	H	16
PLKS171	H	12	PLKS172	H	12	NCHE212	H	08	NCHE312	H	16
NCHE171	X	12	NCHE172	X	12	PLKS211	X	16			
ALDE111	X	12				WVNS211	X	12			
						Total 1st semester		**60**	**Total 1st semester**		**64**
Year Level 1			**Year level 2**			**Year level 3**			**Year level 4**		
Second semester			**Second semester**			**Second semester**			**Second semester**		
Module code	**Core**	**Cr**	**Module code**	**Core**	**Cr**	**Module code**	**Core**	**Cr**	**Module code**	**Core**	**Cr**
ALDE122	X	12				BCHN222	X	16	PLKS324	H	32
						NCHE221	H	08	NCHE321	H	16
						NCHE222	H	08	NCHE322	H	16
						PLKS223	H	16			
						WVNS221	X	12			
						Total 2nd semester		**60**	**Total 2nd semester**		**64**
Total year level 1		**72**	**Total year level 1**		**48**	**Total year level 2**		**120**	**Total year level 3**		**128**
Total credits for the curriculum											**368**

NAS.1.25.7.1 OLD PROGRAMME PHASING OUT (MC):
Extended Curriculum: Bachelor of Science with Biology and Chemistry

CODE: 200159 - N303M (Pipeline only)

CAMPUS: Mafikeng (ENGLISH)

DELIVERY MODE: Full Time

Compilation of programme

Year Level 1			Year level 2			Year level 3			Year level 4		
First semester			First semester			First semester			First semester		
Module code	Core	Cr	Module code	Core	Cr	Module code	Core	Cr	Module code	Core	Cr
SFBM171	H	06	SFBM172	H	06	WVNS211	X	12	BGYM313	H	16
SFCM171	H	06	SFCM172	H	06	BGYM213	H	08	BGYM314	H	16
SFMM171	X	06	SFMM172	X	06	BGYM214	H	08	MCHE315	H	16
SFPM171	X	06	SFPM172	X	06	MCHE215	H	08	MCHE316	H	16
AGLE111	X	12				MCHE216	H	08			
						PHYM215	X	08			
						PHYM216	X	08			
Total 1st semester		**36**	**Total 1st semester**		**24**	**Total 1st semester**		**60**	**Total 1st semester**		**64**
Year Level 1			**Year level 2**			**Year level 3**			**Year level 4**		
Second semester			**Second semester**			**Second semester**			**Second semester**		
Module code	**Core**	**Cr**	**Module code**	**Core**	**Cr**	**Module code**	**Core**	**Cr**	**Module code**	**Core**	**Cr**
SFBM171	H	06	SFBM172	H	06	WVNS221	X	12	BCHS326	H	32
SFCM171	H	06	SFCM172	H	06	PHYM221	X	08	MCHE321	H	16
SFMM171	H	06	SFMM172	H	06	PHYM222	X	08	MCHE326	H	16
SFPM171	X	06	SFPM172	X	06	MCHE221	H	08			
			AGLE121	X	12	MCHE223	H	08			
						BGYM225	H	08			
						BGYM227	H	08			
Total 2nd semester		**24**	**Total 2nd semester**		**36**	**Total 2nd semester**		**60**	**Total 2nd semester**		**64**
Total year level 1		**60**	**Total year level 1**		**60**	**Total year level 2**		**120**	**Total year level 3**		**128**
Total credits for the curriculum											**368**

NAS.1.25.8 EXTENDED PROGRAMME: BACHELOR OF SCIENCE IN ENVIRONMENTAL SCIENCES WITH GEOGRAPHY AND BOTANY

CODE: 2XJ H06 - N301M

CAMPUS: Mafikeng (ENGLISH)

DELIVERY MODE: Full Time

Compilation of programme:

Year Level 1			Year level 2			Year level 3			Year level 4		
Year modules			Year modules			First semester			First semester		
Module code	Core	Cr	Module code	Core	Cr	Module code	Core	Cr	Module code	Core	Cr
MCBN171	X	12	MCBN172	X	12	MKBN211	X	16	GEOG311	H	32
GEOG171	H	12	GEOG172	H	12	PLKS211	H	16	PLKS314	H	32
PLKS171	H	12	PLKS172	H	12	GEOG211	H	16			
NCHE171	X	12	NCHE172	X	12	WVNS211	X	12			
ALDE111	X	12									
						Total 1st semester		60	Total 1st semester		64
Year Level 1			Year level 2			Year level 3			Year level 4		
Second semester			Second semester			Second semester			Second semester		
Module code	Core	Cr	Module code	Core	Cr	Module code	Core	Cr	Module code	Core	Cr
ALDE122	X	12				PLKS223	H	16	GEOG321	H	32
						GEOG221	H	16	PLKS324	H	32
						MKBS221	X	16			
						WVNS221	X	12			
						Total 2nd semester		60	Total 2nd semester		64
Total year level 1		72	Total year level 1		48	Total year level 2		120	Total year level 3		128
Total credits for the curriculum											368

NAS.1.25.8.1 **OLD PROGRAMME PHASING OUT (MC):**
Extended Curriculum: Bachelor of Science with Biology and Geography

CODE: 200205 - N301M (Pipeline only)

CAMPUS: Mafikeng (ENGLISH)

DELIVERY MODE: Full Time

Compilation of programme:

Year Level 1			Year level 2			Year level 3			Year level 4		
First semester			First semester			First semester			First semester		
Module code	Core	Cr	Module code	Core	Cr	Module code	Core	Cr	Module code	Core	Cr
SFBM171	H	06	SFBM172	H	06	WVNS211	X	12	BGYM315	H	16
SFGM171	H	06	SFGM172	H	06	BGYM215	H	08	BGYM316	H	16
SFMM171	X	06	SFMM172	X	06	BGYM216	H	08	GEOM316	H	16
SFIM171	X	06	SFIM172	X	06	GEOM214	H	08	GEOM317	H	16
AGLE111	X	12				GEOM215	H	08			
						CISM213	X	08			
						CISM214	X	08			
Total 1st semester		**36**	**Total 1st semester**		**24**	**Total 1st semester**		**60**	**Total 1st semester**		**64**
Year Level 1			**Year level 2**			**Year level 3**			**Year level 4**		
Second semester			**Second semester**			**Second semester**			**Second semester**		
Module code	**Core**	**Cr**	**Module code**	**Core**	**Cr**	**Module code**	**Core**	**Cr**	**Module code**	**Core**	**Cr**
SFBM171	H	06	SFBM172	H	06	WVNS222	X	12	BCHS326	H	32
SFGM171	H	06	SFGM172	H	06	BGYM226	H	08	GEOM328	H	16
SFMM171	X	06	SFMM172	X	06	GEOM224	H	08	GEOM329	H	16
SFIM171	X	06	SFPIM172	X	06	GEOM225	H	08			
			AGLE121	X	12	CISM225	X	08			
						CISM226	X	08			
Total 2nd semester		**24**	**Total 2nd semester**		**36**	**Total 2nd semester**		**60**	**Total 2nd semester**		**64**
Total year level 1		**60**	**Total year level 1**		**60**	**Total year level 2**		**120**	**Total year level 3**		**128**
Total credits for the curriculum											**368**

NAS.1.25.9 EXTENDED PROGRAMME: BACHELOR OF SCIENCE WITH CHEMISTRY AND COMPUTER SCIENCE

CODE: 2XF H31 - N301M

CAMPUS: Mafikeng (ENGLISH)

DELIVERY MODE: Full Time

Compilation of programme:

Year Level 1			Year level 2			Year level 3			Year level 4		
Year modules			Year modules			First semester			First semester		
Module code	Core	Cr	Module code	Core	Cr	Module code	Core	Cr	Module code	Core	Cr
CMPG171	H	12	CMPG172	H	12	NCHE211	H	8	CMPG311	H	16
MTHS171	X	12	MTHS172	X	12	NCHE212	H	8	CMPG313	H	16
NPHY171	X	12	NPHY172	X	12	MTHS211	X	8	NCHE311	H	16
NCHE171	H	12	NCHE172	H	12	MTHS212	X	8	NCHE312	H	16
ALDE111	X	12				CMPG211	H	16			
						WVNS211	X	12			
						Total 1st semester		**60**	**Total 1st semester**		**64**
Year Level 1			**Year level 2**			**Year level 3**			**Year level 4**		
Second semester			**Second semester**			**Second semester**			**Second semester**		
Module code	**Core**	**Cr**	**Module code**	**Core**	**Cr**	**Module code**	**Core**	**Cr**	**Module code**	**Core**	**Cr**
ALDE122	X	12				NCHE221	H	8	CMPG324	H	16
						NCHE222	H	8	CMPG325	H	16
						MTHS221	X	8	NCHE321	H	16
						MTHS222	X	8	NCHE322	H	16
						CMPG221	H	8			
						CMPG224	H	8			
						WVNS221	X	12			
						Total 2nd semester		**60**	**Total 2nd semester**		**64**
Total year level 1		**72**	**Total year level 1**		**48**	**Total year level 2**		**120**	**Total year level 3**		**128**
Total credits for the curriculum											**368**

NAS.1.25.9.1 OLD PROGRAMME PHASING OUT (MC):
Extended Curriculum: Bachelor of Science with Chemistry and Computer Science

CODE: 200 197 - N302M (Pipeline only)

CAMPUS: Mafikeng (ENGLISH)

DELIVERY MODE: Full Time

Compilation of programme:

Year Level 1			Year level 2			Year level 3			Year level 4		
First semester			First semester			First semester			First semester		
Module code	Core	Cr	Module code	Core	Cr	Module code	Core	Cr	Module code	Core	Cr
SFCM171	H	06	SFCM172	H	06	WVNS211	X	12	MCHE315	H	16
SFIM171	H	06	SFIM172	H	06	MCHE215	H	08	MCHE316	H	16
SFMM171	X	06	SFMM172	X	06	MCHE216	H	08	CISM313	H	16
SFPM171	X	06	SFPM172	X	06	CISM213	H	08	CISM314	H	16
AGLE111	X	12				CISM214	H	08			
						MAYM217	X	16			
Total 1st semester		**36**	**Total 1st semester**		**24**	**Total 1st semester**		**60**	**Total 1st semester**		**64**
Year Level 1			**Year level 2**			**Year level 3**			**Year level 4**		
Second semester			**Second semester**			**Second semester**			**Second semester**		
Module code	**Core**	**Cr**	**Module code**	**Core**	**Cr**	**Module code**	**Core**	**Cr**	**Module code**	**Core**	**Cr**
SFCM171	H	06	SFCM172	H	06	WVNS221	X	12	MCHE321	H	16
SFIM171	H	06	SFIM172	H	06	MCHE221	H	08	MCHE322	H	16
SFMM171	X	06	SFMM172	X	06	MCHE223	H	08	CISM326	H	16
SFPM171	X	06	SFPM172	X	06	CISM225	H	08	CISM327	H	16
			AGLE121	X	12	CISM226	H	08			
						MAYM227	X	16			
Total 2nd semester		**24**	**Total 2nd semester**		**36**	**Total 2nd semester**		**60**	**Total 2nd semester**		**64**
Total year level 1		**60**	**Total year level 1**		**60**	**Total year level 2**		**120**	**Total year level 3**		**128**
Total credits for the curriculum											**368**

NAS.1.25.10 EXTENDED PROGRAMME: BACHELOR OF SCIENCE IN ENVIRONMENTAL SCIENCES WITH CHEMISTRY AND GEOGRAPHY

CODE: 2XJ H18 - N301M

CAMPUS: Mafikeng (ENGLISH)

DELIVERY MODE: Full Time

Compilation of programme:

Year Level 1			Year level 2			Year level 3			Year level 4		
Year modules			Year modules			First semester			First semester		
Module code	**Core**	**Cr**	**Module code**	**Core**	**Cr**	**Module code**	**Core**	**Cr**	**Module code**	**Core**	**Cr**
GEOG171	H	12	GEOG172	H	12	MTHS211	X	08	NCHE311	H	16
MTHS173	X	12	MTHS174	X	12	**and** MTHS212	X	08	NCHE312	H	16
NPHY171	X	12	NPHY172	X	12	**OR**	X	08	GEOG311	H	32
NCHE171	H	12	NCHE172	H	12	NPHY211 **and** NPHY212	X	08			
ALDE111	X	12				GEOG211	H	16			
						NCHE211	H	08			
						NCHE212	H	08			
						WVNS211	X	12			
						Total 1st semester		**60**	**Total 1st semester**		**64**
Year Level 1			**Year level 2**			**Year level 3**			**Year level 4**		
Second semester			**Second semester**			**Second semester**			**Second semester**		
Module code	**Core**	**Cr**	**Module code**	**Core**	**Cr**	**Module code**	**Core**	**Cr**	**Module code**	**Core**	**Cr**
ALDE122	X	12				GEOG221	H	16	NCHE321	H	16
						NPHY221	X	08	NCHE322	H	16
						and NPHY222	X	08	GEOG321	H	32
						OR MTHS221	X	08			
						and MTHS222	X	08			
						NCHE221	H	08			
						NCHE222	H	08			
						WVNS221	X	12			
						Total 2nd semester		**60**	**Total 2nd semester**		**64**
Total year level 1		**72**	**Total year level 1**		**48**	**Total year level 2**		**120**	**Total year level 3**		**128**
Total credits for the curriculum											**368**

NAS.1.25.10.1 **OLD PROGRAMME(PHASING OUT MC:**
Extended Curriculum: Bachelor of Science with Chemistry and Geography

CODE: 200203 - N301M (Pipeline only)

CAMPUS: Mafikeng (ENGLISH)

DELIVERY MODE: Full Time

Compilation of programme:

Year Level 1			Year level 2			Year level 3			Year level 4		
First semester			First semester			First semester			First semester		
Module code	Core	Cr	Module code	Core	Cr	Module code	Core	Cr	Module code	Core	Cr
SFGM171	H	06	SFGM172	H	06	WVNS211	X	12	MCHE315	H	16
SFCM171	H	06	SFCM172	H	06	GEOM214	H	08	MCHE316	H	16
SFMM171	X	06	SFMM172	X	06	GEOM215	H	08	GEOM316	H	16
SFPM171	X	06	SFPM172	X	06	MCHE215	H	08	GEOM317	H	16
AGLE111	X	12				MCHE216	H	08			
						Electives: MAYM217 **or** PHYM215 PHYM216	X	16 **or** 08 08			
Total 1st semester		**36**	**Total 1st semester**		**24**	**Total 1st semester**		**60**	**Total 1st semester**		**64**
Year Level 1			**Year level 2**			**Year level 3**			**Year level 4**		
Second semester			**Second semester**			**Second semester**			**Second semester**		
Module code	**Core**	**Cr**	**Module code**	**Core**	**Cr**	**Module code**	**Core**	**Cr**	**Module code**	**Core**	**Cr**
SFGM171	H	06	SFGM172	H	06	WVNS222	X	12	MCHE321	H	16
SCIM171	H	06	SFCM172	H	06	GEOM224	H	08	MCHE322	H	16
SFMM171	X	06	SFMM172	X	06	GEOM225	H	08	GEOM328	H	16
SFPM171	X	06	SFPM172	X	06	MCHE221	H	08	GEOM329	H	16
			AGLE121	X	12	MCHE223	H	08			
						Electives: MAYM227 **or** PHYM221 PHYM22	X	16 **or** 08 08			
Total 2nd semester		**24**	**Total 2nd semester**		**36**	**Total 2nd semester**		**60**	**Total 2nd semester**		**64**
Total year level 1		**60**	**Total year level 1**		**60**	**Total year level 2**		**120**	**Total year level 3**		**128**
Total credits for the curriculum											**368**

NAS.1.25.11 EXTENDED PROGRAMME: BACHELOR OF SCIENCE WITH CHEMISTRY AND MATHEMATICS

CODE: 2XF H11 - N301M

CAMPUS: Mafikeng (ENGLISH)

DELIVERY MODE: Full Time

Compilation of programme:

Year Level 1			Year level 2			Year level 3			Year level 4		
Year modules			Year modules			First semester			First semester		
Module code	Core	Cr	Module code	Core	Cr	Module code	Core	Cr	Module code	Core	Cr
CMPG171	X	12	CMPG172	X	12	NCHE211	H	08	NCHE311	H	16
MTHS171	H	12	MTHS172	H	12	NCHE212	H	08	NCHE312	H	16
NPHY171	X	12	NPHY172	X	12	MTHS211	H	08	MTHS311	H	16
NCHE171	H	12	NCHE172	H	12	MTHS212	H	08	MTHS312	H	16
ALDE111	X	12				NPHY211	X	08			
						NPHY212	X	08			
						WVNS211	X	12			
						Total 1st semester		**60**	**Total 1st semester**		**64**
Year Level 1			**Year level 2**			**Year level 3**			**Year level 4**		
			Second semester			**Second semester**			**Second semester**		
Module code	**Core**	**Cr**	**Module code**	**Core**	**Cr**	**Module code**	**Core**	**Cr**	**Module code**	**Core**	**Cr**
ALDE122	X	12				NCHE221	H	08	NCHE321	H	16
						NCHE222	H	08	NCHE322	H	16
						MTHS221	H	08	MTHS321	H	16
						MTHS222	H	08	MTHS322	H	16
						NPHY221	X	08			
						NPHY222	X	08			
						WVNS221	X	12			
						Total 2nd semester		**60**	**Total 2nd semester**		**64**
Total year level 1		**72**	**Total year level 1**		**48**	**Total year level 2**		**120**	**Total year level 3**		**128**
Total credits for the curriculum											**368**

NAS.1.25.11.1 **OLD PROGRAMME PHASING OUT (MC):**

Extended Curriculum: Bachelor of Science with Chemistry and Mathematics

CODE: 200195 - N302M (Pipeline only)

CAMPUS: Mafikeng (ENGLISH)

DELIVERY MODE: Full Time

Compilation of programme:

Year Level 1			Year level 2			Year level 3			Year level 4		
First semester			First semester			First semester			First semester		
Module code	Core	Cr	Module code	Core	Cr	Module code	Core	Cr	Module code	Core	Cr
SFCM171	H	06	SFCM172	H	06	WVNS211	X	12	MCHE315	H	16
SFIM171	X	06	SFIM172	X	06	MCHE215	H	08	MCHE316	H	16
SFMM171	H	06	SFMM172	H	06	MCHE216	H	08	MAYM317	H	16
SFPM171	X	06	SFPM172	X	06	PHYM215	H	08	MAYM318	H	16
AGLE111	X	12				PHYM216	H	08			
						MAYM217	X	16			
Total 1st semester		**36**	**Total 1st semester**		**24**	**Total 1st semester**		**60**	**Total 1st semester**		**64**
Year Level 1			**Year level 2**			**Year level 3**			**Year level 4**		
Second semester			**Second semester**			**Second semester**			**Second semester**		
Module code	**Core**	**Cr**	**Module code**	**Core**	**Cr**	**Module code**	**Core**	**Cr**	**Module code**	**Core**	**Cr**
SFCM171	H	06	SFCM172	H	06	WVNS221	X	12	MCHE321	H	16
SFIM171	X	06	SFIM172	X	06	MCHE221	H	08	MCHE322	H	16
SFMM171	H	06	SFMM172	H	06	MCHE223	H	08	MAYM327	H	16
SFPM171	X	06	SFPM172	X	06	PHYM221	H	08	MAMY328	H	16
			AGLE121	X	12	PHYM222	H	08			
						MAYM227	X	16			
Total 2nd semester		**24**	**Total 2nd semester**		**36**	**Total 2nd semester**		**60**	**Total 2nd semester**		**64**
Total year level 1		**60**	**Total year level 1**		**60**	**Total year level 2**		**120**	**Total year level 3**		**128**
Total credits for the curriculum											**368**

NAS.1.25.12 EXTENDED PROGRAMME: BACHELOR OF SCIENCE WITH CHEMISTRY AND PHYSICS

CODE*:* 2XF H05 - N301M

CAMPUS: Mafikeng (ENGLISH)

DELIVERY MODE: Full Time

Compilation of programme:

Year Level 1			**Year level 2**			**Year level 3**			**Year level 4**		
Year modules			**Year modules**			**First semester**			**First semester**		
Module code	**Core**	**Cr**	**Module code**	**Core**	**Cr**	**Module code**	**Core**	**Cr**	**Module code**	**Core**	**Cr**
CMPG171	H	12	CMPG172	H	12	MTHS211	H	08	NCHE311	H	16
MTHS171	X	12	MTHS172	X	12	MTHS212	H	08	NCHE312	H	16
NPHY171	H	12	NPHY172	H	12	NCHE211	H	08	NPHY311	H	16
NCHE171	X	12	NCHE172	X	12	NCHE212	H	08	NPHY312	H	16
ALDE111	X	12				NPHY211	X	08			
						NPHY212	X	08			
						WVNS211	X	12			
						Total 1st semester		**60**	**Total 1st semester**		**64**
Year Level 1			**Year level 2**			**Year level 3**			**Year level 4**		
Second semester			**Second semester**			**Second semester**			**Second semester**		
Module code	**Core**	**Cr**	**Module code**	**Core**	**Cr**	**Module code**	**Core**	**Cr**	**Module code**	**Core**	**Cr**
ALDE122	X	12				MTHS221	H	16	NCHE321	H	16
						MTHS222	H	08	NCHE322	H	16
						NCHE221	H	08	NPHY321	H	16
						NCHE222	X	08	NPHY322	H	16
						NPHY221	X	08			
						NPHY222	X	12			
						WVNS211	X	12			
						Total 2nd semester		**60**	**Total 2nd semester**		**64**
Total year level 1		**72**	**Total year level 1**		**48**	**Total year level 2**		**120**	**Total year level 3**		**128**
Total credits for the curriculum											**368**

NAS.1.25.12.1 **OLD PROGRAMME PHASING OUT (MC):**
Extended Curriculum: Bachelor of Science with Chemistry and Physics

CODE: 200160 - N303M (Pipeline only)

CAMPUS: Mafikeng (ENGLISH)

DELIVERY MODE: Full Time

Compilation of programme:

Year Level 1			Year level 2			Year level 3			Year level 4		
First semester			First semester			First semester			First semester		
Module code	Core	Cr	Module code	Core	Cr	Module code	Core	Cr	Module code	Core	Cr
SFCM171	H	06	SFCM172	H	06	WVNS211	X	12	MCHE315	H	16
SFIM171	X	06	SFIM172	X	06	MCHE215	H	08	MCHE316	H	16
SFMM171	X	06	SFMM172	X	06	MCHE216	H	08	PHYM315	H	16
SFPM171	H	06	SFPM172	H	06	PHYM215	H	08	PHYM316	H	16
AGLE111	X	12				PHYM216	H	08	PHYM317	H	16
						MAYM217	X	16	PHYM318	H	16
Total 1st semester		**36**	**Total 1st semester**		**24**	**Total 1st semester**		**60**	**Total 1st semester**		**64**
Year Level 1			**Year level 2**			**Year level 3**			**Year level 4**		
Second semester			**Second semester**			**Second semester**			**Second semester**		
Module code	**Core**	**Cr**	**Module code**	**Core**	**Cr**	**Module code**	**Core**	**Cr**	**Module code**	**Core**	**Cr**
SFCM171	H	06	SFCM172	H	06	WVNS221	X	12	MCHE321	H	16
SFIM171	X	06	SFIM172	X	06	MCHE221	H	08	MCHE322	H	16
SFMM171	X	06	SFMM172	X	06	MCHE223	H	08	PHYM321	H	16
SFPM171	H	06	SFPM172	H	06	PHYM221	H	08	PHYM322	H	16
			AGLE121	X	12	PHYM222	H	08	PHYM323	H	16
						MAYM227	X	16	PHYM324	H	16
Total 2nd semester		**24**	**Total 2nd semester**		**36**	**Total 2nd semester**		**60**	**Total 2nd semester**		**64**
Total year level 1		**60**	**Total year level 1**		**60**	**Total year level 2**		**120**	**Total year level 3**		**128**
Total credits for the curriculum											**368**

NAS.1.25.13 EXTENDED PROGRAMME: BACHELOR OF SCIENCE WITH COMPUTER SCIENCE AND ELECTRONICS

CODE: 2XF H17 - N301M

CAMPUS: Mafikeng (ENGLISH)

DELIVERY MODE: Full Time

Compilation of programme:

Year Level 1			Year level 2			Year level 3			Year level 4		
Year modules			Year modules			First semester			First semester		
Module code	Core	Cr	Module code	Core	Cr	Module code	Core	Cr	Module code	Core	Cr
SFEM171	H	12	SFEM172	H	12	CMPG211	H	16	CMPG311	H	16
CMPG171	H	12	CMPG172	H	12	ELYM215	H	16	CMPG313	H	16
MTHS171	X	12	MTHS172	X	12	MTHS211	X	08	ELYM315	H	16
NPHY171	X	12	NPHY172	X	12	MTHS212	X	08	ELYM316	H	16
ALDE111	X	12				WVNS211	X	12			
						Total 1st semester		**60**	**Total 1st semester**		**64**
Year Level 1			**Year level 2**			**Year level 3**			**Year level 4**		
Second semester			**Second semester**			**Second semester**			**Second semester**		
Module code	**Core**	**Cr**	**Module code**	**Core**	**Cr**	**Module code**	**Core**	**Cr**	**Module code**	**Core**	**Cr**
ALDE122	X	12				CMPG221	H	8	CMPG324	H	16
						CMPG224	H	8	CMPG325	H	16
						ELYM227	H	16	ELYM325	H	16
						MTHS221	X	8	ELYM327	H	16
						WVNS221	X	12			
						MTHS222	X	8			
						Total 2nd semester		**60**	**Total 2nd semester**		**64**
Total year level 1		**72**	**Total year level 1**		**48**	**Total year level 2**		**120**	**Total year level 3**		**128**
Total credits for the curriculum											**368**

NAS.1.25.14 **OLD PROGRAMME PHASING OUT (MC):**
EXTENDED CURRICULUM: BACHELOR OF SCIENCE WITH COMPUTER SCIENCE AND ELECTRONICS

CODE: 200161 - N303M (Pipeline only)

CAMPUS: Mafikeng (ENGLISH)

DELIVERY MODE: Full Time

Compilation of programme:

Year Level 1			Year level 2			Year level 3			Year level 4		
First semester			First semester			First semester			First semester		
Module code	Core	Cr	Module code	Core	Cr	Module code	Core	Cr	Module code	Core	Cr
SFEM171	H	06	SFEM172	H	06	WVNS211	X	12	CISM313	H	16
SFIM171	X	06	SFIM172	X	06	CISM213	H	08	CISM314	H	16
SFMM171	X	06	SFMM172	X	06	CISM214	H	08	ELYM315	H	16
SFPM171	H	06	SFPM172	H	06	ELYM215	H	16	ELYM316	H	16
AGLE111	X	12				MAYM217	X	16			
Total 1st semester		**36**	**Total 1st semester**		**24**	**Total 1st semester**		**60**	**Total 1st semester**		**64**
Year Level 1			**Year level 2**			**Year level 3**			**Year level 4**		
Second semester			**Second semester**			**Second semester**			**Second semester**		
Module code	**Core**	**Cr**	**Module code**	**Core**	**Cr**	**Module code**	**Core**	**Cr**	**Module code**	**Core**	**Cr**
SFEM171	H	06	SFEM172	H	06	WVNS221	X	12	CISM326	H	16
SFIM171	X	06	SFIM172	X	06	CISM225	H	08	CISM327	H	16
SFMM171	X	06	SFMM172	X	06	CISM226	H	08	ELYM327	H	16
SFPM171	H	06	SFPM172	H	06	ELYM227	H	16	ELYM328	H	16
			AGLE121	X	12	MAYM227	X	16			
Total 1st semester		24	**Total 1st semester**		36	**Total 1st semester**		**60**	**Total 1st semester**		**64**
Total year level 1		**60**	**Total year level 1**		**60**	**Total year level 2**		**120**	**Total year level 3**		**128**
Total credits for the curriculum											**368**

NAS.1.25.15 EXTENDED PROGRAMME: BACHELOR OF SCIENCE IN ENVIRONMENTAL SCIENCES WITH GEOGRAPHY AND COMPUTER SCIENCE

CODE: 2XJ H14 - N301M

CAMPUS: Mafikeng (ENGLISH)

DELIVERY MODE: Full Time

Compilation of programme:

Year Level 1			Year level 2			Year level 3			Year level 4		
Year modules			Year modules			First semester			First semester		
Module code	Core	Cr	Module code	Core	Cr	Module code	Core	Cr	Module code	Core	Cr
GEOG171	H	12	GEOG172	H	12	CMPG211	H	16	CMPG311	H	16
CMPG171	H	12	CMPG172	H	12	GEOG211	H	16	CMPG313	H	16
MTHS173	X	12	MTHS174	X	12	PLKS211	X	16	GEOG311	H	32
PLKS171	X	12	PLKS172	X	12	WVNS211	X	12			
ALDE111	X	12									
						Total 1st semester		**60**	**Total 1st semester**		**64**
Year Level 1			**Year level 2**			**Year level 3**			**Year level 4**		
Second semester			**Second semester**			**Second semester**			**Second semester**		
Module code	**Core**	**Cr**	**Module code**	**Core**	**Cr**	**Module code**	**Core**	**Cr**	**Module code**	**Core**	**Cr**
ALDE122	X	12				CMPG221	H	08	CMPG321	H	16
						CMPG224	H	08	CMPG325	H	16
						GEOG221	H	16	GEOG321	H	32
						PLKS223	X	16			
						WVNS221	X	12			
						Total 2nd semester		**60**	**Total 2nd semester**		**64**
Total year level 1		**72**	**Total year level 1**		**48**	**Total year level 2**		**120**	**Total year level 3**		**128**
Total credits for the curriculum											**368**

NAS.1.25.15.1 **OLD PROGRAMME PHASING OUT (MC):**
Extended Curriculum: Bachelor of Science with Computer Science and Geography

CODE: 200206 - N301M (Pipeline only)

CAMPUS: Mafikeng (ENGLISH)

DELIVERY MODE: Full Time

Compilation of programme:

Year Level 1			Year level 2			Year level 3			Year level 4		
First semester			First semester			First semester			First semester		
Module code	Core	Cr	Module code	Core	Cr	Module code	Core	Cr	Module code	Core	Cr
SFGM171	H	06	SFGM172	H	06	WVNS211	X	12	CISM313	H	16
SFIM171	H	06	SFIM172	X	06	CISM213	H	08	CISM314	H	16
SFMM171	X	06	SFMM172	X	06	CISM214	H	08	GEOM316	H	16
SFTM111	X	12				GEOM214	H	08	GEOM317	H	16
AGLE111	X	12				GEOM215	H	08			
						MAYM217	X	16			
Total 1st semester		**42**	**Total 1st semester**		**18**	**Total 1st semester**		**60**	**Total 1st semester**		**64**
Year Level 1			**Year level 2**			**Year level 3**			**Year level 4**		
Second semester			**Second semester**			**Second semester**			**Second semester**		
Module code	**Core**	**Cr**	**Module code**	**Core**	**Cr**	**Module code**	**Core**	**Cr**	**Module code**	**Core**	**Cr**
SFGM171	H	06	SFGM172	H	06	WVNS221	X	12	CISM326	H	16
SFIM171	H	06	SFIM172	H	06	CISM225	H	08	CISM327	H	16
SFMM171	X	06	SFMM172	X	06	CISM226	H	08	GEOM328	H	16
SFTM121	X	12	AGLE121	X	12	GEOM224	H	08	GEOM328	H	16
						GEOM225	H	08			
						MAYM227	X	16			
Total 2nd semester		**36**	**Total 2nd semester**		**24**	**Total 2nd semester**		**60**	**Total 2nd semester**		**64**
Total year level 1		**72**	**Total year level 1**		**48**	**Total year level 2**		**120**	**Total year level 3**		**128**
Total credits for the curriculum											**368**

NAS.1.25.16 EXTENDED PROGRAMME: BACHELOR OF SCIENCE WITH COMPUTER SCIENCE AND MATHEMATICS

CODE: 2XF H09 - N301M

CAMPUS: Mafikeng (ENGLISH)

DELIVERY MODE: Full Time

Compilation of programme:

Year Level 1			Year level 2			Year level 3			Year level 4		
Year modules			Year modules			First semester			First semester		
Module code	Core	Cr	Module code	Core	Cr	Module code	Core	Cr	Module code	Core	Cr
APPM171	X	12	APPM172	X	12	APPM212	X	08	MTHS311	H	16
CMPG171	H	12	CMPG172	H	12	APPM213	X	08	MTHS312	H	16
MTHS171	H	12	MTHS172	H	12	CMPG211	H	16	CMPG311	H	08
NPHY171	X	12	NPHY172	X	12	MTHS211	H	08	CMPG313	H	08
ALDE111	X	12				MTHS212	H	08			
						WVNS211	X	12			
						Total 1st semester		**60**	**Total 1st semester**		**64**
Year Level 1			**Year level 2**			**Year level 3**			**Year level 4**		
Second semester			**Second semester**			**Second semester**			**Second semester**		
Module code	**Core**	**Cr**	**Module code**	**Core**	**Cr**	**Module code**	**Core**	**Cr**	**Module code**	**Core**	**Cr**
ALDE122	X	12				CMPG221	H	08	MTHS321	H	16
						CMPG224	H	08	MTHS322	H	16
						APPM222	X	08	CMPG321	H	08
						APPM223	X	08	CMPG325	H	08
						MTHS221	H	08			
						MTHS222	H	08			
						WVNS221	X	12			
						Total 2nd semester		**60**	**Total 2nd semester**		**64**
Total year level 1		**72**	**Total year level 1**		**48**	**Total year level 2**		**120**	**Total year level 3**		**128**
Total credits for the curriculum											**368**

NAS.1.25.16.1 **OLD PROGRAMME PHASING OUT (MC):**
Extended Curriculum: Bachelor of Science with Computer Science and Mathematics

CODE: 200162 - N303M (Pipeline only)

CAMPUS: Mafikeng (ENGLISH)

DELIVERY MODE: Full Time

Compilation of programme:

Year Level 1			Year level 2			Year level 3			Year level 4		
First semester			First semester			First semester			First semester		
Module code	Core	Cr	Module code	Core	Cr	Module code	Core	Cr	Module code	Core	Cr
SFAM171	X	06	SFAM172	X	06	WVNS211	X	12	CISM313	H	16
SFIM171	H	06	SFIM172	H	06	CISM213	H	08	CISM314	H	16
SFMM171	H	06	SFMM172	H	06	CISM214	H	08	MAYM317	H	16
SFPM171	X	06	SFPM172	X	06	APMM217	X	16	MAYM318	H	16
AGLE111	X	12				MAYM217	X	16			
Total 1st semester		**36**	**Total 1st semester**		**24**	**Total 1st semester**		**60**	**Total 1st semester**		**64**
Year Level 1			**Year level 2**			**Year level 3**			**Year level 4**		
Second semester			**Second semester**			**Second semester**			**Second semester**		
Module code	**Core**	**Cr**	**Module code**	**Core**	**Cr**	**Module code**	**Core**	**Cr**	**Module code**	**Core**	**Cr**
SFAM171	X	06	SFAM172	X	06	WVNS221	X	12	CISM326	H	16
SFIM171	H	06	SFIM172	H	06	CISM225	H	08	CISM327	H	16
SFMM171	H	06	SFMM172	H	06	CISM226	H	08	MAYM327	H	16
SFPM171	X	06	SFPM172	X	06	APMM227	X	16	MAYM328	H	16
			AGLE121	X	12	MAYM227	X	16			
Total 1st semester		24	**Total 1st semester**		36	**Total 1st semester**		**60**	**Total 1st semester**		**64**
Total year level 1		**60**	**Total year level 1**		**60**	**Total year level 2**		**120**	**Total year level 3**		**128**
Total credits for the curriculum											**368**

NAS.1.25.17 EXTENDED PROGRAMME: BACHELOR OF SCIENCE WITH PHYSICS AND COMPUTER SCIENCE

CODE*:* 2XF H25 - N301M

CAMPUS: Mafikeng (ENGLISH)

DELIVERY MODE: Full Time

Compilation of programme:

Year Level 1			**Year level 2**			**Year level 3**			**Year level 4**		
Year modules			**Year modules**			**First semester**			**First semester**		
Module code	**Core**	**Cr**	**Module code**	**Core**	**Cr**	**Module code**	**Core**	**Cr**	**Module code**	**Core**	**Cr**
NCHE171	X	12	NCHE172	X	12	CMPG211	H	16	CMPG311	H	16
CMPG171	H	12	CMPG172	H	12	MTHS211	X	08	CMPG313/5	H	16
MTHS171	X	12	MTHS172	X	12	MTHS212	X	08	NPHY311	H	16
NPHY171	H	12	NPHY172	H	12	NPHY211	H	08	NPHY312	H	16
ALDE111	X	12				NPHY212	H	08			
						WVNS211	X	12			
						Total 1st semester		**60**	**Total 1st semester**		**64**
Year Level 1			**Year level 2**			**Year level 3**			**Year level 4**		
Second semester			**Second semester**			**Second semester**			**Second semester**		
Module code	**Core**	**Cr**	**Module code**	**Core**	**Cr**	**Module code**	**Core**	**Cr**	**Module code**	**Core**	**Cr**
ALDE122	X	12				CMPG221	H	08	CMPG321	H	16
						CMPG222/4	H	08	CMPG325	H	16
						MTHS222	X	08	NPHY321	H	16
						MTHS224	X	08	NPHY322	H	16
						NPHY221	H	08			
						NPHY222	H	08			
						WVNS221	X	12			
						Total 2nd semester		**60**	**Total 2nd semester**		**64**
Total year level 1		**72**	**Total year level 1**		**48**	**Total year level 2**		**120**	**Total year level 3**		**128**
Total credits for the curriculum											**368**

NAS.1.25.17.1 **OLD PROGRAMME PHASING OUT (MC):**
Extended Curriculum: Bachelor of Science with Computer Science and Physics

CODE: 200200 - N302M (Pipeline only)

CAMPUS: Mafikeng (ENGLISH)

DELIVERY MODE: Full Time

Compilation of programme:

Year Level 1			Year level 2			Year level 3			Year level 4		
First semester			First semester			First semester			First semester		
Module code	Core	Cr	Module code	Core	Cr	Module code	Core	Cr	Module code	Core	Cr
SFCM171	X	06	SFCM172	X	06	WVNS211	X	12	CISM313	H	16
SFIM171	H	06	SFIM172	H	06	CISM213	H	08	CISM314	H	16
SFMM171	X	06	SFMM172	X	06	CISM214	H	08	PHYM315	H	08
SFPM171	H	06	SFPM172	H	06	PHYM215	H	08	PHYM316	H	08
AGLE111	X	12				PHYM216	H	08	PHYM317	H	08
						MAYM217	X	16	PHYM318	H	08
Total 1st semester		**36**	**Total 1st semester**		**24**	**Total 1st semester**		**60**	**Total 1st semester**		**64**
Year Level 1			**Year level 2**			**Year level 3**			**Year level 4**		
Second semester			**Second semester**			**Second semester**			**Second semester**		
Module code	**Core**	**Cr**	**Module code**	**Core**	**Cr**	**Module code**	**Core**	**Cr**	**Module code**	**Core**	**Cr**
SFCM171	X	06	SFCM172	X	06	WVNS221	X	12	CISM326	H	16
SFIM171	H	06	SFIM172	H	06	CISM225	H	08	CISM327	H	16
SFMM171	X	06	SFMM172	X	06	CISM226	H	08	PHYM321	H	08
SFPM171	H	06	SFPM172	H	06	PHYM221	H	08	PHYM322	H	08
			AGLE121	X	12	PHYM222	H	08	PHYM323	H	08
						MAYM227	X	16	PHYM324	H	08
Total 2nd semester		24	**Total 2nd semester**		36	**Total 2nd semester**		**60**	**Total 2nd semester**		**64**
Total year level 1		**60**	**Total year level 1**		**60**	**Total year level 2**		**120**	**Total year level 3**		**128**
Total credits for the curriculum											**368**

NAS.1.25.18 EXTENDED PROGRAMME: BACHELOR OF SCIENCE WITH ELECTRONICS AND MATHEMATICS

CODE: 2XF H19 - N301M

CAMPUS: Mafikeng (ENGLISH)

DELIVERY MODE: Full Time

Compilation of programme:

Year Level 1			Year level 2			Year level 3			Year level 4		
Year modules			Year modules			First semester			First semester		
Module code	Core	Cr	Module code	Core	Cr	Module code	Core	Cr	Module code	Core	Cr
SFEM171	H	12	SFEM172	H	12	APPM212	X	08	ELYM315	H	16
CMPG171	X	12	CMPG172	X	12	APPM213	X	08	ELYM316	H	16
MTHS171	H	12	MTHS172	H	12	ELYM215	H	16	MTHS311	H	16
APPM171	X	12	APPM172	X	12	MTHS211	H	08	MTHS312	H	16
ALDE111	X	12				MTHS212	H	08			
						WVNS211	X	12			
						Total 1st semester		**60**	**Total 1st semester**		**64**
Year Level 1			**Year level 2**			**Year level 3**			**Year level 4**		
Second semester			**Second semester**			**Second semester**			**Second semester**		
Module code	**Core**	**Cr**	**Module code**	**Core**	**Cr**	**Module code**	**Core**	**Cr**	**Module code**	**Core**	**Cr**
ALDE122	X	12				APPM222	X	08	ELYM327	H	16
						APPM223	X	08	ELYM328	H	16
						ELYM227	H	16	MTHS321	H	16
						MTHS222	H	08	MTHS322	H	16
						MTHS221	H	08			
						WVNS221	X	12			
						Total 2nd semester		**60**	**Total 2nd semester**		**64**
Total year level 1		**72**	**Total year level 1**		**48**	**Total year level 2**		**120**	**Total year level 3**		**128**
Total credits for the curriculum											**368**

NAS.1.25.18.1 **OLD PROGRAMME PHASING OUT (MC):**

Extended Curriculum: Bachelor of Science with Electronics and Mathematics

CODE: 200163 - N303M (Pipeline only)

CAMPUS: Mafikeng (ENGLISH)

DELIVERY MODE: Full Time

Compilation of programme:

Year Level 1			Year level 2			Year level 3			Year level 4		
First semester			First semester			First semester			First semester		
Module code	**Core**	**Cr**	**Module code**	**Core**	**Cr**	**Module code**	**Core**	**Cr**	**Module code**	**Core**	**Cr**
SFEM171	H	06	SFEM172	H	06	WVNS211	X	12	MAYM317	H	16
SFIM171	X	06	SFIM172	X	06	ELYM215	H	16	MAYM318	H	16
SFMM171	H	06	SFMM172	H	06	APMM217	X	16	ELYM315	H	16
SFAM171	X	06	SFAM172	X	06	MAYM217	H	16	ELYM316	H	16
AGLE111	X	12									
Total 1st semester		**36**	**Total 1st semester**		**24**	**Total 1st semester**		**60**	**Total 1st semester**		**64**
Year Level 1			**Year level 2**			**Year level 3**			**Year level 4**		
Second semester			**Second semester**			**Second semester**			**Second semester**		
Module code	**Core**	**Cr**	**Module code**	**Core**	**Cr**	**Module code**	**Core**	**Cr**	**Module code**	**Core**	**Cr**
SFEM171	H	06	SFEM172	H	06	WVNS221	X	12	MAYM327	H	16
SFIM171	X	06	SFIM172	X	06	ELYM227	H	16	MAYM328	H	16
SFMM171	H	06	SFMM172	H	06	APMM227	X	16	ELYM327	H	16
SFAM171	X	06	SFAM172	X	06	MAYM227	H	16	ELYM328	H	16
			AGLE121	X	12						
Total 2nd semester		**24**	**Total 2nd semester**		**36**	**Total 2nd semester**		**60**	**Total 2nd semester**		**64**
Total year level 1		**60**	**Total year level 1**		**60**	**Total year level 2**		**120**	**Total year level 3**		**128**
Total credits for the curriculum											**368**

NAS.1.25.19 EXTENDED PROGRAMME: BACHELOR OF SCIENCE WITH ELECTRONICS AND PHYSICS

CODE*:* 2XF H20 - N301M

CAMPUS: Mafikeng (ENGLISH)

DELIVERY MODE: Full Time

Compilation of programme:

Year Level 1			**Year level 2**			**Year level 3**			**Year level 4**		
Year modules			**Year modules**			**First semester**			**First semester**		
Module code	**Core**	**Cr**	**Module code**	**Core**	**Cr**	**Module code**	**Core**	**Cr**	**Module code**	**Core**	**Cr**
SFEM171	H	12	SFEM172	H	12	ELYM215	H	16	ELYM315	H	16
NPHY171	H	12	NPHY172	H	12	MTHS211	X	08	ELYM316	H	16
MTHS171	X	12	MTHS172	X	12	MTHS212	X	08	NPHY311	H	16
CMPG171	X	12	CMPG172	X	12	NPHY211	H	08	NPHY312	H	16
ALDE111	X	12				NPHY212	H	08			
						WVNS211	X	12			
						Total 1st semester		**60**	**Total 1st semester**		**64**
Year Level 1			**Year level 2**			**Year level 3**			**Year level 4**		
Second semester			**Second semester**			**Second semester**			**Second semester**		
Module code	**Core**	**Cr**	**Module code**	**Core**	**Cr**	**Module code**	**Core**	**Cr**	**Module code**	**Core**	**Cr**
ALDE122	X	12				ELYM227	H	16	ELYM327	H	16
						MTHS221	X	08	ELYM328	H	16
						MTHS222	X	08	NPHY321	H	16
						NPHY221	H	08	NPHY322	H	16
						NPHY222	H	08			
						WVNS221	X	12			
						Total 2nd semester		**60**	**Total 2nd semester**		**64**
Total year level 1		**72**	**Total year level 1**		**48**	**Total year level 2**		**120**	**Total year level 3**		**128**
Total credits for the curriculum											**368**

NAS.1.25.19.1 **OLD PROGRAMME PHASING OUT (MC):**
Extended Programme: Bachelor of Science with Electronics and Physics

CODE: 200196 - N302M (Pipeline only)

CAMPUS: Mafikeng (ENGLISH)

DELIVERY MODE: Full Time

Compilation of programme:

Year Level 1			Year level 2			Year level 3			Year level 4		
First semester			First semester			First semester			First semester		
Module code	Core	Cr	Module code	Core	Cr	Module code	Core	Cr	Module code	Core	Cr
SFEM171	H	06	SFEM172	H	06	WVNS211	X	12	PHYM315	H	08
SFPM171	H	06	SFPM172	H	06	ELYM215	H	16	PHYM316	H	08
SFMM171	X	06	SFMM172	X	06	PHYM215	H	08	PHYM317	H	08
SFIM171	X	06	SFIM172	X	06	PHYM216	H	08	PHYM318	H	08
AGLE111	X	12				MAYM217	X	16	ELYM315	H	16
									ELYM316	H	16
Total 1st semester		**36**	**Total 1st semester**		**24**	**Total 1st semester**		**60**	**Total 1st semester**		**64**
Year Level 1			**Year level 2**			**Year level 3**			**Year level 4**		
Second semester			**Second semester**			**Second semester**			**Second semester**		
Module code	**Core**	**Cr**	**Module code**	**Core**	**Cr**	**Module code**	**Core**	**Cr**	**Module code**	**Core**	**Cr**
SFEM171	H	06	SFEM172	H	06	WVNS221	X	12	PHYM321	H	08
SFPM171	H	06	SFPM172	H	06	ELYM227	H	16	PHYM322	H	08
SFMM171	X	06	SFMM172	X	06	PHYM221	H	08	PHYM323	H	08
SFIM171	X	06	SFIM172	X	06	PHYM222	H	08	PHYM324	H	08
			AGLE121	X	12	MAYM227	X	16	ELYM327	H	16
									ELYM328	H	16
Total 2nd semester		24	**Total 2nd semester**		36	**Total 2nd semester**		**60**	**Total 2nd semester**		**64**
Total year level 1		**60**	**Total year level 1**		**60**	**Total year level 2**		**120**	**Total year level 3**		**128**
Total credits for the curriculum											**368**

NAS.1.25.20 EXTENDED PROGRAMME: BACHELOR OF SCIENCE WITH PHYSICS AND MATHEMATICS

CODE: 2XF H23 - N301M

CAMPUS: Mafikeng (ENGLISH)

DELIVERY MODE: Full Time

Compilation of programme:

Year Level 1			Year level 2			Year level 3			Year level 4		
Year modules			Year modules			First semester			First semester		
Module code	Core	Cr	Module code	Core	Cr	Module code	Core	Cr	Module code	Core	Cr
SFEM171	X	12	SFEM172	X	12	ELYM215	X	16	MTHS311	H	16
NPHY171	H	12	NPHY172	H	12	MTHS211	H	08	MTHS312	H	16
MTHS171	H	12	MTHS172	H	12	MTHS212	H	08	NPHY311	H	16
CMPG171	X	12	CMPG172	X	12	NPHY211	H	08	NPHY312	H	16
ALDE111	X	12				NPHY212	H	08			
						WVNS211	X	12			
						Total 1st semester		**60**	**Total 1st semester**		**64**
Year Level 1			**Year level 2**			**Year level 3**			**Year level 4**		
Second semester			**Second semester**			**Second semester**			**Second semester**		
Module code	**Core**	**Cr**	**Module code**	**Core**	**Cr**	**Module code**	**Core**	**Cr**	**Module code**	**Core**	**Cr**
ALDE122	X	12				ELYM227	X	16	MTHS321	H	16
						MTHS221	H	08	MTHS322	H	16
						MTHS222	H	08	NPHY321	H	16
						NPHY221	H	08	NPHY322	H	16
						NPHY222	H	08			
						WVNS211	X	12			
						Total 2nd semester		**60**	**Total 2nd semester**		**64**
Total year level 1		**72**	**Total year level 1**		**48**	**Total year level 2**		**120**	**Total year level 3**		**128**
Total credits for the curriculum											**368**

NAS.1.25.20.1 **OLD PROGRAMME PHASING OUT (MC):**
Extended Curriculum: Bachelor of Science with Mathematics and Physics

CODE: 200164 - N303M (Pipeline only)

CAMPUS: Mafikeng (ENGLISH)

DELIVERY MODE: Full Time

Compilation of programme:

Year Level 1			Year level 2			Year level 3			Year level 4		
First semester			First semester			First semester			First semester		
Module code	Core	Cr	Module code	Core	Cr	Module code	Core	Cr	Module code	Core	Cr
SFEM171	X	06	SFEM172	X	06	WVNS211	X	12	PHYM315	H	08
SFPM171	H	06	SFPM172	H	06	ELYM215	H	16	PHYM316	H	08
SFMM171	H	06	SFMM172	H	06	PHYM215	H	08	PHYM317	H	08
SFIM171	X	06	SFIM172	X	06	PHYM216	H	08	PHYM318	H	08
AGLE111	X	12				MAYM217	X	16	MAYM317	H	16
									MAYM318	H	16
Total 1st semester		**36**	**Total 1st semester**		**24**	**Total 1st semester**		**60**	**Total 1st semester**		**64**
Year Level 1			**Year level 2**			**Year level 3**			**Year level 4**		
Second semester			**Second semester**			**Second semester**			**Second semester**		
Module code	**Core**	**Cr**	**Module code**	**Core**	**Cr**	**Module code**	**Core**	**Cr**	**Module code**	**Core**	**Cr**
SFEM171	X	06	SFEM172	X	06	WVNS221	X	12	PHYM321	H	08
SFPM171	H	06	SFPM172	H	06	ELYM227	H	16	PHYM322	H	08
SFMM171	H	06	SFMM172	H	06	PHYM221	H	08	PHYM323	H	08
SFIM171	X	06	SFIM172	X	06	PHYM222	H	08	PHYM324	H	08
			AGLE121	X	12	MAYM227	X	16	MAYM327	H	16
									MAYM328	H	16
Total 2nd semester		24	**Total 1st semester**		36	**Total 2nd semester**		**60**	**Total 2nd semester**		**64**
Total year level 1		**60**	**Total year level 1**		**60**	**Total year level 2**		**120**	**Total year level 3**		**128**
Total credits for the curriculum											**368**

NAS.1.25.21 EXTENDED PROGRAMME: BACHELOR OF SCIENCE IN BIOLOGICAL SCIENCES WITH BOTANY AND BIOCHEMISTRY

CODE: 2XK H01 - N301M

CAMPUS: Mafikeng (ENGLISH)

DELIVERY MODE: Full Time

Compilation of programme:

Year Level 1			Year level 2			Year level 3			Year level 4		
Year modules			Year modules			First semester			First semester		
Module code	Core	Cr	Module code	Core	Cr	Module code	Core	Cr	Module code	Core	Cr
PLKS171	H	12	PLKS172	H	12	PLKS211	H	16	PLKS314	H	32
MCBN171	H	12	MCBN172	H	12	BCHN213	H	16	BCHS316	H	16
MTHS173	X	12	MTHS174	X	12	NCHE211	X	08	BCHS317	H	16
NCHE171	X	12	NCHE172	X	12	NCHE212	X	08			
ALDE111	X	12				WVNS211	X	12			
Year Level 1			**Year level 2**			**Year level 3**			**Year level 4**		
Second semester			**Second semester**			**Second semester**			**Second semester**		
Module code	**Core**	**Cr**	**Module code**	**Core**	**Cr**	**Module code**	**Core**	**Cr**	**Module code**	**Core**	**Cr**
ALDE122	X	12				PLKS223	H	16	PLKS324	H	32
						BCHN222	H	16	BCHS321	H	16
						NCHE221	X	08	BCHS322	H	16
						NCHE222	X	08			
						WVNS221	X	12			
						Total 2nd semester		**60**	**Total 2nd semester**		**64**
Total year level 1		**72**	**Total year level 1**		**48**	**Total year level 2**		**120**	**Total year level 3**		**128**
Total credits for the curriculum											**368**

NAS.1.25.22 EXTENDED PROGRAMME: BACHELOR OF SCIENCE IN BIOLOGICAL SCIENCES WITH BOTANY AND MICROBIOLOGY

CODE: 2XK H02 - N301M

CAMPUS: Mafikeng (ENGLISH)

DELIVERY MODE: Full Time

Compilation of programme:

Year Level 1			**Year level 2**			**Year level 3**			**Year level 4**		
Year modules			**Year modules**			**First semester**			**First semester**		
Module code	**Core**	**Cr**	**Module code**	**Core**	**Cr**	**Module code**	**Core**	**Cr**	**Module code**	**Core**	**Cr**
PLKS171	H	12	PLKS172	H	12	PLKS211	H	16	PLKS314	H	32
MCBN171 **OR** GEOG171	X	12	MCBN172 **OR** GEOG172	X	12	MKBN211	H	16	MKBS316	H	16
NCHE171	X	12	NCHE172	X	12	BCHN213 **OR** GEOG211	X	16	MKBS317	H	16
NPHY171	X	12	NPHY172	X	12	WVNS211	X	12			
ALDE111	X	12									
Total		**60**	**Total**		**48**	**Total 1st semester**		**60**	**Total 1st semester**		**64**
Year Level 1			**Year level 2**			**Year level 3**			**Year level 4**		
Second semester			**Second semester**			**Second semester**			**Second semester**		
Module code	**Core**	**Cr**	**Module code**	**Core**	**Cr**	**Module code**	**Core**	**Cr**	**Module code**	**Core**	**Cr**
ALDE122	X	12				PLKS223	H	16	PLKS324	H	32
						MKBS221	H	16	MKBS326	H	16
						BCHN222 **OR** GEOG221	X	16	MKBS327	H	16
						WVNS221	X	12			
						Total 2nd semester		**60**	**Total 2nd semester**		**64**
Total year level 1		**72**	**Total year level 1**		**48**	**Total year level 2**		**120**	**Total year level 3**		**128**
Total credits for the curriculum											**368**

NAS.1.25.23 EXTENDED PROGRAMME: BACHELOR OF SCIENCE IN BIOLOGICAL SCIENCES WITH MICROBIOLOGY AND BIOCHEMISTRY

CODE: 2XK H11 - N301M

CAMPUS: Mafikeng (ENGLISH)

DELIVERY MODE: Full Time

Compilation of programme:

Year Level 1			**Year level 2**			**Year level 3**			**Year level 4**		
Year modules			**Year modules**			**First semester**			**First semester**		
Module code	**Core**	**Cr**	**Module code**	**Core**	**Cr**	**Module code**	**Core**	**Cr**	**Module code**	**Core**	**Cr**
MCBN171	H	12	MCBN172	H	12	BCHN213	H	16	BCHS316	H	16
NCHE171	H	12	NCHE172	H	12	NCHE211	X	08	BCHS317	H	16
MTHS173	X	12	MTHS174	X	12	NCHE212	X	08	MKBS316	H	16
NPHY171	X	12	NPHY172	X	12	MKBN211	H	16	MKBS317	H	16
ALDE111	X	12				WVNS211	X	12			
Year Level 1			**Year level 2**			**Year level 3**			**Year level 4**		
Second semester			**Second semester**			**Second semester**			**Second semester**		
Module code	**Core**	**Cr**	**Module code**	**Core**	**Cr**	**Module code**	**Core**	**Cr**	**Module code**	**Core**	**Cr**
ALDE122	X	12				BCHN222	H	16	BCHS321	H	16
						NCHE221	X	08	BCHS322	H	16
						NCHE222	X	08	MKBS326	H	16
						MKBS221	H	16	MKBS327	H	16
						WVNS221	X	12			
						Total 2nd semester		**60**	**Total 2nd semester**		**64**
Total year level 1		**72**	**Total year level 1**		**48**	**Total year level 2**		**120**	**Total year level 3**		**128**
Total credits for the curriculum											**368**

NAS.1.25.23.1 **OLD PROGRAMME PHASING OUT (MC):**
Extended Programme: Bachelor of Science with Microbiology and Biochemistry

CODE: 200202 - N301M (Pipeline only)

CAMPUS: Mafikeng (ENGLISH)

DELIVERY MODE: Full Time

Compilation of programme:

Year Level 1			Year level 2			Year level 3			Year level 4		
First semester			First semester			First semester			First semester		
Module code	Core	Cr	Module code	Core	Cr	Module code	Core	Cr	Module code	Core	Cr
SFBM171	H	06	SFBM172	H	06	WVNS211	X	12	BCHS314	H	16
SFCM171	H	06	SFCM172	H	06	MKBS211	H	08	BCHS315	H	16
SFMM171	X	06	SFMM172	X	06	MKBS212	H	08	MKBS316	H	16
SFPM171	X	06	SFPM172	X	06	MCHE215	X	08	MKBS317	H	16
AGLE111	X	12				MCHE216	X	08			
						BCHS211	H	08			
						BCHS212	H	08			
Total 1st semester		**36**	**Total 1st semester**		**24**	**Total 1st semester**		**60**	**Total 1st semester**		**64**
Year Level 1			**Year level 2**			**Year level 3**			**Year level 4**		
Second semester			**Second semester**			**Second semester**			**Second semester**		
Module code	**Core**	**Cr**	**Module code**	**Core**	**Cr**	**Module code**	**Core**	**Cr**	**Module code**	**Core**	**Cr**
SFBM171	H	06	SFBM172	H	06	WVNS221	X	12	BCHS324	H	16
SFCM171	H	06	SFCM172	H	06	MKBS222	H	08	BCHS325	H	16
SFMM171	X	06	SFMM172	X	06	MKBS223	H	08	MKBS326	H	16
SFPM171	X	06	SFPM172	X	06	MCHE221	X	08	MKBS327	H	16
			AGLE121	X	12	MCHE223	X	08			
						BCHS221	H	08			
						BCHS222	H	08			
Total 2nd semester		**24**	**Total 2nd semester**		**36**	**Total 2nd semester**			**Total 2nd semester**		**64**
Total year level 1		**60**	**Total year level 1**		**60**	**Total year level 2**		**120**	**Total year level 3**		**128**
Total credits for the curriculum											**368**

NAS.1.25.24 EXTENDED PROGRAMME: BACHELOR OF SCIENCE IN ENVIRONMENTAL SCIENCES WITH MICROBIOLOGY AND CHEMISTRY

CODE*:* 2XJ H10 - N301M

CAMPUS: Mafikeng (ENGLISH)

DELIVERY MODE: Full Time

Compilation of programme:

Year Level 1			Year level 2			Year level 3			Year level 4		
Year modules			Year modules			First semester			First semester		
Module code	Core	Cr	Module code	Core	Cr	Module code	Core	Cr	Module code	Core	Cr
MCBN171	H	12	MCBN172	H	12	BCHN213	X	16	NCHE311	H	16
NCHE171	H	12	NCHE172	H	12	NCHE211	H	08	NCHE312	H	16
MTHS173	X	12	MTHS174	X	12	NCHE212	H	08	MKBS316	H	16
NPHY171	X	12	NPHY172	X	12	MKBN211	H	16	MKBS317	H	16
ALDE111	X	12				WVNS211	X	12			
Year Level 1			**Year level 2**			**Year level 3**			**Year level 4**		
Second semester			**Second semester**			**Second semester**			**Second semester**		
Module code	**Core**	**Cr**	**Module code**	**Core**	**Cr**	**Module code**	**Core**	**Cr**	**Module code**	**Core**	**Cr**
ALDE122	X	12				BCHN222	X	16	NCHE321	H	16
						NCHE221	H	08	NCHE322	H	16
						NCHE222	H	08	MKBS326	H	16
						MKBS221	H	16	MKBS327	H	16
						WVNS221	X	12			
Total year level 1		**72**	**Total year level 1**		**48**	**Total year level 2**		**120**	**Total year level 3**		**128**
Total credits for the curriculum											**368**

NAS.1.25.24.1 **OLD PROGRAMME PHASING OUT (MC):**
Extended Programme: Bachelor of Science with Microbiology and Chemistry

CODE: 200204 - N301M (Pipeline only)

CAMPUS: Mafikeng (ENGLISH)

DELIVERY MODE: Full Time

Compilation of programme:

Year Level 1			Year level 2			Year level 3			Year level 4		
Year modules			Year modules			First semester			First semester		
Module code	**Core**	**Cr**	**Module code**	**Core**	**Cr**	**Module code**	**Core**	**Cr**	**Module code**	**Core**	**Cr**
SFBM171	H	06	SFBM172	H	06	WVNS211	X	12	MCHE315	H	16
SFCM171	H	06	SFCM172	H	06	MKBS211	H	08	MCHE316	H	16
SFMM171	X	06	SFMM172	X	06	MKBS212	H	08	MKBS316	H	16
SFPM171	X	06	SFPM172	X	06	MCHE215	H	08	MKBS317	H	16
AGLE111	X	12				MCHE216	H	08			
						BCHS211	X	08			
						BCHS212	X	08			
Total 1st semester		**36**	**Total 1st semester**		**24**	**Total 1st semester**		**60**	**Total 1st semester**		**64**
Year Level 1			**Year level 2**			**Year level 3**			**Year level 4**		
Second semester			**Second semester**			**Second semester**			**Second semester**		
Module code	**Core**	**Cr**	**Module code**	**Core**	**Cr**	**Module code**	**Core**	**Cr**	**Module code**	**Core**	**Cr**
SFBM171	H	06	SFBM172	H	06	WVNS221	X	12	MCHE321	H	16
SFCM171	H	06	SFCM172	H	06	MKBS222	H	08	MCHE322	H	16
SFMM171	X	06	SFMM172	X	06	MKBS223	H	08	MKBS326	H	16
SFPM171	X	06	SFPM172	X	06	MCHE221	H	08	MKBS327	H	16
			AGLE121	X	12	MCHE223	H	08			
						BCHS221	X	08			
						BCHS222	X	08			
Total 2nd semester		**24**	**Total 2nd semester**		**36**	**Total 2nd semester**			**Total 2nd semester**		**64**
Total year level 1		**60**	**Total year level 1**		**60**	**Total year level 2**		**120**	**Total year level 3**		**128**
Total credits for the curriculum											**368**

NAS.1.25.25 EXTENDED PROGRAMME: BACHELOR OF SCIENCE IN INFORMATION TECHNOLOGY /
VERLENGDE PROGRAM: BACCALAUREUS SCIENTIAE IN INLIGTINGSTEGNOLOGIE (VTC)

CODE/ *KODE*: 2XX H01 - N301V

CAMPUS/ *KAMPUS:* Vaal Triangle / *Vaaldriehoek* (ENGLISH: see */sien* NAS1.7)

DELIVERY MODE / *AFLEWERINGSMETODE:* Full Time / *Voltyds*

Compilation of programme / *Samestelling van program:*

Year Level 1			**Year level 2**			**Year level 3**			**Year level 4**		
Year modules			**Year modules**			**First semester**			**First semester**		
Module code	**Core**	**Cr**	**Module code**	**Core**	**Cr**	**Module code**	**Core**	**Cr**	**Module code**	**Core**	**Cr**
BMAN111	X	12	ACFS111	X	16	CMPG211	H	16	CMPG311	H	16
ITSP111	X	12	ITSP113	X	16	CMPG212	H	8	CMPG312	H	16
STTN111	X	12	ITSP114	X	16	CMPG213	H	16	CMPG313	H	16
WISS113	X	12	MTHS113	X	12	CMPG214	H	8	CMPG315	H	16
			CMPG111	H	12	CMPG215	H	8			
						WVNS211	X	12			
Total 1st semester		**48**	**Total 1st semester**		**72**	**Total 1st semester**		**68**	**Total 1st semester**		**64**
Year Level 1			**Year level 2**			**Year level 3**			**Year level 4**		
Second semester			**Second semester**			**Second semester**			**Second semester**		
Module code	**Core**	**Cr**	**Module code**	**Core**	**Cr**	**Module code**	**Core**	**Cr**	**Module code**	**Core**	**Cr**
ALDA/E121	X	12	ACFS121	X	16	CMPG221	H	8	CMPG321	H	16
ITSP121	X	12	BMAN223	X	16	CMPG222	H	8	CMPG322	H	16
STTN121	X	12	CMPG121	H	12	CMPG223	H	16	CMPG323	H	16
WISS123	X	12	CMPG122	H	12	MTHS225	X	8	CMPG324	H	16
						WVNS221	X	12			
Total 2nd semester		**48**	**Total 2nd semester**		**56**	**Total 2nd semester**		**52**	**Total 2nd semester**		**64**
Total year level 1		**96**	**Total year level 1**		**128**	**Total year level 2**		**120**	**Total year level 3**		**128**
Total credits for the curriculum											**472**

NAS.1.25.25.1 OLD PROGRAMME PHASING OUT (VTC):
Extended program: Bachelor of Science in Information Technology /
Verlengde program: Baccalaureus Scientiae in Inligtingstegnologie

CODE/ *KODE* : **264102 - N302V** (Pipeline only/ *Slegs Pyplyn)*

CAMPUS/ *KAMPUS:* Vaal Triangle / *Vaaldriehoek* (ENGLISH see / *sien* NAS1.7)

DELIVERY MODE/ *AFLEWERINGSMETODE:* Full Time / *Voltyds*

Compilation of programme / *Samestelling van program:*

Year Level 1			Year level 2			Year level 3			Year level 4		
Year modules			Year modules			First semester			First semester		
Module code	Core	Cr	Module code	Core	Cr	Module code	Core	Cr	Module code	Core	Cr
BMAN111	X	12	ACFS111	X	16	ITRW211	H	8	ITRW311	H	16
ITSP111	X	12	ITSP113	X	16	ITRW212	H	16	ITRW313	H	8
STTN111	X	12	ITSP114	X	16	ITRW213	H	16	ITRW315	H	8
WISS113	X	12	WISN113	X	12	ITRW214	H	16	ITRW316	H	16
						WVNS211	X	12	ITRW317	H	16
Total 1st semester		**48**	**Total 1st semester**		**60**	**Total 1st semester**		**68**	**Total 1st semester**		**64**
Year Level 1			**Year level 2**			**Year level 3**			**Year level 4**		
Second semester			**Second semester**			**Second semester**			**Second semester**		
Module code	**Core**	**Cr**	**Module code**	**Core**	**Cr**	**Module code**	**Core**	**Cr**	**Module code**	**Core**	**Cr**
AGLA/E121	X	12	ACFS121	X	16	ITRW222	H	16	ITRW321	H	16
ITSP121	X	12	BMAN222	X	12	ITRW225	H	16	ITRW322	H	16
STTN121	X	12	ITRW123	H	12	WISN223	X	8	ITRW324	H	16
WISS123	X	12	ITRW124	H	12	WVNS221	X	12	ITRW325	H	16
Total 2nd semester		**48**	**Total 2nd semester**		**52**	**Total 2nd semester**		52	**Total 2nd semester**		**64**
Total year level 1		**96**	**Total year level 1**		**112**	**Total year level 2**		**120**	**Total year level 3**		**128**
Total credits for the curriculum											**456**

NAS.1.25.26 EXTENDED / *VERLENGDE* PROGRAMME: BACHELOR OF SCIENCE IN QUANTITIVE RISK MANAGEMENT / *BACCALAUREUS SCIENTIAE IN KWANTITATIEWE RISIKOBESTUUR (VTC)*

CODE/ *KODE:* 2XT H01 - N301V

CAMPUS/ *KAMPUS:* Vaal Triangle / *Vaaldriehoek* (ENGLISH see / *sien* NAS1.7)

DELIVERY MODE/ *AFLEWERINGSMETODE:* Full Time / *Voltyds*

Compilation of programme / *Samestelling van program:*

Year Level 1			**Year level 2**			**Year level 3**			**Year level 4**		
Year modules			**Year modules**			**First semester**			**First semester**		
Module code	**Core**	**Cr**	**Module code**	**Core**	**Cr**	**Module code**	**Core**	**Cr**	**Module code**	**Core**	**Cr**
ACFS111	X	16	ACCF111	X	16	ECON211	H	16	BWIA313	H	24
CMPG111	X	12	BWIA111	H	12	MTHS211	X	8	EKRP311	H	16
ECON112	X	12	EKRP211	H	16	MTHS212	X	8	STTN316	H	24
STTF115	X	12	MTHS111	X	12	STTN215	H	16	STTN317	H	8
WISS111	X	12	STTF215	X	16	WVES311	X	12			
Total 1st semester		**64**	**Total 1st semester**		**72**	**Total 1st semester**		**60**	**Total 1st semeste r**		**72**
Year Level 1			**Year level 2**			**Year level 3**			**Year level 4**		
Second semester			**Second semester**			**Second semester**			**Second semester**		
Module code	**Core**	**Cr**	**Module code**	**Core**	**Cr**	**Module code**	**Core**	**Cr**	**Module code**	**Core**	**Cr**
ALDA/E122	X	12	ACCF121	X	16	APPM222	X	8	BWIN321	H	16
ACFS121	X	16	BWIA121	H	12	MTHS222	X	8	EKRP321	H	16
CMPG122	X	12	EKRP221	H	16	STTN225	H	16	STTN326	H	16
ECON122	X	12	MTHS121	X	12				STTN327	H	16
STTF125	X	12	STTF225	X	16						
WISS121	X	12	WVES221	X	12						
Total 2nd semester		**76**	**Total 2nd semester**		**84**	**Total 2nd semester**		**32**	**Total 2nd semester**		**64**
Year Modules											
						BWIA273	H	16			
						FINM271		18			
Total year level 1		**140**	**Total year level 1**		**156**	**Total year level 2**		**126**	**Total year level 3**		**136**
Total credits for the curriculum											**558**

NAS.1.25.26.1 **OLD PROGRAMME PHASING OUT (VTC)**

Extended Programme: Bachelor of Science in Quantitive Risk Management

Verlengde Program: Baccalaureus Scientiae in Kwantitatiewe Risikobestuur

CODE/ *KODE:* 200 207 - N301V (Pipeline only / *Slegs pyplyn*)

CAMPUS/ *KAMPUS:* Vaal Triangle / *Vaaldriehoek* (ENGLISH see / *sien* NAS1.7)

DELIVERY MODE/ *AFLEWERINGSMETODE:* Full Time / *Voltyds*

Compilation of programme / *Samestelling van program:*

Year Level 1			Year level 2			Year level 3			Year level 4		
First semester			First semester			First semester			First semester		
Module code	**Core**	**Cr**	**Module code**	**Core**	**Cr**	**Module code**	**Core**	**Cr**	**Module code**	**Core**	**Cr**
ACFS111	X	16	ACCF111	X	16	ECON211	H	16	BWIA313	H	24
ECON111	H	12	BWIA111	H	12	STTN215	H	16	EKRP311	H	16
ITRW112	X	12	EKRP211	H	16	WISN211	X	8	STTN316	H	24
STTF115	X	12	STTF215	X	16	WISN212	X	8	STTN317	H	8
WISS111	X	12	WISN111	X	12	WVES311	X	12			
Total 1st semester		**64**	**Total 1st semester**		**72**	**Total 1st semester**		**60**	**Total 1st semester**		**72**
Year Level 1			**Year level 2**			**Year level 3**			**Year level 4**		
Second semester			**Second semester**			**Second semester**			**Second semester**		
			Module code	**Core**	**Cr**	**Module code**	**Core**	**Cr**	**Module code**	**Core**	**Cr**
ACFS121	X	16	ACCF121	X	16	STTN225	H	16	BWIN321	H	16
AGLA/E121	X	12	BWIA121	H	12	TGWN223	X	8	EKRP321	H	16
ECON121	H	12	EKRP221	H	16	WISN226	X	8	STTN326	H	16
ITRW123	X	12	STTF225	X	16	FINM221	X	16	STTN327	H	16
WISS121	X	12	WISN121	X	12						
STTF125	X	12	WVES221	X	12						
Total 2nd semester		**76**	**Total 2nd semester**		**84**	**Total 2nd semester**		48	**Total 2nd semester**		**64**
Year Modules											
						BWIA271	H	32			
Total year level 1		**140**	**Total year level 1**		**156**	**Total year level 2**		**140**	**Total year level 3**		**136**
Total credits for the curriculum											**572**

NAS.1.25.27 EXTENDED/ *VERLENGDE* PROGRAMME: BACHELOR OF SCIENCE IN BUSINESS ANALYTICS / *BACCALAUREUS SCIENTIAE IN BESIGHEIDSANALISE (VTC)*

CODE/ *KODE:* 2XR H01 - N301V

CAMPUS/ *KAMPUS:* Vaal Triangle / *Vaaldriehoek* (ENGLISH see / *sien* NAS1.7)

DELIVERY MODE/ *AFLEWERINGSMETODE:* Full Time / *Voltyds*

Compilation of programme / *Samestelling van program:*

Year Level 1			**Year level 2**			**Year level 3**			**Year level 4**		
Year modules			**Year modules**			**First semester**			**First semester**		
Module code	**Core**	**Cr**	**Module code**	**Core**	**Cr**	**Module code**	**Core**	**Cr**	**Module code**	**Core**	**Cr**
ACFS111	X	16	BWIA111	H	12	MTHS211	H	8	CMPG311	H	16
CMPG111	X	12	CMPG211	H	16	MTHS212	H	8	CMPG312	H	16
ECON112	X	12	CMPG213	H	16	STTN215	H	16	CMPG313	H	16
STTF115	X	12	MTHS111	X	12	WVES311	X	12	STTN316	H	24
WISS111	X	12	STTF215	X	16				STTN317	H	8
Total 1st semester		**64**	**Total 1st semester**		**72**	**Total 1st semester**		**44**	**Total 1st semester**		**80**
Year Level 1			**Year level 2**			**Year level 3**			**Year level 4**		
Second semester			**Second semester**			**Second semester**			**Second semester**		
Module code	**Core**	**Cr**	**Module code**	**Core**	**Cr**	**Module code**	**Core**	**Cr**	**Module code**	**Core**	**Cr**
ALDA/E122	X	12	BWIA121	H	12	APPM222	X	8	CMPG321	H	16
ACFS121	X	16	CMPG223	H	16	CMPG221	H	8	CMPG322	H	16
CMPG121	H	12	ECON122	X	16	MTHS222	X	8	STTN326	H	16
CMPG122	H	12	MTHS121	X	12	STTN225	H	16	STTN327	H	16
STTF125	X	12	STTF225	X	16	WVES221	X	12			
WISS121	X	12									
Total 2nd semester		**76**	**Total 2nd semester**		**72**	**Total 2nd semester**		**60**	**Total 2nd semester**		**64**
Year Modules											
						BWIA273	H	16			
Total year level 1		**140**	**Total year level 1**		**144**	**Total year level 2**		**120**	**Total year level 3**		**144**
Total credits for the curriculum											**548**

NAS.1.25.27.1 **OLD PROGRAMME PHASING OUT (VTC):**
Extended Programme : Bachelor of Science in Data Mining /
Verlengde Program : Baccalaureus Scientiae in Data-ontginning

CODE/ *KODE* *:* **200198 - N302V** (Piplines only / *Slegs Pyplyn*)

CAMPUS/ *KAMPUS:* Vaal Triangle/ *Vaaldriehoek* (ENGLISH see / *sien* NAS1.7)

DELIVERY MODE/ *AFLEWERINGSMETODE:* Full Time / *Voltyds*

Compilation of programme / *Samestelling van program*:

Year Level 1			Year level 2			Year level 3			Year level 4		
First semester			First semester			First semester			First semester		
Module code	**Core**	**Cr**	**Module code**	**Core**	**Cr**	**Module code**	**Core**	**Cr**	**Module code**	**Core**	**Cr**
ACFS111	X	16	BWIA111	H	12	ITRW214	H	16	ITRW311	H	16
ECON111	H	12	ITRW212	H	16	STTN215	H	16	ITRW317	H	16
ITRW112	X	12	ITRW213	H	16	WISN211	X	8	STTN316	H	24
STTF115	X	12	SSTTF215	X	16	WISN212	X	8	STTN317	H	8
WISS111	X	12	WISN111	X	12	WVES311	X	12			
Total 1st semester		**64**	**Total 1st semester**		**72**	**Total 1st semester**		**60**	**Total 1st semester**		**64**
Year Level 1			**Year level 2**			**Year level 3**			**Year level 4**		
Second semester			**Second semester**			**Second semester**			**Second semester**		
Module code	**Core**	**Cr**	**Module code**	**Core**	**Cr**	**Module code**	**Core**	**Cr**	**Module code**	**Core**	**Cr**
ACFS121	X	16	BWIA121	H	12	ITRW325	H	16	ITRW321	H	16
AGLA/E121	X	12	ECON121	X	12	STTN225	H	16	STTN326	H	16
ITRW123	H	12	ITRW222	H	16	TGWN223	X	8	STTN327	H	16
ITRW124	H	12	STTF225	X	16	WISN226	X	8			
STTF125	X	12	WISN121	X	12	WVES221	X	12			
WISS121	X	12									
Total 2nd semester		**76**	**Total 2nd semester**		**68**	**Total 2nd semester**		60	**Total 2nd semester**		**48**
Total year level 1		**140**	**Total year level 1**		**140**	**Total year level 2**		**120**	**Total year level 3**		**112**
Total credits for the curriculum											**512**

NAS.1.25.28 EXTENDED/ *VERLENGDE* PROGRAMME:
BACHELOR OF SCIENCE IN FINANCIAL MATHEMATICS /
BACCALAUREUS SCIENTIAE IN FINANSIËLE WISKUNDE (VTC)

CODE/ *KODE:* 2XS H01- N301V

CAMPUS/ *KAMPUS:* Vaal Triangle / *Vaaldriehoek* (ENGLISH see / *sien* NAS1.7)

DELIVERY MODE/ *AFLEWERINGSMETODE:* Full Time / *Voltyds*

Compilation of programme / *Samestelling van program:*

Year Level 1			**Year level 2**			**Year level 3**			**Year level 4**		
Year modules			**Year modules**			**First semester**			**First semester**		
Module code	**Core**	**Cr**	**Module code**	**Core**	**Cr**	**Module code**	**Core**	**Cr**	**Module code**	**Core**	**Cr**
ACFS111	X	16	BWIA111	H	12	MTHS211	H	8	BWIA313	H	24
CMPG111	X	12	ECON211	X	16	MTHS212	H	8	MTHS311	H	16
ECON112	X	12	EKRP211	H	16	STTN215	H	16	STTN316	H	24
STTF115	X	12	MTHS111	X	12	WVES311	X	12	STTN317	H	8
WISS111	X	12	STTF215	X	16						
Total 1st semester		**64**	**Total 1st semester**		**72**	**Total 1st semester**		**44**	**Total 1st semester**		**72**
Year Level 1			**Year level 2**			**Year level 3**			**Year level 4**		
Second semester			**Second semester**			**Second semester**			**Second semester**		
Module code	**Core**	**Cr**	**Module code**	**Core**	**Cr**	**Module code**	**Core**	**Cr**	**Module code**	**Core**	**Cr**
ALDA/E122	X	12	BWIA121	H	12	APPM222	X	8	BWIN321	H	16
ACFS121	X	16	EKRP221	X	16	MTHS221	X	8	EKRP321	H	16
CMPG122	X	12	MTHS121	H	12	MTHS222	H	8	STTN326	H	16
ECON122	X	12	STTF225	X	16	STTN225	H	16	STTN327	H	16
STTF125	X	12	WVES221	X	12						
WISS121	X	12									
Total 2nd semester		**76**	**Total 2nd semester**		**68**	**Total 2nd semester**		**40**	**Total 2nd semester**		**64**
Year Modules											
						BWIA273	H	16			
Total year level 1		**140**	**Total year level 1**		**140**	**Total year level 2**		**100**	**Total year level 3**		**136**
Total credits for the curriculum											**516**

NAS.1.25.28.1 **OLD PROGRAMME PHASING OUT (VTC):**

Extended Curriculum: Bachelor of Science in Financial Mathematics / ***Verlengde Curriculum: Baccalaureus Scientiae in Finansiële Wiskunde (VTC)***

CODE/ KODE : 200208 - N301V (Pipeline only / *slegs Pyplyn*)

CAMPUS/ ***KAMPUS:*** Vaal Triangle / *Vaaldriehoek* (ENGLISH, see / *sien* NAS1.7)

DELIVERY MODE/ ***AFLEWERINGSMETODE:*** Full Time / *Voltyds*

Compilation of programme / ***Samestelling van program:***

Year Level 1			Year level 2			Year level 3			Year level 4		
First semester			First semester			First semester			First semester		
Module code	**Core**	**Cr**	**Module code**	**Core**	**Cr**	**Module code**	**Core**	**Cr**	**Module code**	**Core**	**Cr**
ACFS111	X	16	BWIA111	H	12	STTN215	H	16	BWIA313	H	24
ECON111	H	12	ECON211	X	16	WISN211	X	8	STTN316	H	24
ITRW112	X	12	EKRP211	H	16	WISN212	X	8	STTN317	H	8
STTF115	X	12	STTF215	X	16	WVES311	X	12	WISN314	H	16
WISS111	X	12	WISN111	X	12						
Total 1st semester		**64**	**Total 1st semester**		**72**	**Total 1st semester**		**44**	**Total 1st semester**		**72**
Year Level 1			**Year level 2**			**Year level 3**			**Year level 4**		
Second semester			**Second semester**			**Second semester**			**Second semester**		
Module code	**Core**	**Cr**	**Module code**	**Core**	**Cr**	**Module code**	**Core**	**Cr**	**Module code**	**Core**	**Cr**
ACFS121	X	16	BWIA121	H	12	STTN225	H	16	BWIN321	H	16
AGLA/E121	X	12	EKRP221	X	16	TGWN223	X	8	STTN326	H	16
ECON121	H	12	STTF225	X	16	WISN226	H	8	STTN327	H	16
ITRW123	X	12	WISN121	H	12	WISN224	H	8	EKRP321	H	16
STTF125	X	12	WVES221	X	12						
WISS121	X	12									
Total 2nd semester		**76**	**Total 2nd semester**		**68**	**Total 2nd semester**		**40**	**Total 2nd semester**		**64**
Year module											
						BWIA271	H	32			
Total year level 1		**140**	**Total year level 1**		**140**	**Total year level 2**		**116**	**Total year level 3**		**136**
Total credits for the curriculum											**532**

NAS.2 MODULE OUTCOMES / *MODULE UITKOMSTE*

NAS.2.1 DIPLOMA IN ANIMAL HEALTH

Module code: AHVM111	**SEMESTER 1**	**NQF Level: 5**
Title: **Anatomy and Physiology: Animal Health I**		
Module outcomes: Students should be able to: • Describe the basic organization of living organisms with respect to the cell, tissues and organ systems; • Describe the basic anatomy and physiology of domestic animals, including birds, with respect to the integumentary, musculo-skeletal, nervous and endocrine systems.		
Method of delivery: Lectures (Power Point), Videos		
Assessment modes: Assignments, Quizzes, Tests, Written and Practical Examinations		
Module code: AHVM112	**SEMESTER 1**	**NQF Level: 5**
Title: **Animal Welfare, Handling and Equipment I**		
Module outcomes: Students should be able to: • Perform basic animal handling techniques and farm procedures; • Name and describe the commonly used veterinary instruments and equipment; • In practical sessions students practice under the supervision of veterinarians and animal health technicians, procedures related to the theory topics above; • Video tapes may be used to supplement the students practical learning.		
Method of delivery: Lectures (Power Point), Videos and Farm Visits		
Assessment modes: Assignments, Quizzes, Tests, Examinations		
Module code: AHVM121	**SEMESTER 2**	**NQF Level: 5**
Title: **Basic Microbiology for Animal Health**		
Module outcomes: Students should be able to: • Give a basic description of the classes of microorganisms of veterinary importance (bacteria, viruses, fungi, rickettsia and protozoans etc); • Give a general grouping of bacteria and fungi of veterinary importance according to staining results, morphology and characteristics; • Give a basic description of the general principles of pathogenesis by microbiological agents; • Describe the commonly encountered animal health infections: causative agents, transmission, prevention of transmission, human health implications; • In practical sessions, learners will participate in the use of general laboratory procedures in microbiology, including but not limited to, staining and viewing of bacteria under the microscope, culturing of bacteria, use of different media, sensitivity testing etc., especially as related to animal diseases. (case studies may also be used); Make use of practical microbiological procedures to help differentiate common microbiological pathogens.		
Method of delivery: Lectures (Power Point), Videos and Practical on Live Carcasses and Use of Models		
Assessment modes: Assignments, Quizzes, Tests, Written and Practical Examinations		

Module code: AHVM122	SEMESTER 2	NQF Level: 5
Title: **Anatomy and Physiology: Animal Health II**		
Module outcomes: Students should be able to: • Describe, differentiate the anatomy and physiology of domestic animals, including birds, with respect to the respiratory, circulatory, gastrointestinal, urinary, and reproductive systems; • In practical sessions, be able to identify and differentiate normal tissues and anatomical organs in domestic animals.		
Method of delivery: Lectures (Power Point), Videos, Practical and Dissection		
Assessment modes: Assignments, Quizzes, Tests, Written and Practical Examinations		
Module code: AHVM123	**SEMESTER 2**	**NQF Level: 5**
Title: **Animal Welfare, Handling and Equipment II**		
Module outcomes: Students should be able to: • Increase their proficiency and perform additional basic animal handling techniques and routine farm procedures and revise previous skills; • Name and describe additional commonly used veterinary instruments and equipment; • In practical sessions students will practice and increase their proficiency under the supervision of veterinarians and animal health technicians, procedures related to the theory topics above; • video tapes may be be used to supplement the students practical learning.		
Method of delivery: Lectures (Power Point), Videos and Practical Visit on Farms		
Assessment modes: Assignments, Quizzes, Tests, Examinations		
Module code:AHVM211	**SEMESTER 1**	**NQF Level: 5**
Title: **Diseases I**		
Module outcomes: Students should be able to: • Describe the basic concepts of the commonly occurring viral and bacterial diseases in respect to epidemiology, clinical signs, postmortem, diagnostic methods, treatment, and preventative measures with emphasis on the notifiable diseases; • Evaluate lists of differential diagnoses and come up with tentative diagnosis; • In practical sessions, students will be involved in assisting the veterinarian in the examination, diagnosis and treatment as well as prevention of the diseases; • When specific disease conditions are not seen in the live animals, videos will be used to supplement the student practical learning; Students will be guided in the use of epidemiological surveys and investigations, including the collection and recording of data related to the diseases studied.		
Method of delivery: Lectures (Power Point), Videos and Farm Visits		
Assessment modes: Assignments, Quizzes, Tests, Examinations		

Module code: AHVM212	SEMESTER 1	NQF Level: 5
Title: **Parasitology for Animal Health**		
Module outcomes: Students should be able to: • Describe the basic aspects of the commonly encountered internal and external parasites. • Describe the basic classes of the commonly encountered helminths (nematodes, trematodes, cestodes); • Describe the basic classes of the commonly encountered ticks, mites, insects and lices of veterinary importance; • Treatment and control for external parasites; • Treatment and control of helminths using both oral and injectable medication; Practicals: identification of helminths, and/ or eggs from faecal samples as well as identification of external parasites; including ticks, tick counts, mites, insects and lice dipping for external parasite.		
Method of delivery: Lectures (Power Point), Videos and Laboratory Practicals		
Assessment modes: Assignments, Quizzes, Tests, Written and Practical Examinations		
Module code: AHVM213	**SEMESTER 1**	**NQF Level: 5**
Title: **Diseases I**		
(Not Received)		
Module Code: AHVM214	**SEMESTER 1**	**NQF Level: 5**
Title: **Pathology I**		
Module outcomes: Students should be able to: • Explain the common concepts of general pathology; • Perform post mortem procedures and write the report using correct terminology; • Collect and dispatch specimens, in addition to proper disposal and disinfection of carcasses and pollution sites, respectively; • Understand the general pathology of the cells, blood circulation, inflammation and causes of diseases.		
Method of delivery: Lectures (Power Point), Videos and Practicals		
Assessment modes: Assignments, Quizzes, Tests, Written and Practical Examinations		
Module code: AHVM221	**SEMESTER 2**	**NQF Level: 5**
Title: **Diseases II**		
Module outcomes: Students should be able to: • Describe the basic concepts of the commonly occurring viral and bacterial diseases in respect to epidemiology, clinical signs, post-mortem, diagnostic methods, treatment, and preventative measures with emphasis on the notifiable diseases; • They should be able to evaluate lists of differential diagnoses and come up with tentative diagnosis; • In practical sessions, students will be involved in assisting the veterinarian in the examination, diagnosis and treatment as well as prevention of the diseases; • When specific disease conditions are not seen in the live animals, videos (youtube) will be used to supplement the student practical learning; • Students will be guided in the use of epidemiological surveys and investigations, including the collection and recording of data related to the diseases studied.		
Method of delivery: Lectures (Power Point), Videos and Farm Visits		
Assessment modes: Assignments, Quizzes, Tests, Examinations		

Module code: AHVM222	SEMESTER 2	NQF Level: 5
Title: **Obstetrics and Genital Diseases: Animal Health**		
Module outcomes: Students should be able to: • Describe the basic concepts of the reproductive cycles of domestic animals, and the factors which influence them; • Describe the diseases and conditions causing infertility in production and companion animals and know how to prevent them; • Describe the basic physiology of gestation and parturition, and its related problems. • Understand the basic principles of pregnancy diagnosis; Practicals: learners assist the veterinarian with clinical cases involving obstetrical procedures for relieving dystocia, treatments associated with dystocia, assisting with dystocia, retained placentas, fertility examinations, semen evaluations, sheath washes, and other clinical cases related to obstetrics and reproductive diseases.		
Method of delivery: Lectures (Power Point), Videos and Practicals		
Assessment modes: Assignments, Quizzes, Tests, Written and Practical Examinations		
Module code: AHVM223	**SEMESTER 2**	**NQF Level: 5**
Title: **Pharmacology and Toxicology: Animal Health**		
Module outcomes: Students should be able to: • Explain the basic pharmacokinetic and toxicokinetic concepts of medicines, toxic plants and common poisons; • Explain the basic modes of action of the toxins, and relate them to the respective clinical signs; • Explain the basic diagnostic methods and treatments in cases of poisoning; • Sssist the veterinarian in the treatment of sick animals using the various medications, as well as in the treatment of common intoxications; • In practical sessions, learners use different routes of administration of medication, including subcutaneous, intramuscular, intravenous, intraperitoneal, epidural, intramammary, subconjunctival, topical and oral; • Restraint and the assistance of the veterinarian in drug administration; • Identification of common toxic plants, poisons, heavy metals, organophosphates, rodenticides and others.		
Method of delivery: Lectures (Power Point), Practicals		
Assessment modes: Assignments, Quizzes, Tests, Examinations		

MODULE CODE: AHVM224	SEMESTER 2	NQF Level: 5

Title: **Public Health for Animal Health**

Module outcomes:

Students should be able to:

- Describe the general measures that ensure that water and food of animal origin is free from pathogens and toxins;
- Advise farmers on concepts of safe and hygienic food production;
- Demonstrate functional knowledge of the relevant national and international legislation regarding the management of food-borne and zoonotic diseases;
- Describe the gross anatomy of a slaughter carcass;
- Describe the abattoir slaughter procedures;
- Describe the abattoir hygiene processes;
- Describe the basic procedure of meat inspection in an abattoir;
- Describe the statutory requirements and obligations of animal health technicians in terms of the relevant acts;
- Describe the general life cycles, epidemiology, treatment and control measures of the common zoonoses, as learnt from Diseases modules, including but not limited to, rabies, anthrax, brucellosis, Rift Valley fever, tapeworms and hookworms;
- In practical sessions, students visits all categories and grades of abattoirs in and around the province;
- Visits to dairies and dairy processing plants;
- Integration with public health officials, meat and dairy inspectors and others involved in regulatory public health services.

Method of delivery: Lectures (Power Point), Videos and Practicals

Assessment modes: Assignments, Quizzes, Tests, Examinations

MODULE CODE: AHVM225	SEMESTER 2	NQF Level: 5

Title: **Clinical Laboratory Techniques**

Module outcomes:

Students should be able to:

- Explain the basic laboratory techniques;
- Demonstrate the basic theoretical and practical laboratory diagnostic skills;
- In practical sessions, students do blood smear preparation and evaluation, faecal flotation preparation and evaluation, haematocrit preparation and evaluation, urine samples evaluation, sediment staining and evaluation, bacteria cultures and sensitivity testing, media preparation, specimen preservation and storage, milk testing, somatic cell counts, rumen fluid evaluation, skin scrapings for all species, clinical chemistry;
- Students will practice in the lab, the procedures studied in the theory of the various courses;
- Practice the collection, preservation and preparation of samples for dispatch to the various kinds of laboratories (these procedures will be practised by outsourcing staff from government laboratories and the use of demonstration videos);
- Demonstrate the knowledge and application of basic laboratory practices on samples brought to the laboratory and also by way of assignments.

Method of delivery: Lectures (Power Point), Practicals, Videos and Visits to Other Laboratories.

Assessment modes: Assignments, Practicals, Quizzes, Tests, Written and Practical Examinations

Module code: AHVM226	SEMESTER 2	NQF Level: 5

Title: **Basic Microbiology for Animal Science**

Module outcomes:

- Students should be able to give a functional description of the classes of microorganisms of animal health importance (bacteria, viruses, fungi, rickettsia and protozoans etc);
- Give a functional description of the general principles of pathogenesis by microbiological agents;
- Give a general grouping of bacteria and fungi of animal health importance according to staining results, morphology and characteristics;
- Describe microbes causing important diseases of animals;
- Describe the commonly encountered animal health infections: causative agents, transmission, prevention of transmission, human health implications;
- In practical sessions, learners will participate in the use of general laboratory procedures in microbiology, including but not limited to, staining and viewing of bacteria under the microscope, culturing of bacteria, use of different media, sensitivity testing, etc., especially as related to animal diseases (case studies may also be used);
- Make use of practical microbiological procedures to help differentiate common microbiological pathogens.

Method of delivery: Lectures (Power Point), Videos and Farm Visits

Assessment modes:
Summative: Assignments, Quizzes, Tests, Written and Practical Examinations

MODULE CODE: AHVM227	SEMESTER 2	NQF Level: 5

Title: **Disease II**

(Not Received)

Method of delivery:

Assessment modes:

MODULE CODE: AHVM228	SEMESTER 2	NQF Level: 5

Title: **Pathology II**

Module outcomes:
Students should be able to:

- Conduct post-mortems and write reports using correct terminology;
- Collect and dispatch specimens for laboratory diagnosis;
- Describe the systemic pathology of the skin, muscular skeletal system, cvs, rs, git, haemopoietic, urinary, reproductive, nervous and endocrine systems.

Method of delivery: Lectures (Power Point), Videos and Practicals

Assessment modes: Assignments, Quizzes, Tests, Written and Practical Examinations

Module Code: AHVM316	SEMESTER 1	NQF Level: 5

Title: **Companion Animal Clinical Care for AHT II**

Module outcomes:

Students should be able to:

- Perform further first aid procedures on companion animals prior to attendance by a veterinarian;
- Perform further primary health care procedures on companion animals;
- Communicate preventative methods to clients;
- Assist veterinarians in surgery, diagnostics, and treatments;
- Execute procedures done during practical sessions such as: clinical exam, first aid, general patient management, wound management, supportive care, treatment techniques for the different species, fluid therapy, monitoring the patient, administration of medication, assisting with surgical cases, pre- and postoperative care, care of debilitated animals, physical therapy, surgical instrument management, care of equipment, collection of samples for laboratory examination;
- Execute procedures studied in the various theory courses so that they are able to work with all species of animals in a relaxed and professional way with a minimum of risks of injury to the animal, the client or themselves.

Method of delivery: Lectures (Power Point), Videos and Practicals Farm Visits

Assessment modes: Assignments, Quizzes, Tests, Written and Practical Examinations

Module Code: AHVM327	SEMESTER 2	NQF Level: 5

Title: **Production Animal Clinical Care for AHT II**

Module outcomes:

Students should be able to:

- Perform further fundamental first aid procedures on production animals prior to attendance by a veterinarian;
- Perform further primary health care procedures on production animals;
- Communicate fundamental preventative methods to clients;
- Assist veterinarians in surgery, diagnostics, and treatments;
- In practical session, conduct procedures such as: clinical exam, first aid, general patient management, wound management, supportive care, treatment techniques for the different species, fluid therapy, monitoring the patient, administration of medication, assisting with surgical cases, pre- and postoperative care, care of debilitated animals, physical therapy, surgical instrument management, care of equipment, collection of samples for laboratory examination;

Students will practice the procedures studied in the various theory courses so that they are able to work with all species of animals in a relaxed and professional way with a minimum of risks of injury to the animal, the client or themselves.

Method of delivery: Lectures (Power Point), Videos and Practicals On Farms

Assessment modes: Assignments, Quizzes, Tests, Written and Practical Examinations

Module Code: AHVM328	SEMESTER 1	NQF Level: 5
Title: **Practical Experiential Learning II**		
Modules outcomes: Students should be able to: • Demonstrate knowledge and understanding of important legislation governing the veterinary and para-veterinary laws in the world and in South Africa; • Demonstrate knowledge of the application of legislation in the control of diseases and the role of animal health technicians; • Demonstrate the ability to formulate and write legal documents; understand the concept of animal welfare and animal welfare assessment of both farm animals and companion animals; • Understand procedures and legislation and solve problems when dealing with trading, animal protection and insurance.		
Method of delivery: Lectures (Power Point)		
Assessment modes: Assignments, Quizzes, Tests, Examinations		
Module Code: AHDM316	**SEMESTER 1**	**NQF Level: 5**
Title: **Meat Inspection I**		
Module outcomes: Students should be able to: • Demonstrate knowledge and understanding of important legislation governing the veterinary and para-veterinary laws in the world and in South Africa; • Demonstrate knowledge of the application of legislation in the control of diseases and the role of animal health technicians; • Demonstrate the ability to formulate and write legal documents; understand the concept of animal welfare and animal welfare assessment of both farm animals and companion animals; understand procedures and legislation and solve problems when dealing with trading, animal protection and insurance.		
Method of delivery: Lectures (Power Point), Videos and Abattoir Training		
Assessment modes: Assignments, Quizzes, Tests, Written and Practical Examinations		
Module Code: AHDM317	**SEMESTER 1**	**NQF Level: 5**
Title: **Veterinary Jurisprudence**		
Modules outcomes: Students should be able to: • Demonstrate knowledge and understanding of important legislation governing the veterinary and para-veterinary laws in the world and in South Africa; • Demonstrate knowledge of the application of legislation in the control of diseases and the role of animal health technicians; • Demonstrate the ability to formulate and write legal documents; understand the concept of animal welfare and animal welfare assessment of both farm animals and companion animals; • Understand procedures and legislation and solve problems when dealing with trading, animal protection and insurance.		
Method of delivery: Lectures (Power Point)		
Assessment modes: Assignments, Quizzes, Tests, Examinations		

Module Code: AHDM326	SEMESTER 2	NQF Level: 5
Title: **Meat Inspection II**		
Module outcomes: Student should be able to theoretically and practically: • Demonstrate extensive knowledge of meat inspection and abattoir hygiene; • Demonstrate understanding of the microbiological contamination and sample and specimen collection in abattoirs; • Perform ante mortem and post mortem inspections; • Implement hygiene management systems with the objective of improving meat safety in abattoirs; • Apply the relevant national and international legislation with regards to all aspects of abattoirs.		
Method of delivery: Lectures (Power Point), Videos and Visits at Abattoirs		
Assessment modes: Assignments, Quizzes, Tests, Written and Practical Examinations		

NAS.2.2 BSC AGRICULTURE - ANIMAL HEALTH

Module Code: AHBM321	SEMESTER 2	NQF Level: 7
Title: **Research Methodology**		
Module outcomes: Students should be able to: • Perform further emergency procedures on companion animals prior to attendance by a veterinarian; • Perform further primary health care procedures on companion animals; • Communicate preventative and control methods to clients; • Assist veterinarians during surgery, diagnostics, and treatments; • In practical sessions, learners do the following: vital signs, clinical exam, first aid, general patient management, wound management, supportive care, treatment techniques for the different species, fluid therapy, monitoring the patient, administration of medication, assisting with surgical cases, pre- and postoperative care, care of deliberated animals, physical therapy, surgical instrument management, care of equipment, collection of samples for laboratory examination.		
Method of delivery: Full Time		
Assessment modes:		
Module Code: AHPM211	**SEMESTER 1**	**NQF Level: 6**
Title: Microbiology for Animal Health		
Module outcomes: (Not Received)		
Method of delivery: Lectures (Power Point), Videos and Practicals in Laboratory		
Assessment modes: Assignments, Quizzes, Tests, Written and Practical Examinations		
Module Code: AHPM212	**SEMESTER 1**	**NQF Level: 6**
Title: **Anatomy and Physiology I**		
Module outcomes: (Not Received)		
Method of delivery: Lectures (Power Point), Videos and Practicals in Laboratory		
Assessment modes: Assignments, Quizzes, Tests, Written and Practical Examinations		

Module Code: AHPM213	SEMESTER 1	NQF Level: 6

Title: **Veterinary Microbiology**

Module outcomes:
Students should be able to:

- Describe the classes of microorganisms of veterinary importance (bacteria, viruses, fungi, rickettsia and protozoans etc.);
- Group bacteria and fungi of veterinary importance according to staining results, morphology and characteristics;
- Describe the general principles of pathogenesis by microbiological agents;
- Describe the commonly encountered animal health infections: causative agents, transmission, prevention of transmission, human health implications;
- In practical sessions, learners will participate in the use of general laboratory procedures in microbiology, including but not limited to, staining and viewing of bacteria under the microscope, culturing of bacteria, use of different media, sensitivity testing, etc. Especially as related to animal diseases (case studies may also be used).
- Use practical microbiological procedures to help differentiate common microbiological pathogens;
- Apply the above acquired knowledge to conduct research.

Method of delivery: Lectures (Power Point), Videos and Practicals in Laboratory

Assessment modes: Assignments, Quizzes, Tests, Written and Practical Examinations

Module Code: AHPM214	SEMESTER 1	NQF Level: 6

Title: **Anatomy and Physiology: Animal Health I**

Module outcomes:
Students should be able to:

- Describe the organization of living organisms with respect to the cell, tissues, and organ systems;
- Describe the anatomy and physiology of domestic animals including birds, with respect to the integumentary, musculo-skeletal, nervous, and endocrine systems;
- Practicals: demonstrations by lecturer and dissections by students of systems, organs and tissues studied in the theory.

Method of delivery: Lectures (Power Point), Videos and Practicals

Assessment modes: Assignments, Quizzes, Tests, Written and Practical Examinations

Module Code: AHPM216	SEMESTER 1	NQF Level: 6

Title: **Animal Welfare, Handling and Equipment I**

Module outcomes:
Students should be able to:

- Perform animal handling techniques and selected basic farm procedures;
- Name and describe commonly used veterinary instruments and equipment;
- Practical will involve students practising, under the supervision of veterinarians and animal health technicians, procedures related to the theory topics above (video tapes may be be used to supplement the students practical learning).

Method of delivery: Lectures (Power Point), Videos and Practicals

Assessment modes: Assignments, Quizzes, Tests, Written and Practical Examinations

Module Code: AHPM221	SEMESTER 2	NQF Level: 6

Title: **Anatomy and Physiology II**

Module outcomes:
(Not Received)

Method of delivery: Lectures (Power Point), Videos and Practicals

Assessment modes: Assignments, Quizzes, Tests, Written and Practical Examinations

Module Code: AHPM223	SEMESTER 2	NQF Level: 6
Title: **Animal Welfare, Handling and Equipment II**		
(Not Received)		
Method of delivery:		
Assessment modes:		
Module Code: AHPM224	**SEMESTER 2**	**NQF Level: 6**
Title: **Anatomy and Physiology: Animal Health II**		
Module outcomes: Students should be able to: • Describe the anatomy and physiology of domestic animals, including birds, with respect to the respiratory, circulatory, gastrointestinal, urinary, and reproductive systems; • Practicals: demonstrations by lecturer and dissections by students of systems, organs and tissues studied in the theory.		
Method of delivery: Lectures (Power Point), Videos and Practicals		
Assessment modes: Assignments, Quizzes, Tests, Written and Practical Examinations		
Module Code: AHPM225	**SEMESTER 2**	**NQF Level: 6**
Title: **Animal Welfare, Handling and Equipment II**		
(Not Received)		
Method of delivery: Lectures (Power Point), Videos and Practicals		
Assessment modes: Assignments, Quizzes, Tests, Written and Practical Examinations		
Module Code: AHPM311	**SEMESTER 1**	**NQF Level: 7**
Title: **Diseases I**		
Module outcomes: Students should be able to: • Describe the basic concepts of the commonly occurring viral and bacterial diseases in respect to epidemiology, clinical signs, post-mortem, diagnostic methods, treatment, and preventative measures with emphasis on the notifiable diseases; • Evaluate lists of differential diagnoses and come up with tentative diagnosis; • In practical sessions students will be involved in assisting the veterinarian in the examination, diagnosis and treatment as well as prevention of the diseases; • When specific disease conditions are not seen in the live animals, videos (youtube) will be used to supplement the student practical learning; • Students will be guided in the use of epidemiological surveys and investigations including the collection and recording of data related to the diseases studied; • An assignment that uses diseases taught to do an investigative project, will also be given and students are expected to follow up a project outline for it.		
Method of delivery: Lectures (Power Point), Videos and Practicals		
Assessment modes: Assignments, Quizzes, Tests, Examinations		

Module Code: AHPM312	SEMESTER 1	NQF Level: 7
Title: **Epidemiology**		
Module outcomes: Students should be able to: • Explain the importance of epidemiology in disease surveillance, prevention and control. Explain and demonstrate epidemiologic concepts as they relate to disease surveillance, prevention and control; • Describe the laws that pertain to veterinary practice; • Practicals will involve students practising relevant aspects of what they covered during theory classes as stipulated above (video and other teaching aids may be be used to supplement the students practical learning).		
Method of delivery: Lectures (Power Point), Videos and Practicals		
Assessment modes: Assignments, Quizzes, Tests, Examinations		
Module Code: AHPM313	**SEMESTER 1**	**NQF Level: 7**
Title: **Obstetrics and Genital Diseases: Animal Health**		
Module outcomes: Students should be able to: • Describe the fundamental concepts of the reproductive cycles of domestic animals, and the factors which influence them; • Describe the diseases and conditions causing infertility in production and companion animals and know how to prevent them; • Describe the physiology of gestation and parturition, and its related problems; • Practicals will involve assisting the veterinarian with clinical cases involving obstetrical procedures for relieving dystocia, treatments associated with dystocia, assisting with dystocia, retained placentas, fertility examinations, semen evaluations, sheath washes, and other clinical cases related to obstetrics and reproductive diseases.		
Method of delivery: Lectures (Power Point), Videos and Practicals		
Assessment modes: Assignments, Quizzes, Tests, Examinations		
Module Code: AHPM315	**SEMESTER 1**	**NQF Level: 7**
Title: **Public Health for Animal Health I**		
Module outcomes: Students should be able to: • Describe the measures that ensure that water and food of animal origin is free from pathogens and toxins; • Advise farmers on concepts of safe and hygienic food production; • Demonstrate knowledge of the relevant national and international legislation regarding the management of food-borne and zoonotic diseases; • Describe the gross anatomy of a slaughter carcass; • Describe the abattoir slaughter procedures; • Describe the abattoir hygiene processes; • Describe the basic procedure of meat inspection in an abattoir; • Describe the statutory requirements and obligations of animal health technicians in terms of the relevant acts; • Describe the life cycles, epidemiology, treatment and control measures of the common zoonosis, as learnt from diseases modules, including but not limited to, rabies, anthrax, brucellosis, rift valley fever, tapeworms and hookworms; • In practical sessions there shall be visits to all categories and grades of abattoirs in and around the province; • Visits to dairies, dairy processing plants; • Interaction with public health officials, meat and dairy inspectors, and others involved in regulatory public health services.		

Method of delivery: Lectures (Power Point), Videos and Practicals

Assessment modes: Assignments, Quizzes, Tests, Examinations

Module Code: AHPM317	**SEMESTER 1**	**NQF Level: 7**

Title: **Pathology I**

Module outcomes:

Students should be able to:

- Explain the fundamental concepts of clinical pathology;
- Differentiate between the general normal and abnormal organ structures during postmortem procedures, and also be able to collect and dispatch specimens, in addition to proper disposal and disinfection of carcasses and pollution sites;
- Explain the general anatomical and functional structures of the body and the associated pathology;
- In practical sessions learners will observe the following: functional osteology, teeth and ageing, applied anatomy of the head, practical anatomy and gross pathology of the respiratory and circulatory systems, lymphoid tissues, pathology of the central nervous system and vertebral column; gross pathology of the gastrointestinal tract and related abdominal organs, clinical anatomy of the hoof, functional anatomy and gross pathology of the male and female genital tracts, palpation and/or observation where applicable on the live animal of the systems and organs, and gross pathology of the various systems, organs and tissues during post mortem examinations; specimen collection, storage and dispatch; carcass disposal; clinical pathology procedures, and results interpretation; safety and occupational health procedures.

Method of delivery: Lectures (Power Point), Videos and Practicals

Assessment modes: Assignments, Quizzes, Tests, Examinations

Module Code: AHPM318	**SEMESTER 1**	**NQF Level: 7**

Title: **Introduction to Game and Wildlife**

Module outcomes:

Students should be able to

- Demonstrate detailed knowledge and understanding of the principles, habitat, game Capture, physiology & chemistry, nutrition, disease, toxic plants & soil, vegetation, carrying capacity & game reserve management;
- Demonstrate knowledge and understanding of clinical techniques, preventions and considerations used in game and wildlife care;
- Identify, analyse and solve problems in the context of game and wild life care;
- Communicate and debate information and solutions to problems in this particular field of study.

Method of delivery: Lectures (Power Point), Videos and Practicals

Assessment modes: Assignments, Quizzes, Tests, Examinations

Module Code: AHPM319	**SEMESTER 2**	**NQF Level: 7**

Title: **Epidemiology for Animal Health Technicians**

(Not Received)

Method of delivery: Lectures (Power Point), Videos and Practicals

Assessment modes: Assignments, Quizzes, Tests, Examinations

Module Code: AHPM321	SEMESTER 2	NQF Level: 5

Title: **Diseases II**

Module outcomes:

Students should be able to:

- Describe the fundamental concepts of the common protozoal, rickettsial, fungal and non-infectious conditions regarding epidemiology, clinical signs, postmortem, sampling and diagnostic methods, treatment, and preventative measures;
- Evaluate lists of differential diagnoses and come up with tentative diagnosis;
- Apply national and international disease control measures in terms of existing legislation;
- Most of the practicals will involve the students in assisting the veterinarian in the examination, diagnosis, and treatment as well as prevention of the diseases studied in the theory;
- When specific disease conditions are not seen in the live animals, video tapes will be used to supplement the students practical learning;
- Students will be guided in the use of epidemiological surveys and investigations, including the collection and recording of data related to the diseases studied.

Method of delivery: Lectures (Power Point), Videos and Practicals

Assessment modes: Assignments, Quizzes, Tests, Examinations

Module Code: AHPM322	SEMESTER 2	NQF Level: 7

Title: **Parasitology : Animal Health**

Module outcomes:

Students should be able to:

- Describe the basic aspects of the commonly encountered internal and external parasites;
- Describe the basic classes of the commonly encountered helminths (nematodes, trematodes, cestodes);
- Describe the basic classes of the commonly encountered ticks, mites, insects and lices of veterinary importance;
- Treatment and control for external parasites;
- Treatment and control of helminths using both oral and injectable medication;
- Practicals: iidentification of helminths, and/ or eggs from faecal samples, identification of external parasites; including ticks, tick counts, mites, insects and lice, and dipping for external parasites
- Apply the acquired knowledge to conduct research.

Method of delivery: Contact Lecturers, Practical in Laboratory and Farms, Videos

Assessment Methods: Assessment modes: Assignments, Quizzes, Tests, Examinations

Module Code: AHPM323	SEMESTER 2	NQF Level: 7

Title: **Pharmacology and Toxicology: Animal Health**

Module outcomes:

Students should be able to:

- Explain the fundamental pharmacokinetic and toxicokinetic concepts of common medicines, toxic plants and poisons;
- Explain the general modes of action of common medicines, toxic plants, poisons and relate them to the respective effects and clinical signs;
- Explain the basic diagnostic methods and treatments in cases of poisoning;
- Assist the veterinarian in the treatment of sick animals using the various medications, as well as in the treatment of common intoxications;
- Practicals will involve use of the different routes of administration of medication including subcutaneous, intramuscular, intravenous, intra-peritoneal, epidural, intra-mammary, sub-conjunctival, topical and oral;
- Restraint and the assistance of the veterinarian in drug administration;
- Identification of common toxic plants, poisons, heavy metals, organophosphates, rodenticides and others.

Method of delivery: Contact Lecturers, Practical in Laboratory and Farms, Videos

Assessment Methods: Assessment modes: Assignments, Quizzes, Tests, Examinations

Module Code: AHPM325	**SEMESTER 2**	**NQF Level: 7**

Title: **Clinical Laboratory Techniques**

Module outcomes:

Students should be able to:

- Explain the basic laboratory techniques;
- Demonstrate the basic theoretical and practical laboratory diagnostic skills;
- In practical sessions, students do blood smear preparation and evaluation, faecal flotation preparation and evaluation, haematocrit preparation and evaluation, urine samples evaluation, sediment staining and evaluation, bacteria cultures and sensitivity testing, media preparation, specimen preservation and storage, milk testing, somatic cell counts, rumen fluid evaluation, skin scrapings for all species, clinical chemistry;
- Students will practice in the lab, the procedures studied in the theory of the various courses.
- Practice the collection, preservation and preparation of samples for dispatch to the various kinds of laboratories (these procedures will be practised by outsourcing staff from government laboratories and the use of demonstration videos);
- Demonstrate the knowledge and application of basic laboratory practices on samples brought to the laboratory and also by way of assignments;
- Apply the laboratory principles learnt in carrying out a research methodology projects.

Method of delivery: Lectures (Power Point), Practicals, Videos and Visits to Other Laboratories.

Assessment modes: Assignments, Practicals, Quizzes, Tests, Written and Practical Examinations

Module Code: AHPM326	**SEMESTER 2**	**NQF Level: 5**

Title: **Livestock Diseases (For Animal Science)**

Module outcomes:

Students should be able to:

- Define the common terms used to describe diseases and conditions in farm animals;
- Describe the fundamental concepts of diseases in farm animals;
- Discuss the main bacterial, viral, rickettsial, and protozoal infections of farm animals;
- Describe the influence of nutrition, genetics, and environment on disease occurrence;
- Describe the important toxic principles and metabolic diseases of farm animals;
- Most of the practicals will involve the students in assisting the veterinarian in the examination, diagnosis, and treatment, as well as prevention of the diseases studied in the theory (when specific disease conditions are not seen in the live animals, video tapes will be used to supplement the students practical learning);
- Students will be guided in the use of epidemiological surveys and investigations, including the collection and recording of data related to the diseases studied.

Method of delivery: Lectures (Power Point), Videos and Practicals

Assessment modes: Assignments, Quizzes, Tests, Examinations

Module Code: AHPM327	SEMESTER 2	NQF Level:7
Title: **Veterinary Jurisprudence**		
Module outcomes: Students should be able to: • Demonstrate integrated knowledge and understanding of legislation governing the veterinary and para-veterinary laws in the world and in South Africa; • Demonstrate knowledge of the application of legislation in the control of diseases and the role of animal health technicians; • Demonstrate the ability to formulate and write legal documents; • Understand the concept of animal welfare and animal welfare assessment of both farm animals and companion animals; and apply knowledge of procedures and legislation to deal with trading, animal protection and insurance and critically reflect and communicate theory driven arguments.		
Method of delivery: Lectures (Power Point), Videos and Practicals		
Assessment modes: Assignments, Quizzes, Tests, Examinations		
Module Code: AHPM329	**SEMESTER 2**	**NQF Level: 7**
Title: **Pathology II**		
Module outcomes: Students should be able to: • Explain additional fundamental concepts of clinical pathology; • Perform additional postmortem procedures, and also be able to collect and dispatch specimens, together with the proper disposal and disinfection of carcasses and pollution sites. • In practical sessions students perform the following, post mortem procedures, specimen collection, storage and dispatch; carcass disposal; clinical pathology procedures, and results interpretation; safety and occupational health procedures.		
Method of delivery: Lectures (Power Point), Videos and Practicals		
Assessment modes: Assignments, Quizzes, Tests, Examinations		
Module Code: AHPM411	**SEMESTER 1**	**NQF Level: 8**
Title: **Companion Animal Medicine & Surgery I**		
Module outcomes: Students should be able to: • Perform emergency procedures on companion animals prior to attendance by a veterinarian; • Perform primary health care procedures on companion animals; • Communicate preventative and control methods to clients; • Assist veterinarians during surgery, diagnostics, and treatment of animals; • In practical sessions learners do the following; vital signs, clinical exam, first aid, general patient management, wound management, supportive care, treatment techniques for the different species, fluid therapy, monitoring the patient, administration of medication, assisting with surgical cases, pre- and postoperative care, care of deliberated animals, physical therapy, surgical instrument management, care of equipment, collection of samples for laboratory examination; • Students will practice the procedures studied in the various theory courses so that they are able to work with all species of animals in a relaxed and professional way with a minimum of risks of injury to the animal, the client or themselves.		
Method of delivery: Lectures (Power Point), Videos and Practicals		
Assessment modes: Assignments, Quizzes, Tests, Written and Practical Examinations		

Module Code: AHPM412	SEMESTER 1	NQF Level: 8
Title: **Production Animal Clinical Care for AHT I**		
Module outcomes: Students should be able to: • Perform fundamental emergency procedures on production animals prior to attendance by a veterinarian; • Perform primary health care procedures on production animals; • Communicate preventative and control methods to clients; • Assist veterinarians during surgery, diagnostics, and treatment of animals; • In practical sessions learners do the following; vital signs, clinical exam, first aid, general patient management, wound management, supportive care, treatment techniques for the different species, fluid therapy, monitoring the patient, administration of medication, assisting with surgical cases, pre- and postoperative care, care of deliberated animals, physical therapy, surgical instrument management, care of equipment, collection of samples for laboratory examination; • Students will practice the procedures studied in the various theory courses so that they are able to work with all species of animals in a relaxed and professional way with a minimum of risks of injury to the animal, the client or themselves.		
Method of delivery: Lectures (Power Point), Videos and Practicals		
Assessment modes: Assignments, Quizzes, Tests, Written and Practical Examinations		

Module Code: AHPM414	SEMESTER 1	NQF Level: 8
Title: **Practical Experiential Learning I**		
Module outcomes: Students should be able to: • Relate what they learnt during the entire degree curriculum with the actual field situations under supervision of professionals in various fields of animal health and production; • Modalities: students will be required to spend 2 weeks in the field (outside the university) in an approved laboratory, registered veterinary clinic, state veterinary office, wildlife park and other such stations under the supervision of qualified veterinarians, game rangers or game veterinarian (the period will fall during the vacation); • Students will also work at the university farm under the supervision of the farm sectional managers, the farm manager and animal health staff members at prescribed times during the semester; • One of the two sessions (between practical experiential learning i and ii, should be conducted under a veterinarian or an animal health technician working first hand with treatment and control of animal diseases.		
Method of delivery: Lectures (Power Point), Videos and Practicals on Different Farms and Stations		
Assessment modes: Assignments, Quizzes, Tests, Examinations		

Module Code: AHPM415	SEMESTER 1	NQF Level: 8
Title: **Research Project And Seminar I**		
Module outcomes: Students should be able to: • Explain the fundamental concepts of projects planning, research methodologies, produce a literature review and present project proposals; • Evaluate scientific literature.		
Method of delivery: Full Time Research		
Assessment Methods: Proposal Submission and Presentation		

Module Code: AHPM416	SEMESTER 1	NQF Level: 8
Title: **Public Health for AHTII**		
(Not Received)		
Method of delivery: Lectures (Power Point), Videos and Practicals		
Assessment modes: Assignments, Quizzes, Tests, Written and Practical Examinations		
Module Code: AHPM417	**SEMESTER 1**	**NQF Level: 8**
Title: **Work Integrated Learning**		
(Not Received)		
Method of delivery:		
Assessment modes:		
Module Code: AHPM421	**SEMESTER 2**	**NQF Level: 8**
Title: **Companion Animal Medicine & Surgery II**		
Module outcomes: Students should be able to: • Perform further emergency procedures on companion animals prior to attendance by a veterinarian; • Perform further primary health care procedures on companion animals; • Communicate preventative and control methods to clients; • Assist veterinarians during surgery, diagnostics, and treatments; • In practical sessions learners do the following: vital signs, clinical exam, first aid, general patient management, wound management, supportive care, treatment techniques for the different species, fluid therapy, monitoring the patient, administration of medication, assisting with surgical cases, pre- and postoperative care, care of deliberated animals, physical therapy, surgical instrument management, care of equipment, collection of samples for laboratory examination; • Students will practice the procedures studied in the various theory courses so that they are able to work with all species of animals in a relaxed and professional way with a minimum of risks of injury to the animal, the client or themselves.		
Method of delivery: Lectures (Power Point), Videos and Practicals		
Assessment modes: Assignments, Quizzes, Tests, Written and Practical Examinations		
MODULE CODE: AHPM422	**SEMESTER 2**	**NQF Level: 8**
Title: **Production Animal Clinical Care for AHT II**		
Module outcomes: Students should be able to: • Perform further emergency procedures on production animals prior to attendance by a veterinarian; • Perform further primary health care procedures on production animals; • Communicate preventative and control methods to clients; • Assist veterinarians during surgery, diagnostics, and treatments; • In practical sessions learners do the following; vital signs, clinical exam, first aid, general patient management, wound management, supportive care, treatment techniques for the different species, fluid therapy, monitoring the patient, administration of medication, assisting with surgical cases, pre- and postoperative care, care of deliberated animals, physical therapy, surgical instrument management, care of equipment, collection of samples for laboratory examination; • Students will practice the procedures studied in the various theory courses so that they are able to work with all species of animals in a relaxed and professional way with a minimum of risks of injury to the animal, the client or themselves.		
Method of delivery: Lectures (Power Point), Videos and Practicals		
Assessment modes: Assignments, Quizzes, Tests, Written and Practical Examinations		

Module Code: AHPM424	SEMESTER 2	NQF Level:8
Title: **Practical Experiential Learning II**		
Module outcomes: Students should be able to: • Further relate what they learnt during the entire degree curriculum with the actual field situations under supervision of professionals in various fields of animal health and production; • Modalities: students will be required to spend 2 weeks in the field (outside the university) in an approved laboratory, registered veterinary clinic, state veterinary office, wildlife park and other such stations, under the supervision of qualified veterinarians, game rangers or game veterinarian (the period will fall during the vacation); • Students will also work at the university farm under the supervision of the sectional managers, the farm manager and animal health staff members at prescribed times during the semester; • One of the two sessions (between practical experiential learning i and ii, should be conducted under a veterinarian or an animal health technician working first hand with treatment and control of animal diseases.		
Method of delivery: Lectures (Power Point), Videos and Practicals on Different Farms and Stations		
Assessment modes: Assignments, Quizzes, Tests, Examinations		
Module Code: AHPM425	**SEMESTER 2**	**NQF Level: 8**
Title: **Research Project and Seminar II**		
Module outcomes: Students should be able to: • Produce a written mini-dissertation from their research projects; • Present their mini-dissertations orally.		
Method of delivery: Full Time Research		
Assessment modes: Mini Dissertation Submission		
Module Code: AHPM426	**SEMESTER 2**	**NQF Level: 8**
Title: **Scheduled Diseases**		
Module outcomes: Students should be able to: • Describe and perform procedures relating to the Tuberculosis (TB) and Contagious Abortion (CA) eradication schemes as prescribed by the National Department of Agriculture; • Describe the general concepts of Scheduled Diseases and current disease outbreaks; • Practical**:** prescribed field tests, sampling procedures using relevant materials and equipment and interpretation of results (video shows of current disease outbreaks may be used).		
Method of delivery: Lectures (Power Point), Group Discussions		
Assessment modes: Assignments, Quizzes, Tests, Examinations		
Module Code: AHPM427	**SEMESTER 2**	**NQF Level: 8**
Title: **Work Integrated Learning**		
(Not Received)		
Method of delivery:		
Assessment modes:		

NAS.2.3 DIPLOMA IN ANIMAL SCIENCE

Module code: ANDM121	**Semester 2**	**NQF level: 5**
Title: **Introduction to Animal Science**		
Module outcomes: Students should be able to: • describe the South African animal science industry overview; • Explain the role of animal science to economic and human development; • Classify farm animals based on climate, size, gastro-intestinal tract, feeding behaviour and production; • Differentiate between breeds of farm animals; • Discuss location of animals to different geographical areas based on their adaptability; • Explain the basic introductory principles of the physiology of growth and development, reproduction, breeding, nutrition and health of farm animals.		
Method of delivery: Contact		
Assessment modes: Continuous Formative and Summative Assessments		
Module code: ANDM122	**Semester 2**	**NQF level: 5**
Title: **Non–Ruminant Production**		
Module outcomes: Students should be able to: • Demonstrate an understanding of the poultry and pig industry, poultry and pig breeds and their contribution to animal agriculture; • Propose strategies on improvement of poultry production system and appropriate breeds; • Develop a comprehensive plan of a poultry production unit health programme; • Apply modern management techniques in efficient feeding and rearing of broilers and layers; • Evaluate and provide recommendation on monogastric products and their quality and their marketing strategies.		
Method of delivery: Contact		
Assessment modes: Continuous Formative and Summative Assessments		
Module code: ANDM211	**Semester 1**	**NQF level: 6**
Title: **Animal Nutrition**		
Module outcomes: Students should be able to: • Compare the roles and functions of different nutrients found in animal feed and explain the importance of animal nutrition; • Discuss the role played by nutrients in the health of animals and digestion in ruminants and non-ruminants; • Describe the requirements of nutrients for growth, maintenance, reproduction and production. Identify and classify south african feedstuffs based on their nutritive value; • Formulate rations for farm animals and justify the need for evaluating feeds.		
Method of delivery: Contact		
Assessment modes: Continuous Formative and Summative Assessments		
Module code: ANDM212	**Semester 1**	**NQF level: 6**
Title: **Animal Genetics and Breeding**		
Module outcomes: Students should be able to: • Outline the possible deviations from the expected Mendelian ratios and provide comprehensive explanations for them; • Utilize the concept of sex linkage in farming situations;		

- Describe mutations as a source of genetic variation in living organisms;
- Predict genetic change and describe different selection methods and mating system;
- evaluate the importance of cell division in living organisms.

Method of delivery: Contact

Assessment modes: Continuous Formative and Summative Assessments

Module code: ANDM213	**Semester 1**	**NQF level: 6**

Title: **Ruminant Animal Production**

Module outcomes:

Students should be able to:

- Describe the South African ruminant industry overview and the economic importance of the ruminant industry in human and economic development;
- Identify and describe the physical and production characteristics of different breeds of sheep, goats, beef and dairy cattle;
- Locate different breeds of sheep, goats, beef and dairy cattle to various livestock production systems and climatic conditions;
- Apply management principles such as rearing systems (calves/lambs/kids), breeding and selection, reproduction and feeding (nutrition) in various ruminant production systems.

Method of delivery: Contact

Assessment modes: Continuous Formative and Summative Assessments

Module code: ANDM221	**Semester 2**	**NQF level: 6**

Title: **Small Stock Production and Management**

Module outcomes:

Students should be able to:

- To describe the South African smallstock industry overview and the economic importance of the smallstock industry in human and economic development;
- Identify and describe the physical and production characteristics of different breeds of sheep and goats;
- Locate different breeds of sheep and goats, to various livestock production systems and climatic conditions;
- Apply management principles such as rearing systems (lambs/kids), breeding and selection, reproduction and feeding (nutrition) in smallstock production systems;
- Develop and evaluate breeding, nutrition, reproduction and health programmes in smallstock.

Method of delivery: Contact

Assessment modes: Continuous formative and Summative Assessments

Module code: ANDM223	**Semester 2**	**NQF level: 6**

Title: **Beef Production and Management**

Module outcomes:

Students should be able to:

- Recognise the beef cattle industry in South Africa as integrated industry from farm to market place;
- Characterise beef cattle breeds and their crosses according to their biological types and adaptability to specific environments;
- Develop suitable beef cattle production systems to meet the objective of different farmers;
- Plan, monitor and critically evaluate breeding, reproductive, nutritional and health programmes;
- Manage beef cattle enterprises according to their production systems.

Method of delivery: Contact

Assessment modes: Continuous Formative and Summative Assessments

Module code: ANDM225	Semester 2	NQF level: 6
Title: **Principles of Veld Management**		
Module outcomes: Students should be able to: • Explain the basic principles governing the vegetation development; • Justify the need for the practical application of principles in each of the six biome types; • Compare and contrast the factors associated with forage quality and how they influences animal performance; • Describe the problems of increasing bush encroachment in savanna, with proposals on how to deal with the problem; • Discuss the approach to, and theoretical basis of, veld management on the game ranch; • Summarise the management of veld in the communal areas of south africa.		
Method of delivery: Contact		
Assessment modes: Continuous Formative and Summative Assessments		
Module code: ANDM312	**Semester 1**	**NQF level: 7**
Title: **Poultry Production and Management**		
Module outcomes: Students should be able to: • Name the sources of breeding material for the different sectors of the poultry industry; • Illustrate the structure of the poultry, meat and egg industries, and their contribution to the supply of meat and eggs for the south african population; • Summarize the procedures for the monitoring and management of the environment to ensure ideal conditions during hatching and brooding; • Select and apply the procedures for the preparation of poultry house to receive broiler chicks. • Implement disinfection and apply management procedures of the broiler house before chick placement; • Apply management procedures of the layer house before point-of-lay chickens are placed; • Justify reasons for feeding different diets to broilers and layers; • Outline the different types of records kept in poultry production; • Tabulate and maintain production records on broiler and layer farms, as per company sop's; • Draw up a vaccination plan for layers and broilers.		
Method of delivery: Contact		
Assessment modes: Continuous Formative and Summative Assessments		
Module code: ANDM313	**Semester 1**	**NQF level: 7**
Title: **Dairy Production and Management**		
Module outcomes: Students should be able to: • Identify dairy cattle breeds, their production characteristics and their economic importance to the South African dairy industry; • Integrate dairy cattle breeding, feeding and reproduction for total management of the dairy cattle enterprise; • Plan and implement management practices in dairy cattle herds; • Formulate, keep and use dairy cattle records system (production and financial); • Develop, implement and manage health programmes in dairy herds for prevention and the diagnoses of various diseases for assurance of dairy cattle health.		
Method of delivery: Contact		
Assessment modes: Continuous Formative and Summative Assessments		

Module code: ANDM314	Semester 1	NQF level: 7
Title: **Pig Production and Management**		
Module outcomes: Students should be able to: • Differentiate and characterize breeds of pigs and their potential contribution to the Pork Industry in South Africa; • Integrate pig production systems with components of pork quality and major aspects of producer to consumer chain in the pig industry; • Develop, plan, implement and manage pig breeding and selection, nutrition, reproduction and health programmes for the breeding herd; • Evaluate management practices involved in effective feeding, breeding, reproduction, health and housing of pigs as well as their relationship in assuring a profitable pig enterprise.		
Method of delivery: Contact		
Assessment modes: Continuous Formative and Summative Assessments		
Module code: ANDM321	**Semester 2**	**NQF level: 7**
Title: **Practical Animal Production**		
Module outcomes: Students should be able to: • Apply practical handling skills and management to handle farm animals; • Observe and be exposed to major livestock and related industries in southern africa; • Manage feeding and breeding and keep farm records in assurance of general livestock management; • Evaluate animal breeding, nutrition, reproduction and health programmes; • Assess the viability, economic outlook and current situations of subsistence and commercial livestock farm enterprises; • Write a scientific report about the work experience done.		
Method of delivery: Visits to Farm Facilities for Hands On Practical		
Assessment modes: Assignments and Mentor's Report		

NAS.2.4 BSC AGRICULTURE IN ANIMAL SCIENCE

Module code: ANSM121	Semester 2	NQF level: 5
Title: **Introduction to Agricultural Biometry**		
Module outcomes: Students should be able to: • Summarize data in the form of graphs and descriptive statistics; • Solve probability application problems in agriculture; • Differentiate random variables and associated distributions, relationship between population and samples within context of central limit theorem; • Write statistical hypothesis, carryout analyses and test hypotheses based on simple statistical procedures.		
Method of delivery: Contact		
Assessment modes: Continuous Formative and Summative Assessments		
Module code: ANSM211	**Semester 1**	**NQF level: 6**
Title: **Introduction to Animal Science**		
Module outcomes: Students should be able to: • Describe the South African animal science industry overview;		

- Explain the role of animal science to economic and human development;
- Distinguish, identify and differentiate breeds of farm animals used in South Africa and modes of animal classification;
- Justify why breeds of farm animals are located in different environments based on their adaptability features and mechanism;
- Summarise the basic introductory principles of the physiology of growth and development, reproduction, breeding, nutrition and health of farm animals.

Method of delivery: Contact

Assessment modes: Continuous Formative and Summative Assessments

Module code: ANSM214	**Semester 1**	**NQF level: 6**

Title: **Ruminant Production Science**

Module outcomes:

Students should be able to:

- To describe the South African ruminant industry overview;
- Describe the economic importance of the ruminant industry in human and economic development;
- Identify and describe the physical and production characteristics of different breeds of sheep, goats, beef and dairy cattle;
- Locate different breeds of sheep, goats, beef and dairy cattle to various livestock production systems and climatic conditions;
- Explain the role and application of management principles, such as rearing systems (calves/lambs/kids), breeding and selection, reproduction and feeding (nutrition) in various ruminant production systems.

Method of delivery: Contact

Assessment modes: Continuous Formative and Summative Assessments

Module code: ANSM223	**Semester 2**	**NQF level: 6**

Title: **Animal Nutrition**

Module outcomes:

Students should be able to:

- Describe the importance of animal nutrition and explain the processes of digestion, absorption and metabolism in ruminants and non-ruminants and their end products;
- Identify, classify and distinguish the main components of feed of plant and animal origin consumed by farm animals and south african feedstuff according to their nutritive value;
- Summarize role played by nutrients in the health of animals and the importance of enzymes in animal nutrition;
- Solve problems related to the determination of the nutrient content of feeds using proximate system of analysis;
- Justify the importance of conducting digestibility trials.

Method of delivery: Contact

Assessment modes: Continuous Formative and Summative Assessments

Module code: ANSM224	**Semester 2**	**NQF level: 6**

Title: **Non-Ruminant Production**

Module outcomes:

Upon completion of this module, the learner(s) should be able to:

- Demonstrate an understanding of the poultry and pig industry, poultry and pig breeds and contribution in agriculture.
- Evaluate and provide recommendation on monogastric products and their quality and marketing. Develop a comprehensive plan of a poultry production unit health programme.
- Propose strategies on improvement of poultry production system and appropriate breeds.
- Apply modern management techniques in efficient feeding and rearing of broilers and layers.

Method of delivery: Contact

Assessment modes: Continuous Formative and Summative Assessments

Module code: ANSM226	**Semester 2**	**NQF level: 6**

Title: **Animal Genetics and Breeding**

Module outcomes:

Upon completion of this module, the learner(s) should be able to:

- Differentiate the main branches of Animal Genetics and Breeding and their relationship with cell biology and basic molecular mechanisms;
- Explain the principles of Mendelian genetics and calculation of probabilities;
- Discuss the genetic effects in the population;
- Evaluate the methods and tools available for use in genetic improvement of livestock

Method of delivery: Contact

Assessment modes: Continuous Formative and Summative Assessments

Module code: ANSM311	**Semester 1**	**NQF level: 7**

Title: **Principles of Veld Management**

Module outcomes:

Students should be able to:

- Describe the growth and developmental morphology of forages;
- Compare and contrast the different types of grazing systems in veld management;
- Explain the processes of plant succession;
- Identify and explain the veld ecosystem components and their functions;
- Summarise the procedures for the production of hay and silage, and be able to suggest a fodder production and preservation plan given specific farm condition;
- Differentiate grassland management in different veld types and identify the major grouping of veld types in S.A,. And be aware of their nutritional value;
- Justify the need for rangeland monitoring and awareness of the behaviour of ruminants on grazing as well as the need for grazing in livestock production.

Method of delivery: Contact

Assessment modes: Continuous Formative and Summative Assessments

Module code: ANSM312	**Semester 1**	**NQF level: 7**

Title: **Applied Agricultural Biometry**

Module outcomes:

Students should be able to:

- Develop appropriate statistical hypothesis and design for different research problems;
- Recognize when and how to apply some widely used hypotheses testing procedures;
- Apply analysis of variance (anova) procedures to test hypotheses from widely recognized experimental designs in agriculture;
- Critique experimental design of published research articles in agricultural research.

Method of delivery: Contact

Assessment modes: Continuous Formative and Summative Assessments

Module code: ANSM313	**Semester 1**	**NQF level: 7**

Title: **Agricultural Biochemistry**

Module outcomes:

Students should be able to:,

- Describe the biochemical importance of water and its ionization products in the body;
- Differentiate different solutions into basic or acidic medium solutions based on their ph;
- Differentiate between proteins, carbohydrates, lipids, nucleic acids and vitamins on the basis of their elementary composition and biochemical importance;

- Distinguish the components of dna & rna, recognise the genetic implications of several enzymes in key metabolic process and the vital importance of the mechanism of enzyme synthesis within the cell.

Method of delivery: Contact

Assessment modes: Continuous Formative and Summative Assessments

Module code: ANSM314	**Semester 1**	**NQF level: 7**

Title: **Physiology of Reproduction and Growth**

Module outcomes:

Students should be able to:

- Identify reproductive systems of the female and male animals and conceptualise their functions;
- Integrate the physiological mechanisms that regulate reproduction in farm animals;
- Summarise the process of fertilisation, gestation and parturition in farm animals;
- Apply reproductive technologies to improve and manage reproduction in farm animals and solve problems related to reproduction in farm animals;
- Evaluate growth and development in domestic animals;
- Evaluate factors affecting growth (prenatal and postnatal) and technologies to improve growth in farm animals.

Method of delivery: Contact

Assessment modes: Continuous Formative and Summative Assessments

Module code: ANSM322	**Semester 2**	**NQF level: 7**

Title: **Planted Pastures and Fodder Crops**

Module outcomes:

Students should be able to:

- Explain and describe the role of planted pastures and crops;
- Evaluate the basic principles concerning establishment of planted pastures;
- Analyze and plan a basic fertilization program for planted pastures and fodder crops;
- Discuss weed control program in establishing cultivated pastures;
- Analyze and choose a specific pasture species for a specific situation;
- Identify species available on market and how species fit into a fodder flow program.

Method of delivery: Contact

Assessment modes: Continuous Formative and Summative Assessments

Module code: ANSM323	**Semester 2**	**NQF level: 7**

Title: **Quantitative Genetics**

Module outcomes:

Students should be able to:

- To apply the principles of gene and genotypic frequency determination procedures for economically important traits in livestock population;
- Demonstrate understanding of statistical principles as applied to quantitative traits;
- Use the procedure for testing breeding animals for undesirable genetic defects;
- Know the basic principles, application and procedures of estimating heritability, repeatability, genetic and phenotypic correlations for various economically important traits in livestock;
- Master the procedure of estimating breeding values;
- Respond to selection and dissemination of genetic gain in livestock population.

Method of delivery: Contact

Assessment modes: Continuous Formative and Summative Assessments

Module code: ANSM326	Semester 2	NQF level: 7
Title: **Small Ruminant Production Science**		
Module outcomes: Students should be able to: • Describe the small ruminant industry and its economic importance in human and economic development; • Identify and describe the physical and production characteristics of different breeds of sheep and goats; • Locate different breeds of sheep and goats, to various livestock production systems and climatic conditions; • Explain the role and application of management principles such as rearing systems (lambs/kids), breeding and selection, reproduction and feeding (nutrition) in small ruminant production systems; • Explain the principles of marketing in sheep and goats enterprise.		
Method of delivery: Contact		
Assessment modes: Continuous Formative and Summative Assessments		
Module code: ANSM412	**Semester 1**	**NQF level: 8**
Title: **Applied Animal Breeding**		
Module outcomes: Students should be able to: • Demonstrate understanding of fundamental principles, theory, concept and procedures associated with inbreeding and crossbreeding as mating systems in genetic improvement of farm animals, • Analyse animal performance and pedigree data to estimate genetic parameters (heritability and genetic correlations), breeding values, genetic gains, inbreeding effects and crossbreeding outcomes for a given livestock population; • Review and summarize scientific publications regarding genetic parameters, breeding values, inbreeding effects and crossbreeding values for economically important traits in livestock.		
Method of delivery: Contact		
Assessment modes: Continuous Formative and Summative Assessments		
Module code: ANSM415	**Semester 1**	**NQF level: 8**
Title: **Beef Production Science**		
Module outcomes: Students should be able to: • Recognise the economic important role of the large stock industry in South Africa; • Plan, monitor and critically evaluate, breeding, reproductive, nutritional and health programmes; • Design, recommend and use large stock facilities, equipment and buildings; • Develop, plan, implement and manage large stock enterprise according to their production systems; • Implement animal health programmes to assure preventative measures to various diseases.		
Method of delivery: Contact		
Assessment modes: Continuous Formative and Summative Assessments		
Module code: ANSM416	**Semester 1**	**NQF level: 8**
Title: **Applied Non-Ruminant Nutrition**		
Module outcomes: Students should be able to: • Explain and describe the digestive tract of pigs, horses, poultry, horse and rabbits; • Summarise feeding management of non-ruminants;		

- Discuss the use of feed additives classes as drugs;
- Briefly discuss nutritional management and environmental pollution in non-ruminants animals;
- Analyse the gaps and solve problems related to the quality of livestock.

Method of delivery: Contact

Assessment modes: Continuous Formative and Summative Assessments

Module code: ANSM423	**Semester 2**	**NQF level: 8**

Title: **Practical Experience**

Module outcomes:

Students should be able to:

- Apply practical handling skills and management to handle farm animals through observations and exposure to major livestock and related industries in Southern Africa;
- Manage feeding and breeding and keep farm records in assurance of general livestock management;
- Evaluate animal breeding, nutrition, reproduction and health programmes;
- Assess the viability, economic outlook and current situations of subsistence and commercial livestock farm enterprises;
- Write a scientific report about the work experience;
- Integrates academic learning with its application in the workplace that is, combining theory with practice as part of an enrolled program of study (will makes a significant contribution to our graduates' work and industry-readiness);
- Partner with industry, community, government and other educational providers on and offshore.

Method of delivery: Contact

Assessment modes: Students are to submit a report of all activities done during the time and will carry a cumulative weight of 50%. The assessment by the mentor using a standard assessment tool as approved by the Animal Science department, will also carry a cumulative weight of 50%. The 50% of the report and the 50% of the mentor's assessment tool will then be added to give a final mark. A student will have passed the module if the final mark is 50%.

Module code: ANSM426	**Semester 2**	**NQF level: 8**

Title: **Pig Production Science**

Module outcomes:

Students should be able to:

- Recognise the potential contribution of the South African Pork industry to animal protein production;
- Integrate pig production systems with components of pork quality and major aspects of producer to consumer chain in the pig industry;
- Develop, plan, implement and manage pig breeding and selection, nutrition, reproduction and health programmes for the breeding herd;
- Develop, plan, implement and manage large stock enterprise according to their production systems;
- Evaluate management practices involved in effective feeding, breeding, reproduction, health and housing of pigs, as well as their relationship in assuring a profitable pig enterprise;
- Intergrate pig production practises and the pillars of sustainable pig production, namely environmental, economic and socio-cultural sustainability

Method of delivery: Contact

Assessment modes: Continuous Formative and Summative Assessments

Module code: ANSM427	Semester 2	NQF level: 8

Title: **Poultry Production Science**

Module outcomes:

Students should be able to:

- Demonstrate understanding of the importance of the external and internal anatomical features and physiology of the chicken;
- Demonstrate the ability to successfully use a hatchery to incubate and hatch eggs;
- Differentiate the methods of housing poultry and be able to match the housing system with the environment and management**;**
- Describe how poultry waste must be managed;
- Differentiate between feeding methods of layers and broilers;
- Draw a vaccination plan for layers and broilers;
- Outline a marketing strategy for poultry products;
- Apply modern management techniques in efficient feeding and rearing of broilers and layers;
- Develop a poultry production unit health programme.

Method of delivery: Contact

Assessment modes: Continuous Formative and Summative Assessments

Module code: ANSM428	Semester 2	NQF level: 8

Title: **Dairy Production Sciences**

Module outcomes:

Students should be able to:

- Outline the history and development of the South African dairy industries and identify factors affecting production and composition of milk;
- Integrate the principles and factors involved in dairy production;
- Summarise the physiological mechanism mammogenesis, lactogenesis, galactopoesis, milk secretion and involution;
- Analyse quality control and regulations in production and processing of dairy products;
- Evaluate milking parlour and equipment as well as system analysis and operation.

Method of delivery: Contact

Assessment modes: Continuous Formative and Summative Assessments

Module code: ANSM479	Year module	NQF level: 8

Title: **Research Project**

Module outcomes:

Students should be able to:

- Demonstrate in-depth knowledge of the research methodology in the field of Animal Science Research, plan and perform investigations and experiments by utilizing scientific modelling techniques, analyze, interpret and derive information from data and apply appropriate scientific methods to evaluate the results;
- Demonstrate specialist knowledge in the field of Animal Science Research to enable engagement with, and critique of, current research or practices in combination with advanced scholarship or research in specific fields within the Animal Science discipline;
- Identify, evaluate and creatively and innovatively address, under supervision, certain convergent and divergent problems in Animal Science;
- Understand the consequences of solutions or insights generated within the context of Animal Science, be able to make autonomous ethical decisions which affect knowledge production or complex organisational or professional issues, and make critical contributions to the development of ethical standards;
- Communicate and defend ideas and results that are the products of the research in the field of Animal Science and use a range of advanced and specialised skills to communicate to a range of audiences with different levels of knowledge or expertise;

- Operate independently and take full responsibility for his/her own as well as others' work, and, where appropriate, to account for leading and initiating processes and implementing systems.

Method of delivery: Contact

Assessment modes:
Continuous Formative Assessment (in the form of assignments and oral presentations) is aimed at determining the student's progress towards attaining the stipulated outcomes. The student's ability to use and apply specific methodological skills is furthermore evaluated in his/her critical review of current literature in the subject area and the formulation and execution of a research project. The student is to report on it and generate an integrated dissertation of research findings. The supervisor assesses continuously while the dissertation is being written. Examination of the dissertation is finally done by at least one external examiners, who is an expert in the Animal Science field of specialization. A supervisor is not appointed as an examiner.

This module consists of two components i.e. a *research proposal* and a *research mini dissertation*. All of the formative assessment tasks mentioned above (with a cumulative weight of 50%), will be used to calculate the final mark of each student for this module. The external examiner will provide a mark in the form of a percentage that will have a cumulative weight of 50%. The 50% of the research proposal and 50% from the external examiner will be added and will serve as a final mark for this module. A student will have passed the module if the addition of two formative assessments adds up to 50%.

Module code: CSDM111	**Semester 1**	**NQF LEVEL 5 CREDITS 12**

Title: **Botany for Agriculture**

Module outcomes:
Students should be able to:
- Describe basic plant taxonomy, morphology, and anatomy and function in plants;
- Learners will be able to outline the principles of classification including concepts of species, genus, family, order, division and kingdom, binomial system of nomenclature;
- Learners will be able to understand the processes of photosynthesis and transpiration;
- Learners will be able to explain the relationship between plant botany, genetics and plant breeding.

Method of delivery: Contact - Lectures, Discussions, Seminars, PowerPoint

Assessment modes: Assignments, Class Tests, Quizzes, Practicals, Term Papers, Final End of Semester Examination

Module code: CSDM121	**Semester 2**	**NQF LEVEL 5 CREDITS 12**

Title: **Introduction to Crop Production**

Module outcomes:
Students should be able to:
- Appreciate the importance of crop plants in human welfare;
- Learners will be able to understand the objectives of crop production and be familiar with the basic concepts of crop production strategies relating to yield and quality;
- Learners will be knowledgeable about tillage practices and concerns about sustainable crop production and practices aimed at achieving sustainability and are familiar with fertilizer types, rates and methods of application and know the different soil factors affecting crop production.

Method of delivery: Contact - Lectures

Assessment modes: Tests, Assignments ,Practical Assessments And Examination

Module code: CSDM211	Semester 1	NQF LEVEL 6 CREDITS 16

Title: **Introduction to Soil Science**

Module outcomes:

Students should be able to:

- Demonstrate an understanding of soil as a natural entity for sustainable agriculture as they study each of the areas of soil science: soil genesis, soil physics, soil conservation, soil microbiology, soil chemistry, and soil fertility;
- Knowledge of these soil properties will enable students to gain basic understanding of soils and their importance and relevance in different areas of agriculture (they will therefore be able to appreciate soils as a natural resource for south africa and for the world);
- Develop an understanding of the role that soils play in the agricultural and economic situation in south africa and the world.

Method of delivery: Contact – Teaching, Powerpoint Presentations

Assessment modes: Tests, Assignments ,Practical Assessments and Examinations

Module code: CSDM212	Semester 1	NQF LEVEL 6 CREDITS 12

Title: **Agricultural Climatology**

Module outcomes:

Students should be able to:

- Describe the basic weather elements in agriculture, their measurement and influence on crop and animal production in the North West Province, South Africa and the world at large.
- Collect and summarize the basic weather elements in agriculture.

Method of delivery: Contact - Lectures

Assessment modes: Tests, Assignments ,Practical Assessments and Examinations

Module code: CSDM213	Semester 1	NQF LEVEL 6 CREDITS 8

Title: **Farm Machinery**

Module outcomes:

Students should be able to:

- Take proper care of farm machinery and implements;
- Use farm implements and machinery properly;
- Do minor repairs of farm implements and machinery;
- Do budgeting of farm operations;
- Make use of equipment used in the construction of farm buildings;
- Demonstrate an understanding of the construction of farm buildings and the budgeting for construction;

Produce simple designs of farm buildings.

Method of delivery: Contact - Lectures

ssment modes: Tests, Assignments ,Practical Assessments and Examinations

Module code: CSDM215	Semester 1	NQF LEVEL 6 CREDITS 8

Title: **Vegetable Production**

Module outcomes:

Students should be able to:

- Select and grow vegetables in specific agro-ecological regions of South Africa;
- Be knowledgeable in the agronomy of major vegetables grown in RSA;
- Be competent in organic farming principles;

Apply theoretical and practical knowledge to guide farmers and gardeners to produce vegetables.

Method of delivery: Contact - Lectures

Assessment modes: Formal Class Tests, Practical/Field Reports, Assignments

Module code: CSDM221	**Semester 2**	**NQF LEVEL 6 CREDITS 16**

Title: **Principles of Crop Improvement**

Module outcomes:

Students should be able to:

- Explain the importance of genetic crop improvement in increasing crop yield and quality and have an appreciation of plant breeder's work;
- Explain the difference between self- and cross-pollinated crops;
- Clarify how genetic principles relate to plant breeding methods;

Outline and explain seed certification and multiplication principles.

Method of delivery: Contact - lectures, discussions, seminars, PowerPoint

Assessment modes: Formative: Assignments, Class Tests, Quizzes, Practicals, Term Papers; Summative: Final End of Semester Examination

Module code: CSDM222	**Semester 2**	**NQF LEVEL 6 CREDITS 16**

Title: **Soil Fertility and Fertilizers**

Module outcomes:

Students should be able to:

- Demonstrate strong knowledge of how soil conditions affect plant growth and suggest possible management practices to increase crop yield;
- Gain knowledge of the 17 essential elements required for plant growth in regards to factors which affect nutrient availability in soils;
- Evaluate the fertility status of soils and make subsequent fertilizer recommendations

Method of delivery: Contact – Teaching, Powerpoint Presentations, Excursions to Complement Teaching

Assessment modes: Tests, Assignments ,Practical Reports and Examinations

Module code: CSDM223	**Semester 2**	**NQF LEVEL 6 CREDITS 12**

Title: **Soil Conservation**

Module outcomes:

Students should be able to:

- Describe various types of land degradation and how they are caused, as well as identify and assess different stages and forms of soil degradation;
- Have an understanding of how different soil management practices affect soil quality and the role that these have on agricultural productivity;
- Identify and describe different strategies used in soil conservation.

Method of delivery: Contact - Lectures

Assessment modes: Tests, Assignments, Reports and Examination

Module code CSDM224	**Semester 2**	**NQF LEVEL 6 CREDITS 8**

Title: **Farm Practical II**

Module outcomes:

Students should be able to:

- Demonstrate practical skills in the production of vegetable and field crops;
- Identify weeds, insects and diseases associated with vegetable and field crops;
- Demonstrate the application of appropriate control measures for pests;
- Demonstrate irrigation and fertilizer management in the production of vegetables and field crops;

- Select and correctly use farm implements and machinery for various cultural practices, mainly for field crops;
- Demonstrate harvesting, sorting and grading crop products for marketing;
- Draw up a business plan for field crops;
- Calculate yield estimations for field crops;

Design crop rotation programmes for field crops.

Method of delivery: Contact - Hands-on Field Activities, Field Trips and Excursions

Assessment modes: Practical and Field Trip Reports

Module code: CSDM225	**Semester 2**	**NQF LEVEL 6 CREDITS 8**

Title: **Fruit Production**

Module outcomes:

Students should be able to:

- Identify different fruit crops;
- Apply theoretical and practical knowledge in the production and cultural practices of fruit crops;
- Show competence in the fruit propagation techniques such as budding and grafting, harvesting, grading storage and marketing of fruit produce;
- Be knowledgeable in the role of plant hormones in the growth, flowering and ripening of fruits;
- Demonstrate skills in basic post-harvest fruit processing techniques.

Method of delivery: Contact – Lectures

Assessment modes: Formal Class Tests, Practical/Field Reports, Assignments

Module code: CSDM311	**Semester 1**	**NQF LEVEL 7 CREDITS 8**

Title: **Agronomy of Summer Crops**

Module outcomes:

Students should be able to:

- Know the origin, economic importance, distribution and morphology, the climatic and soil requirements and the appropriate cultural practices, for each prescribed summer crop.

Method of delivery: Contact - Lectures

Assessment modes: Tests, Assignments ,Practical Assessments and Examination

Module code: CSDM312	**Semester 1**	**NQF LEVEL 7 CREDITS 16**

Title: **Plant Protection**

Module outcomes:

Students should be able to:

- Understand and interpret the reports on plant protection;
- Identify common garden and field pests and diseases;
- Come up with appropriate control measures for the identified pests;
- Show competence in knapsack and boom sprayer calibration;
- Introduce new information about plant protection to farmers;
- Guide and supervise farmers regarding plant protection;
- Understand the quarantine /phytosanitory regulations of rsa.

Method of delivery: Contact - Lectures

Assessment modes: Formal Class Tests, Practical/Field Reports, Assignments

Module code: CSDM315	Semester 1	NQF LEVEL 7 CREDITS 8

Title: **Pedology and Soil Classification**

Module outcomes:

Students should be able to:

- Describe the factors and processes involved in the formation of soils;
- Describe the different categories of horizons;
- Explain the principles behind soil classification;
- Explain how diagnostic horizons are employed in the classification of soils;
- Describe the major systems of soil classification and be able to explain how the south african system of soil classification fits in other global systems.

Method of delivery: Contact - Lectures

Assessment modes: Tests, Assignments ,Practical Assessments and Examination

Module code: CSDM321	Semester 2	NQF LEVEL 7 CREDITS 8

Title: **Agronomy of Winter Crops**

Module outcomes:

Students should be able to:

- Know the origin, economic importance distribution, and morphology, the climatic and soil requirements and the appropriate cultural practices for each prescribed winter crop.

Method of delivery: Contact - Lectures

Assessment modes: Tests, Assignments ,Practical Assessments and Examination

Module code: CSDM322	Semester 2	NQF LEVEL 7 CREDITS 16

Title: **Weeds and Weed Control**

Module outcomes:

Students should be able to:

- Identify weed species and come up with weed control measures;
- To comprehend and interpret literature related to weed control;
- Supervise and guide farmers how to control weeds;
- Introduce to farmers new technology of weed control;
- Understand the use of selective and non-selective herbicides;
- Show competence in knapsack and boom sprayer calibration.

Method of delivery: Contact - Lectures

Assessment modes: Formal Class Tests, Practical/Field Reports, Assignments

Module code: CSDM323	Semester 2	NQF LEVEL 7 CREDITS 16

Title: **Elements of Agriculture Microbiology**

Module outcomes:

Students should be able to:

- Describe the different groups of microorganisms that are of significance in agriculture;
- Explain the function of these groups of microorganisms in agricultural productivity;
- Explain how environmental factors and soil management techniques influence the dissemination and control of microorganisms of significance in agriculture, and apply knowledge of the ecological and nutritional requirements of the major groups of microorganisms in designing environmentally friendly methods of disease control.

Method of delivery: Contact – Teaching, Provision of Lecture Notes as Powerpoint Presentation/Slides and Assignment Topics are Pasted on Efundi.

Assessment modes: Assessment is Through Tests, Assignments, Practical Reports and Examination.

Module code: CSDM324	Semester 2	NQF LEVEL 7 CREDITS 16
Title: **Elementary Irrigation**		
Module outcomes: Students should be able to: • Explain the role of irrigation in agriculture; • Select an appropriate irrigation system for horticultural and field crops and environment; • Show diagnostic skills in operation and maintenance of irrigation infrastructure; • Demonstrate agronomic management of irrigated crops; • Monitor crop water requirement and schedule irrigation; Manage drainage and salinity problems in irrigation.		
Method of delivery: Contact – Lectures		
Assessment modes: Formal Class Tests, Practical/Field Reports, Assignments		
Module code: CSDM371		**NQF LEVEL 7 CREDITS 16**
Title: **Practical Crop Production**		
Module outcomes: Students should be able to: • Show practical skills in the production of vegetable; • Identify weeds, insects and diseases associated with all aspects of crop production, vegetables, field crops and orchards; • Demonstrate the application of appropriate management and control measures for pests and diseases; • Irrigation and fertilizer management in the production of vegetables and field crops; • Select and correctly use farm implements and machinery for various cultural practice; • Understand harvesting, sorting and grading crop products for marketing; • Draw up a business plan for vegetable and field crops; • Calculate yield estimations for vegetables and crops; • Demonstrate design of vegetable and crop production programme; • Layout field trials; • Operate farm machinery properly; • Calibrate implements properly; • Weigh and apply fertilizers properly; • Classify soils at particular site; • Calculate yield and plant population estimates.		
Method of delivery: Contact - Hands-on Field Activities, Field Trips and Excursion		
Assessment modes: Practical and Field Trip Reports		

NAS.2.5 AGRICULTURE – AGRONOMY AND HORTICULTURE SCIENCE

Module code: CSMP411	Semester 1	NQF LEVEL 8 CREDITS 16
Title: **Advanced Plant Breeding**		
Module outcomes: Students should be able to: • Develop well defined breeding objectives; • Plan a plant breeding programme; • Demonstrate understanding of conventional and unconventional plant breeding methods for self- and cross-pollinated crops; • Demonstrate understanding of breeding methods for selected crops;		

- Explain the concepts of classical quantitative genetics in breeding programmes;
- Be able to demonstrate practical skills in pollinating plants;
- Demonstrate understanding and application of molecular breeding techniques;
- Articulate on the societal issues with regard to GMOs.

Method of delivery: Contact - Lectures, Discussions, Seminars and PowerPoint

Assessment modes: Formative – Assignments, Class Tests, Quizzes, Practical, Term Papers; Summative – Final End Of Semester Examination

Module code: CSMP412	**Semester 1**	**NQF LEVEL 8 CREDITS 12**

Title: **Horticultural Science**

Module outcomes:

Students should be able to:

- Understand the effect of climate on horticultural production;
- Demonstrate the ability to comprehend scientific literature related to horticultural production;
- Have understanding and practical skills/exposure in scientific propagation techniques such as use of tissue culture, hydroponics in horticulture;
- Be equipped with mushroom production technology;
- Conduct projects to demonstrate ability of project management;
- Add value to horticultural produce in RSA.

Method of delivery: Contact - Lectures

Assessment modes: Formal Class Tests, Practical/Field Reports, Assignments

Module code: CSPM211	**Semester 1**	**NQF LEVEL 6 CREDITS 16**

Title: **Introduction to Soil Science**

Module outcomes:

Students should be able to

- Demonstrate an understanding of soil as a natural entity for sustainable agriculture;
- Gain insight into the genesis, physics, chemistry, biology and microbiology of soils;
- Demonstrate basic knowledge of how these soil properties interact to affect soil quality for different purposes will be gained;
- Demonstrate the skills and ability to perform basic tests aimed at assessing soil fertility;
- Appreciate soils as a natural resource for south africa and for the world;
- Develop an understanding of the role that soils play in the agricultural and economic situation in south africa and the world.

Method of delivery: Contact - Lectures

Assessment modes: Formal Class Tests, Practical/Field Reports, Assignments, Final 3 hr Written Examination Paper

Module code: CSPM212	**Semester 1**	**NQF LEVEL 6 CREDITS 12**

Title: **Agricultural Climatology**

Module outcomes:

Students should be able to

- Summarize and interpret weather data.
- Identify the climate variables that may affect agricultural productivity.
- Read and measure weather data.
- Predict effects of man's activities on climate change.

Method of delivery: Contact - Lectures

Assessment modes: Tests, Assignments ,Practical Assessments and Examination

Module code: CSPM213	Semester 1	NQF LEVEL 6 CREDITS 8

Title: **Farm Machinery**

Module outcomes:

Students should be able to:

- Take proper care of farm machinery and implements;
- Use farm implements and machinery properly;
- Do budgeting of farm operations;
- Demonstrate an understanding of how farm buildings are constructed and the budgeting for construction of farm buildings;
- Produce simple designs of farm buildings.

Method of delivery: Contact - Lectures

Assessment modes: Tests, Assignments ,Practical Assessments and Examination

Module code: CSPM221	Semester 2	NQF LEVEL 6 CREDITS 16

Title: **Introduction to Crop Production**

Module outcomes:

Students should be able to:

- Understand climatic factors on crop production;
- Gain knowledge on organic farming and quality in crop products;
- Understand the different management practices on crop production, such as tillage, rotation, intercropping and conservation agriculture.

Method of delivery: Contact – Teaching, Provision of Lecture Notes through Powerpoint Presentation Slides and Assignment Topics are Pasted on Efundi.

Assessment modes: Tests, Assignments, Practical Reports and Examinations.

Module code: CSPM222	Semester 2	NQF LEVEL 6 CREDITS 16

Title: **Soil Fertility and Fertilizers**

Module outcomes:

Students should be able to:

- Demonstrate a good knowledge of how soil conditions (such as soil texture, soil ph, clay mineralogy and cation exchange capacity) affect plant growth and suggest possible management practices to increase crop yield;
- Gain knowledge of the 17 essential elements required for plant growth in regards to factors which affect nutrient availability in soils;
- Evaluate the fertility status of soils and make subsequent fertilizer recommendations.

Method of delivery: Contact – Teaching, Powerpoint Presentations, Excursions to Complement Teaching

Assessment modes: Tests, Assignments ,Practical Reports and Examination

Module code: CSPM223	Semester 2	NQF LEVEL 6 CREDITS 12

Title: **Soil Conservation**

Module outcomes:

Students should be able to:

- Describe various types of land degradation and how they are caused, as well as identify and assess different stages and forms of soil degradation;
- Have an understanding of how different soil management practices affect soil quality and the role that these have on agricultural productivity;
- Demonstrate knowledge of the effect of agricultural activities on soil degradation and vice versa;

- Identify and describe different strategies and management techniques used in controlling soil degradation.

Method of delivery: Contact – Teaching, Provision of Lecture Notes Through Powerpoint Presentation Slides and Assignment Topics are Pasted on Efundi.

Assessment modes: Tests, Assignments, Examination, Practical Reports and Examination.

Module code: CSPM225	**Semester 2**	**NQF LEVEL 6 CREDITS 12**

Title: **Agricultural Microbiology**

Module outcomes:

Students should be able to:

- Identify and describe microorganisms that commonly present in soils, plants and animals;
- Differentiate beneficial and pathogenic microorganisms in agriculture, and have an understanding of the role that both beneficial and pathogenic microorganisms play in agricultural productivity;
- Know the role of these microorganisms in nutrient cycling in agriculture and how to control the dissemination of microorganisms that are pathogenic to plants and animals.

Method of delivery: Contact - Lectures

Assessment modes: Formal Class Tests, Practical/Field Reports, Assignments

Module code: CSPM311	**Semester 1**	**NQF LEVEL 7 CREDITS 8**

Title: **Agronomy of Summer Crops**

Module outcomes:

Students should be able to:

- For each prescribed summer crop:
  - know its origin, economic importance distribution, and morphology;
  - know its climatic and soil requirements and its appropriate cultural practices;
  - know its fertilizer requirements;
  - know current challenges and topical issues in the production of the crop and related areas of research focus.

Method of delivery: Contact – Teaching, Provision of Lecture Notes Through Powerpoint Presentation Slides and Assignment Topics are Pasted on Efundi.

Assessment modes: Tests, Assignments, Practical Reports and Examination.

Module code: CSPM313	**Semester 1**	**NQF LEVEL 7 CREDITS 16**

Title: **Vegetable Production**

Module outcomes:

Students should be able to:

- Understand the importance and classification of vegetables and also the vegetable industries;
- Gain knowledge on different methods of vegetable propagations;
- Understand aspects of vegetable production such as hydroponics and transplanting;
- Gain knowledge on different production methods of selected vegetables.

Method of delivery: Contact – Teaching, Provision of Lecture Notes Through Powerpoint Presentation Slides and Assignment Topics are Pasted on Efundi.

Assessment modes: Tests, Assignments, Practical Reports and Examination.

Module code: CSPM317	Semester 1	NQF LEVEL 7 CREDITS 8

Title: **Plant Pathology and Nematology**

Module outcomes:

Students should be able to:

- Carry out disease field and laboratory diagnosis of plant diseases and parasitic nematodes for the commonly cultivated field and horticultural crops;
- Identify the non-pathogenic plant diseases;
- Comprehend the plant diseases infection processes and development of both polycyclic and monocyclic diseases of various crops (fungal, viral and bacterial diseases);
- Comprehend and interpret research data and literature on plant pathology and nematology;
- Understand and interpret legislation governing control of diseases and nematodes e.g. Quarantine/phytosanitary control regulations;
- Advise the farming community on how to prevent or control plant diseases and nematodes.

Method of delivery: Contact - Lectures

Assessment modes: Formal Class Tests, Practical/Field Reports, Assignment

Module code: CSPM319	Semester 1	NQF LEVEL 7 CREDITS 8

Title: **Agricultural Entomology**

Module outcomes:

Students should be able to:

- Carry out field and laboratory identification of pests (arthropods, insects & vertebrates), for the commonly cultivated field and horticultural crops;
- Comprehend the biology and life cycle of arthropods and insect pests of different orders (orthoptera, hemiptera, homoptera, diptera);
- Comprehend and interpret research data and literature on agricultural pests;
- Understand and interpret legislation governing control of pests e.g. Quarantine/phytosanitary control regulations;
- Advise the farming community on how to prevent or control agricultural pests, including understanding of regional/international regulations on the management and control of migratory pests such red locust, fall armyworm and african armyworm.

Method of delivery: Contact - Lectures

Assessment modes: Formal Class Tests, Practical/Field Reports, Assignments

Module code: CSPM321	Semester 2	NQF LEVEL 7 CREDITS 8

Title: **Agronomy of Winter Crops**

Module outcomes:

Students should be able to:

- For each prescribed winter crop:
  - know its origin, economic importance distribution, and morphology;
  - know its climatic and soil requirements;
  - know its appropriate cultural practices;
  - know current challenges and topical issues in the production of the crop and research focus in addressing challenges.

Method of delivery: Contact – Teaching, Provision of Lecture Notes Through Powerpoint Presentation Slides and Assignment Topics are Pasted on Efundi.

Assessment modes: Tests, Assignments, Practical Reports and Examination.

Module code: CSPM322	Semester 2	NQF LEVEL 7 CREDITS 16
Title: **Weeds and Weed Control**		
Module outcomes: Students should be able to: • Have an in-depth understanding of the biology of agricultural weeds; • Identify weed species for water bodies, and ethnobotany; • Identify weed species; • Come up with appropriate weed control measures; • Have scientific knowledge in the use of herbicides, i.e. Modes of action and metabolism; • Recommend other non-chemical methods of weed control measures; • Comprehend and interpret literature related to weed control. • Supervise and guide farmers how to control weeds; • introduce to farmers new technology of weed control.		
Method of delivery: Contact - Lectures		
Assessment modes: Formal Class Tests, Practical/Field Reports, Assignments		
Module code: CSPM323	**Semester 2**	**NQF LEVEL 7 CREDITS 16**
Title: **Fruits Production**		
Module outcomes: Students should be able to: • Select appropriate fruit crops for specific area; • Apply theoretical and practical knowledge in establishment and management of orchards and vineyards giving particular attention to the following: propagation techniques, pruning and training, processing and marketing of fruit produce.		
Method of delivery: Contact - Lectures		
Assessment modes: Formal Class Tests, Practical/Field Reports, Assignments		
Module code: CSPM324	**Semester 2**	**NQF LEVEL 7 CREDITS 16**
Title: **Principles of Irrigation**		
Module outcomes: Students should be able to: • Know the basic concepts, tools, and skills used to deliver water efficiently and effectively, on both a field and garden scale; • Identify the most efficient irrigation system to use under various circumstances because they will have an understanding of the movement and cycling of water in agricultural systems, and the environmental factors that influence the type, frequency, and duration of irrigation; • Calculate the water requirement for irrigation, and specify for determinants of irrigation scheduling based on available irrigation system; • Conduct a simple evaluation of an existing irrigation system.		
Method of delivery: Contact - Lectures, Powerpoint Presentations, Video Shows, Group Task Presentation		
Assessment modes: Formal Class Tests, Practical/Field Reports, Assignments		

Module code: CSPM325/315	Semester 2	NQF LEVEL 7 CREDITS 8

Title: **Plant Physiology**

Module outcomes:

Students should be able to:

- Outline the importance of crop-soil-water relations;
- Explain the physiology and the role of mineral nutrients in plants;
- Outline the nitrogen, carbon, phosphorus and other major biogeochemical cycles;
- Explain photosynthetic processes and the different types of photosynthetic pathways;
- Explain water potential and outline the translocation process;
- Explain the significance of plant hormones in crop production as well as be able to explain dormancy and its significance in crop plants.

Method of delivery: Contact - Lectures, Discussions, Seminars, Powerpoint

Assessment modes: Formative: – Assignments, Class Tests, Quizzes, Practicals, Term Papers; Summative: – Final End of Semester Examination

Module code: CSPM326	Semester 1	NQF LEVEL 7 CREDITS 8

Title: **Principles of Genetics & Plant Breeding**

Module outcomes:

Students should be able to:

- Explain the concept of plant breeding;
- Demonstrate understanding of genetics as the basis of plant breeding;
- Apply mendel's principles of inheritance in plant breeding;
- Discuss the reproductive systems in plants and their importance/significance in breeding;
- Describe the dna structure and its importance as a modern tool in plant breeding;
- Discuss the impact of genetic engineering in society with reference to gmos.

Method of delivery: Contact - Lectures, Discussions, Seminars, Powerpoint

Assessment modes: Assignments, Class Tests, Quizzes, Practicals, Term Papers, Final End of Semester Examination

Module code: CSPM327	Semester 2	NQF LEVEL 7 CREDITS 8

Title: **Soil Survey & Land Use Planning**

Module outcomes:

Students should be able to:

- Be familiar with and describe the different kinds of soil survey;
- Utilize the knowledge of remote sensing and other soil information systems (i.e. Soil physical, chemical, vegetation and geologic) to generate soil map;
- Undertake soil evaluation by utilizing soil maps for land use planning purposes;
- Describe and apply the knowledge of precision agriculture and concept of management zones.

Method of delivery: Contact – Lectures and Powerpoint Presentations, Video Shows, Assign Project

Assessment modes: Formal Class Tests, Reports of Project & Practicals and Assignments

Module code: CSPM411	Semester 1	NQF LEVEL 8 CREDITS 8

Title: **Crop Production Systems**

Module outcomes:

Students should be able to:

- Give a global overview of different crop production systems;
- Know sustainable crop production;

- Gain knowledge on organic farming and categories of different farming systems.
- Understand different cropping systems;
- Know the advantages and disadvantages associated with each of the two major crop production systems;
- Analyse and interpret results from multiple cropping systems;
- Know how to assess yield advantages from multiple cropping systems.

Method of delivery: Contact – Teaching, Provision of Lecture Notes Through Powerpoint Presentation Slides and Assignment Topics Are Pasted on Efundi.

Assessment modes: Tests, Assignments, Practical Reports and Examination**.**

Module code: CSPM415	**Semester 1**	**NQF LEVEL 8 CREDITS 16**

Title: **Pedology and Soil Classification**

Module outcomes:

Students should be able to:

- Understand soil formation with regards to chemical & physical weathering and the soil pedogenic processes;
- Appreciate and understand the relationship between the factors of soil formation and soil formation in different environments;
- Describe various soil profiles and determine the environment of formation of each;
- Utilize soil field, laboratory, and environmental data to classify soils using different soil classification systems including the south african soil classification system.

Method of delivery: Contact - Lectures

Assessment modes: Formal Class Tests, Reports Of Practicals And Assignments

Module code: CSPM416	**Semester 1**	**NQF LEVEL 8 CREDITS 8**

Title: **Soil Physics**

Module outcomes:

Students should be able to:

- Appreciate the role of the three phases of soil in agriculture and the constraints that they present in plant growth;
- Know the basic concepts of transport and retention of water and solutes in the soil and comprehend transfer processes for water, air, solutes, and heat in soils;
- Perform laboratory and field experiments to measure selected physical properties of soils that affect soil water flow including the transport of heat, air and agrochemicals in soils;
- Apply the principles governing the flow and retention of water and solutes in the root zone to solve practical problems relating to general water management of soil-water-systems used in agriculture.

Method of delivery: Contact - Lectures, Powerpoint Presentations, Video Shows, Group Task Presentation

Assessment modes: Formal Class Tests, Practical/Field Reports, Assignments

Module code: CSPM419	**Semester 1**	**NQF LEVEL 8 CREDITS 12**

Title: **Soil Chemistry & Mineralogy**

Module outcomes:

Students should be able to:

- Demonstrate knowledge of the 3-phase soil system as the basis for explaining reaction processes of soil for fertility management;
- Explain and predict the various layer silicates that may be formed in soils using the knowledge of mineral stability diagrams;

- Understand knowledge of mineral solution chemistry including thermodynamic principles in soil system and apply these to explain availability of essential elements to crops;
- Demonstrate knowledge of exchange processes in relation to plant nutrient availability and uptake;
- Explain soil reaction in relation to soil fertility constraints with emphasis on soil acidity and alkalinity, and their management.

Method of delivery: Contact - Lectures, Powerpoint Presentations, Assigned Project

Assessment modes: Formal Class Tests, Reports of Practicals & Assigned Project, Assignments

Module code: CSPM421	**Semester 2**	**NQF LEVEL 8 CREDITS 16**

Title: **Crop Physiology**

Module outcomes:

Students should be able to:

- Relate crop growth analysis to practical field crop production;
- Explain the physiological basis of crop yield;
- Demonstrate an understanding of source-sink relationships;
- Apply their knowledge of plant hormones to crop production;
- Apply their knowledge of the physiology of mineral nutrition to better manage crop nutrition

Method of delivery: Contact, Lectures, Discussions, Seminars, Powerpoint

Assessment modes: Formative - Assignments, Class Tests, Quizzes, Practicals, Term Papers; Summative– Final End of Semester Examination

Module code: CSPM425	**Semester 2**	**NQF LEVEL 8 CREDITS 12**

Title: **Applied Crop Protection**

Module outcomes:

Students should be able to:

- Understand and apply scientific principles in practical crop protection to cover the following: Entomology, Plant Pathology and Nematology;
- Have understanding of Principles of Integrated Pest Management Programme;
- Under Entomology - have an in-depth knowledge of insect pest classification, focusing on the following important Genera: Hymenoptera, Coleoptera, and Lepidoptera;
- Under Plant Pathology - be knowledgeable in Plant Bacteriology, Mycology and Virology, that is, etiology and epidemiology of the major plant diseases of economic importance;
- Have basic understanding of Nematology;
- Demonstrate critical and creative thinking in research and development in areas of crop protection.

Method of delivery: Contact - Lectures

Assessment modes: Formal Class Tests, Practical/Field Reports, Assignments

Module code: CSPM426	**Semester 2**	**NQF LEVEL 8 CREDITS 12**

Title: **Soil Microbiology**

Module outcomes:

Students should be able to:

- Classify microorganisms in the soil, and appreciate the soil properties that favour the survival of the vast number and variety of microorganisms that inhabit the soil;
- Determine how different soil management techniques affect the diversity and population of microorganisms in the soil;
- Conduct measurements in soil microbiology, and apply microbiological technology to improve crop production.

Method of delivery: Contact – Lectures and Powerpoint Presentations		
Assessment modes: Formal Class Tests, Reports of Practicals and Assignments		
Module code: CSPM474	**Year module**	**NQF LEVEL 8 CREDITS 32**
Title: **Research Project and Seminar**		
Module outcomes: Students should be able to: • Conceptualize, prepare and submit research project proposal; • Conduct a critical review of literature review on identified research topic, critique relevant aspects of the literature, synthesize information generated and relate to own study; and present proposal at a departmental review forum for assessment; • Comply with the relevant nwu research ethics; • Successfully undertake the research project upon review as recommended during the presentation; • Collect and collate all data, and subject the data generated into useful and appropriate statistical analysis for interpretation; and draw useful inferences, and carefully document the findings in the form of a research report in an approved format.		
Method of delivery: Contact – Teaching on Research Methodology, Prepare and Submit Draft Research Proposal and Presentation, Supervision of Execution of Proposed Research, Data Collection, Presentation of Results of Data Collection And Writing of Final Report		
Assessment modes: Assessment of Oral Presentations (Research Proposal and Results/Findings), and Submitted Final Research Report.		
Module code: CSPM479	**Year module**	**NQF LEVEL 8 CREDITS 12**
Title: **Practical Crop Production Training**		
Module outcomes: Students should be able to: • Layout field trials; • Operate farm machinery properly; • Calibrate implements properly system ; • Weigh and apply fertilizers properly; • Classify soils at a particular site; • Calculate yield and plant population estimates.		
Method of delivery: Contact - Hands-on Field Activities, Field Trips and Excursion		
Assessment modes: Practical Reports		

NAS.2.5.1 AGRICULTURAL ECONOMICS

Module code: AEDM111	**Semester 1**	**NQF LEVEL 5 CREDITS 12**
Title: **Introduction to Agricultural Economics**		
Module outcomes: Students should be able to: • Provide an understanding of the main economic issues, concepts and tools of agricultural economics; • Develop an understanding of solving basic economic problems, outlining the potential solutions to those problems and describing the major types of economic system.		
Method of delivery:		
Assessment modes:		

Module code: AEDM314	Semester 1	NQF LEVEL 7 CREDITS 8

Title: **Farm Management and Accounting**

Module outcomes:

Students should be able to:

- Demonstrate understanding of farm management functions;
- Apply farm management principles and perform farm management and farm accounting tasks;
- Demonstrate understanding of financial planning, analysis and control in farming;
- Apply and analyze financial planning and control tasks in farming environment.

Method of delivery:

Assessment modes:

Module code: AECM111	Semester 1	NQF LEVEL 5 CREDITS 12

Title**: Introduction to Agricultural Economics**

Module Outcomes:

Students should be able to:

- Provide a sound understanding of the basic economic relationship amongst household, firms, government and to provide solutions to global economic challenges;
- Interpret and analyse tables (demand, supply schedules etc) and graphs in agricultural economics;
- Manage and handle economic data and tasks.

Method of delivery: Contact

Assessment modes: Tests, Assignments and Examination

Module code: AECM221	Semester 2	NQF LEVEL 6 CR3EDITS 8

itle: **Land Reform and Agricultural Development**

Module outcomes:

Students should be able to:

- Fathom the achievement of South Africa's Land Reform as from 1994 to date
- Understand the possible effects/consequences of "land grabbing" on the economy of South Africa.
- Able to link Land Reform and food security: local and international perspective
- Recognize Constraints of Land Reform: local and international perspective
- Rationally critic or converse "the willing buyer-willing seller policy" of South Africa's Land Reform.
- Appreciate the consequences of "Land expropriation with and without compensation".
- Understand Land Restitution programme.
- Comprehend SLAG Sub programme of South Africa's Land Reform.
- Comprehend LRAD Sub programme of South Africa's Land Reform.
- Understand PLAS Sub programme of South Africa's Land Reform.
- Understand Recapitalization and Development Programme and its importance (RADP)
- Understand Impact of land reform on women empowerment
- Understand socio-economic & political effects of land reform
- Understand land tenure programme
- Recognize Factors affecting land reform beneficiaries accessibility to credit
- Able to link corruption and rural development : Land reform perspective
- Comprehend Factors affecting living conditions of farm workers- land reform perspective
- Rationally argue or Understand better ways in which Land Reform in South Africa can be implementation

- Understand how the following factors influence land reform beneficiaries' accessibility to credit in South Africa
  - Title deed (LRAD and PLAS perspective)
  - Market access
  - Farm size (LRAD perspective)
  - Owners' equity (LRAD perspective)

Method of delivery: Contact

Assessment modes: Tests, Assignments and Examination

Module code: AECM223	**Semester 2**	**NQF LEVEL 6 CR3EDITS 8**

Title: **Farm Accounting**

Module Outcomes:

Students should be able to:

- Demonstrate an understanding the importance and the use of farm accounting for farm management;
- Make use of records and accounts as a tool of farm management;
- Understand and apply important depreciation and tax decisions.

Method of delivery: Contact

Assessment modes: Tests, Assignments and Examination

Module code: AECM311	**Semester 1**	**NQF LEVEL 7 CREDITS 16**

Title**: Agricultural Micro-Economics**

Module outcomes:

Students should be able to:

- Have knowledge and demonstrate an understanding of relevant terms, rules, concepts, principles and theories to describe microeconomics and be able to apply this knowledge and principles in the real world situations;
- Conduct economic analysis in agricultural and related enterprises;
- Advise agricultural stakeholders on micro-economic matters.

Method of delivery: Contact

Assessment modes: Tests, Assignments and Examination

Module code: AECM312	**Semester 1**	**NQF LEVEL 7 CREDITS 8**

Title**: International Agricultural Trades**

Module outcomes:

Students should be able to:

- Have knowledge and demonstrate an understanding of relevant terms, rules, concepts, principles and theories to describe international agricultural trade and be able to apply this knowledge and principles in the real world situations.

Method of delivery: Contact

Assessment modes: Tests, Assignments and Examination

Module code: AECM313	**Semester 1**	**NQF LEVEL 7 CREDITS 16**

Title**: Agricultural Statistics for Research I**

Module outcomes:

Students should be able to:

- Demonstrate the use and application of linear regression and general linear model to economic data;

- Demonstrate the use and interpretation of at least two econometric software for data analysis;
- Discuss the problems of estimation when classical assumption of linear regression are violated and application of chi-square analysis;
- Demonstrate estimation of index numbers and time series analysis in the agricultural sector.

Method of delivery: Contact

Assessment modes: Tests, Assignments and Examination

Module code: AECM314	**Semester 1**	**NQF LEVEL 7 CREDITS 8**

Title: **Farm Management and Accounting**

Module outcomes:

Students should be able to:

- Demonstrate understanding of farm management function;
- Apply farm management principles and perform farm management and farm accounting tasks;
- Demonstrate understanding of financial planning, analysis and control in farming;
- Apply and analyze financial planning and control tasks in farming environment.

Method of delivery: Contact

Assessment modes: Tests, Assignments and Examination

Module code: AECM315	**Semester 1**	**NQF LEVEL 7 CREDITS 8**

Title: **Food Security Analysis**

Module outcomes:

Students should be able to:

- Demonstrate an understanding of the meaning and concepts of food security;
- Analyse and identify the indicators of food security;
- Discuss the influence on household types and food security;
- Describe food security situation in terms of South African agricultural policy and explain the determinants of food security.

Method of delivery: Contact

Assessment modes: Tests, Assignments and Examination

Module code: AECM316	**Semester 1**	**NQF LEVEL 7 CREDITS 16**

Title: **Agricultural Production Economics**

Module outcomes:

Students should be able to:

- Optimize the objective function of the farming community or the nation within a framework of limited resources;
- Provide guidance to individual farmers in using their resources in most efficient way; facilitate the most efficient use of resources from economic point of view.

Method of delivery: Contact

Assessment modes: Tests, Assignments and Examination

Module code: AECM321	**Semester 2**	**NQF LEVEL 7 CREDITS 16**

Title: **Land Resource and Environmental Economics**

Module outcomes:

Students should be able to:

- demonstrate an understanding of theories of land resource economics and the framework of land resource management;

- application of economic tools to resources use and environmental issues;
- discuss the interrelationship between environment, economic growth and public policy on environmental issues and quality and discuss environmental problems in South Africa.

Method of delivery: Contact

Assessment modes: Tests, Assignments and Examination

Module code: AECM322	**Semester 2**	**NQF LEVEL 7 CREDITS 16**

Title: **Agricultural Production Economics**

Module outcomes:

Students should be able to:

- Optimize the objective function of a farming community or a nation within a framework of limited resources;
- Provide guidance to individual farmers in using their resources in most efficient way and facilitate the most efficient use of resources from economic point of view.

Method of delivery: Contact

Assessment modes: Tests, Assignments and Examination

Module code: AECM323	**Semester 2**	**NQF LEVEL 7 CREDITS 8**

Title: **Agricultural Marketing**

Module outcomes:

Students should be able to:

- Demonstrate understanding of the principles of agricultural marketing and price analysis;
- Apply agricultural marketing and risk management principles;
- Understand the role of agricultural marketing and risk management in south africa and wide variety of settings.

Method of delivery: Contact

Assessment modes: Tests, Assignments and Examination

Module code: AECM325	**Semester 2**	**NQF LEVEL 7 CREDITS 8**

Title: **Agricultural Macro- Economics**

Module outcomes:

Students should be able to:

- show knowledge and demonstrate an understanding of relevant terms, rules, concepts, principles and theories to describe macro-economics and be able to apply this knowledge and principles in the real world situations;
- advise agricultural stakeholders, i.e. organized agriculture, government, NGOs etc., on macro-economic matters.

Method of delivery: Contact

Assessment modes: Tests, Assignments and Examination

Module code: AECM326	**Semester 2**	**NQF LEVEL 7 CREDITS 8**

Title: Agricultural Finance

Module outcomes:

Students should be able to:

- Apply financial principles to the farming environment and be familiar with numerous management functions, regardless of the size of the farm business;
- Learn about and apply the basic concepts and practices of modern agricultural finance principles as they are used in a wide variety of settings;

- Use the techniques of financial and economic analysis to assess economic viability and loan repayment ability of a farm.

Method of delivery: Contact

Assessment modes: Tests, Assignments and Examination

Module code: AECM327	**Semester 2**	**NQF LEVEL 7 CREDITS 8**

Title**: International Agricultural Trade**

Module outcomes:

Students should be able to:

- Have knowledge and demonstrate an understanding of relevant terms, rules, concepts, principles and theories to describe international agricultural trade, and be able to apply this knowledge and principles in the real world situations.

Method of delivery: Contact

Assessment modes: Tests, Assignments and Examination

Module Code: AECM411	**Semester 1**	**NQF LEVEL 8 CREDITS 8**

Title: **Agricultural Project Appraisal and Management**

Module outcomes:

Students should be able to:

- Be an efficient, competent agricultural project manager, who understands project appraisal and management principles and can use the knowledge acquired practically;
- Contribute towards improvement of project appraisal and management locally and nationally and be able to function within a group for mutual support and sustenance to peers for professional growth and development.

Method of delivery: Contact

Assessment modes: Tests, Assignments and Examination

Module Code: AECM412	**Semester 1**	**NQF LEVEL 8 CREDITS 16**

Title: **Research Project and Seminar I**

Module outcomes:

Students should be able to:

- Demonstrate knowledge and understanding of research problems creation and identification in agricultural economics:
  - formulation of research questions and objectives,
  - description of research population and application of research sampling procedures;
  - identification appropriate data collection instruments and procedures;
  - evaluation and application of correct data analysis techniques;
  - generation and analysis of a bankable research proposal.

Method of delivery: Contact

Assessment modes:

Module Code: AECM413	**Semester 1**	**NQF LEVEL 8 CREDITS 16**

Title: **Quantitative Methods in Agricultural Economics**

Module Outcomes:

Students should be able to:

- Understand and apply basic mathematical methods that are essential for adequate economic analysis and proper understanding of the current economic literature.

Method of delivery: Contact

Assessment modes: Tests, Assignments and Examination

Module Code: AECM414	Semester 1	NQF LEVEL 8 CREDITS 16
Title: **Agricultural Statistics for Research II**		
Module Outcomes: Students should be able to: • Make an estimation of simultaneous equation models; • Describe the properties of stochastic and linear time series and estimate regression models, including dummy variables and dummy dependent models including the application of single equation models		
Method of delivery: Contact		
Assessment modes: Tests, Assignments and Examination		
Module Code : AECM415	**Semester 1**	**NQF LEVEL 8 CREDITS 16**
Title: **Agribusiness Management**		
Module Outcomes: Students should be able to: • Apply production, financial, marketing, human resource and risk management principles to the three sectors of agribusiness environment and a wide variety of agricultural related business settings.		
Method of delivery: Contact		
Assessment modes: Tests, Assignments and Examination		
Module Code: AECM421	**Semester 2**	**NQF LEVEL 8 CREDITS 8**
Title: **Farm Planning and Linear Programming**		
Module Outcomes: Students should be able to: • Use linear programming and other operations research methods/models in solving allocative and decision problems of agriculture, such as what to produce, how much to produce, and the most profitable enterprise combinations, costs reduction and general optimization of resource usage.		
Method of delivery: Contact		
Assessment modes: Tests, Assignments and Examination		
Module code: AECM422	**Semester 2**	**NQF LEVEL 8 CREDITS 16**
Title: **Agricultural Policy Analysis**		
Module outcomes: Students should be able to: • Apply agricultural policy principles to the farming environment and a wide variety of farm business settings for efficient and effective agricultural projects and programme implementation.		
Method of delivery: Contact		
Assessment modes: Tests, Assignments and Examination		
Module code: AECM424	**Semester 2**	**NQF LEVEL 8 CREDITS 8**
Title**: Agriculture and Economic Development**		
Module outcomes: Students should be able to: • Understand the economic problems of agriculture in developing communities/countries; • Analyse agriculture's role in the development of underdeveloped communities/countries;		

- Identify barriers to agricultural development and to examine critically remedial agricultural policies and well-known tools of economic analysis to foster more rapid development;
- Apply agricultural policy principles to the farming environment and a wide variety of farm business settings for efficient and effective agricultural projects and programme implementation;
- Demonstrate a very good understanding of principles of technical, allocative, scale and economic efficiencies.

Method of delivery: Contact

Assessment modes: Tests, Assignments and Examination

Module code: AECM425	**Semester 2**	**NQF LEVEL 8 CREDITS 8**

Title**: Research Project and Seminar II**

(Not Received)

Method of delivery:

Assessment modes:

NAS.2.5.2 AGRICULTURAL EXTENSION

Module code: AEXM211	**Semester 1**	**NQF LEVEL 6 CREDITS 16**

Title: **Fundamentals of Agricultural Extension**

Module outcomes:

Students should be able to:

- Demonstrate an understanding of principles of Agricultural Extension;
- Identify challenges of agricultural extension;
- Demonstrate an understanding of the process and elements of communication process;
- Identify different extension teaching methods and understanding of extension program planning and management concepts.

Method of delivery:

Assessment modes:

Module code: AEXM212	**Semester 1**	**NQF LEVEL 6 CREDITS 8**

Title: **Communication and Agricultural Technology Transfer**

Module outcomes:

Students should be able to:

- describe the processes of communication and analyze the communication process in relation to extension service delivery;
- describe different technology transfer models,explain technology transfer processes and highlight the synergy of technology transfer processes and models.

Method of delivery:

Assessment modes:

Module code: AEXM222	**Semester 2**	**NQF LEVEL 6 CREDITS 8**

Title: **Agricultural Extension for Development**

Module outcomes:

Students should be able to:

- Demonstrate an understanding of the role of extension in the development process;
- Demonstrate an understanding of the teaching and learning process in agricultural extension and the use of different extension teaching methods;

- Identify and develop an extension program for development purposes.

Method of delivery:

Assessment modes:

Module code: AEXM324	**Semester 2**	**NQF LEVEL 7 CREDITS 8**

Title: **Agricultural Rural Sociology**

Module outcomes:

Students should be able to:

- Demonstrate an understanding of the meaning, nature and scope of rural sociology, theories of social change,organization of societies and problems of cultural and directed change;
- Demonstrate an understanding of the definition of diffusion and adoption, and processes of diffusion and adoption,adopter categories and diffusion curves.

Method of delivery:

Assessment modes:

Module code: AXDM211	**Semester 1**	**NQF LEVEL 6 CREDITS 16**

Title: **Fundamentals of Agricultural Extension**

Module outcomes:

Students should be able to:

- Develop an understanding of the concepts of agricultural extension and its environment and demonstrate an understanding of the principles of Agricultural Extension;
- Demonstrate an understanding of basic social, cultural and psychological concepts in agricultural extension and communication process in agricultural extension;
- Demonstrate an understanding of extension program planning, management and evaluation concepts.

Method of delivery:

Assessment modes:

Module code: AXDM311	**Semester 1**	**NQF LEVEL 7 CREDITS 8**

Title: **Agricultural Extension for Development**

Module outcomes:

Students should be able to:

Demonstrate an understanding of the role of extension in the development, teaching and learning process in agricultural extension and the use of different extension teaching methods.

Method of delivery:

Assessment modes:

NAS.2.6 EXTENDED PROGRAMMES: MODULE OUTCOMES VAAL CAMPUS

See the Faculty of Economic and Management Sciences yearbook for the module outcomes of ACFS / *Sien die Fakulteit van Ekonomiese en Bestuurswetenskappe se jaarboek vir die module uitkomste van ACFS.*

Module code: ITSP111	**Semester 1**	**NQF level: 5**

Title: **Introduction to Problem Solving / *Inleiding tot Probleemoplossing***

Module outcomes:

Students should be able to:

- Explain the difference between solving problems and writing computer programming language code;
- Understand what problems are and that they have several possible solutions;
- Apply a strategy to help understand, solve, and evaluate the solution to a problem;
- Write solutions to problems in a semi-formal structured english (pseudo-code);
- Recognize the role of sequence, choice (selection), and repetition (iteration) in solving problems;
- Understand the importance of the role of abstraction in problem solving;
- Identify the variables (data items) needed in a problem solution (algorithm);
- Estimate likely ranges of variables;
- Apply the problem solving strategy to real-world problems involving variables and nested action blocks;
- Understand the ways in which different kinds (types) of data affect the way solutions to problems are designed;
- Recognize appropriate operations that can be carried out on different data types;
- Identify different ways of carrying out selection and iteration and understand how different specialized control constructs can be used appropriately;
- Understand the difference between simple and compound selections, and how complex conditions can be expressed to control the selections;
- Understand the difference between determinate and indeterminate iterations and how complex conditions can be expressed to control the iterations;
  - determinate: count-controlled iteration;
  - indeterminate: zero-or-more and at-least-once iterations;
- Analyse real-world problems to identify the appropriate selection and iteration constructs to use.

Module-uitkomste:

Studente moet in staat wees om:

- *Te verduidelik wat die verskil is tussen probleemoplossing en die skryf van rekenaar programme in programmeertaal;*
- *Te verstaan wat probleme is en dat probleme meer as een oplossing het;*
- *'n Strategie toe te pas vir die verstaan, oplos en evaluering van 'n oplossing van 'n probleem;*
- *Oplossings te skryf vir probleme in 'n semi-formele gestruktureerde engels (pseudo kode);*
- *Die rol van volgorde, keuse (seleksie) en herhaling in probleemoplossing te herken;*
- *Probleemoplossing-strategie toe te pas op werklike probleme, insluitend alternatiewe rigtings van aksie en herhalende stappe van aksie;*
- *Die belangrikheid wat die rol van abstraksie speel in probleemoplossing te verstaan;*
- *Die veranderlikes (data items) wat benodig word in probleemoplossing (algoritme) te identifiseer;*
- *Skatting van waarskynlike reekswaardes vir veranderlikes te doen;*
- *Die probleemoplossing-strategie toe te pas op werklike probleme wat veranderlikes en geneste aksie blokke bevat;*

- *Die maniere waarin verskillende tipes data die manier affekteer hoe oplossings tot probleme ontwerp word, te verstaan;*
- *Toepaslike aksies wat op verskillende data tipes toegepas kan word, te herken;*
- *Verskillende maniere te identifiseer waarop seleksie en herhaling uitgevoer kan word en te verstaan hoe verskillende gespesialiseerde kontrolestrukture toepaslik gebruik kan word;*
- *Die verskil tussen eenvoudige en saamgestelde seleksiestrukture, en hoe komplekse voorwaardes uitgedruk kan word om seleksiestrukture te beheer, te verstaan;*
- *Die verskil tussen bepaalde en onbepaalde herhalings en hoe komplekse kondisies uitgedruk kan word om die herhalings te beheer, te verstaan;*
  - *bepaalde: teller- gekontroleerde herhaling;*
  - *onbepaalde: nul-of-meer en ten-minste-een keer herhalings;*
- *Werklike probleme te analiseer om toepaslike seleksie- en herhalingstrukture te gebruik.*

Method of delivery: Full-time
Metode van aflewering: *Voltyds*

Assessment modes: Formative and Summative
Assesseringsmetodes: *Formatief en Summatief*

ITSP111(Introduction to Problem Solving) is intended for students who have not taken programming at a grade 12 level.
ITSP111 (Inleiding tot Probleemoplossing) is bedoel vir studente wat nie programmering op graad 12 vlak geneem het nie.

Module code: ITSP113	**Semester 1**	**NQF level: 5**

Title: **Introduction to Graphical Interface Programming / *Inleiding tot Grafiese Koppelvlakprogrammering***

Module outcomes:
Students should be able to:
Knowledge:
- Demonstrate that he/she is familiar with basic theoretical programming concepts and have gained basic introductory knowledge and skills of a graphical interface programming environment to develop and test basic programs in a GUI computer programming language;
- Understand introductory aspects of graphical interface design and event-driven programming;

Skills:
- Prove that he/she can apply the theory of basic graphical interface programming in a practical way by writing algorithms and subsequently solve basic problems using a GUI programming language.

Module-uitkomste:
Studente moet in staat wees om:
Kennis:
- *Te demonstreer dat hy/sy vertroud is met basiese teoretiese programmeringskonsepte en dat hy/sy oor basiese inleidende kennis en vaardighede van 'n grafiese koppelvlak programmeringsomgewing beskik wat hom/haar in staat stel om basiese programme te ontwikkel en te toets deur die gebruik van 'n GGK rekenaar programmeringstaal;*
- *Inleidende aspekte van grafiese koppelvlakontwerp en gebeurlikheidsgedrewe programmering te verstaan;*

Vaardighede:
- *Te bewys dat hy/sy die teorie van basiese grafiese koppelvlakprogrammering op 'n praktiese wyse kan toepas deur algoritmes te skryf en vervolgens basiese probleme op te los deur die gebruik van 'n GGK programmeringstaal*.

Method of delivery: Full-time
Metode van aflewering: *Voltyds*

Assessment modes:
Formative: Class Tests Theory and Practical. Lecture/ Student Observation and Interaction;
Summative: Formal Examination.
Assesseringsmetodes:
Formatief: *Teoretiese en Praktiese Klastoetse. Dosent /Student Waarneming en Interaksie;*
Summatief: *Formele Eksamen*

ITSP113 (Introduction to Graphical Interface Programming) is preparatory for the regular first level module in Graphical Interface Programming.
ITSP113 (Inleiding tot Grafiese Koppelvlakprogrammering) is ter voorbereiding vir die gewone eerstevlak module in Grafiese Koppelvlakprogrammering

Module code: ITSP114	**Semester 1**	**NQF level: 5**

Title: **Introduction to Object Oriented Programming / *Inleiding tot Objekgeöriënteerde Programmering***

Module outcomes:
Students should be able to:
Knowledge:
- Demonstrate basic knowledge on and insight in the basic structures, data types, methods, classes and objects of an object oriented programming language;
- Demonstrate basic knowledge and insight on problem solving, including: debugging, testing and executing of applications;

Skills:
- Show that he/she can apply the knowledge and insight that have been obtained in problem solving by means of a computer. Specifically he/she should be able to:
  - develop a solution plan (algorithm) to solve a problem that has been defined, "translate" (encode) the algorithm in Java, debug it, test it and execute it by means of the computer;
  - apply certain steps of problem solving on defined problems;
  - use general properties of the programming language Java to develop applications;
  - create and use classes in problem solving;
  - handle different data types in Java;
  - do arithmetic calculations;
  - use classes and methods that already have been defined in Java;
  - use Java's decision making structures (choice), namely *if* and *switch*, in problem solving;
  - use the repeating structures of Java (loops), namely *while*, *do. while* and *for* in problem solving;
  - use a good programming style (program readability);
  - write structured classes and programs that gives neat output;
  - write programs that are user friendly.

Module-uitkomste:
Studente moet in staat wees om:
Kennis:
- *Basiese kennis en insig te demonstreer van 'n objekgerigte programmeringstaal se basiese strukture, datatipes, metodes, klasse en objekte;*
- *Basiese kennis en insig te demonstreer van probleemoplossing wat insluit: ontfouting, toetsing en uitvoering van toepassings;*

Vaardighede:
- *Te kan bewys lewer dat hy/sy die kennis en insig wat verwerf is, kan toepas in probleem-oplossing met behulp van die rekenaar. In besonder behoort hy/sy in staat te wees om:*
  - *vir 'n probleem wat gedefinieer is, 'n oplossingsplan (algoritme) te ontwikkel om die probleem op te los, die algoritme te "vertaal" (kodeer) in Java, dit te ontfout, te toets en uit te voer met behulp van die rekenaar;*

- *sekere stappe van probleemoplossing te kan toepas op gedefinieerde probleme;*
- *algemene eienskappe van die programmeringstaal Java te gebruik om toepassings te ontwikkel;*
- *klasse te skep en te gebruik in probleemoplossing;*
- *verskillende datatipes in Java te hanteer;*
- *rekenkundige bewerkings te doen;*
- *klasse en metodes wat reeds in Java gedefinieer is, te kan gebruik;*
- *Java se besluitnemingstrukture (keuse) naamlik if en switch in probleemoplossing te gebruik;*
- *die herhalingstrukture van Java (lusse), naamlik while, do while en for te gebruik in probleemoplossing;*
- *'n goeie programmeringstyl te gebruik (programleesbaarheid);*
- *gestruktureerde klasse en programme te skryf wat netjiese uitvoer lewer;*
- *programme te skryf wat gebruikersvriendelik is.*

Method of delivery: Full-time
Metode van aflewering: *Voltyds*

Assessment modes:
Formative: Class Tests Theory and Practical. Lecture /Student Observation and Interaction;
Summative: Formal Examination.
Assesseringsmetodes:
Formatief: *Teoretiese en Praktiese Klastoetse. Dosent /Student Waarneming en Interaksie;*
Summatief: *Formele Eksamen*

ITSP114 (Introduction to Object Oriented Programming) is preparatory for the regular first level module in Programming.
ITSP114 (Inleiding tot Objekgeöriënteerde Programmering) is ter voorbereiding vir die gewone eerstevlak module in Programmering

Module code: ITSP121	**Semester 2**	**NQF level: 5**

Title: **Introductory Programming Principles /** ***Inleiding tot Programmeringsbeginsels***

Module outcomes:
Students should be able to:
- Know various components of a computer;
- Understand how various components of a computer work;
- Understand how to use various components of a computer effectively;
- Demonstrate knowledge of how a computer works;
- Know and explain basic computer concepts;
- Write basic algorithms.

Module-uitkomste:
Studente moet in staat wees om:
- *Die onderskeie komponente van 'n rekenaar te ken;*
- *Te verstaan hoe die onderskeie komponente van 'n rekenaar werk;*
- *Te verstaan hoe om die onderskeie komponente effektief te gebruik;*
- *Te kan demonstreer dat hy/sy weet hoe 'n rekenaar werk;*
- *Basiese rekenaarkonsepte te ken en te verduidelik;*
- *Basiese algoritmes te skryf.*

Method of delivery: Full-time
Metode van aflewering: *Voltyds*

Assessment modes: Formative and Summative
Assesseringsmetodes: *Formatief en Summatief*

ITSP121 (Introductory Programming Principles) is preparatory for the regular first level module in Programming.
I*TSP121 (Inleiding tot Programmeringsbeginsels) is ter voorbereiding vir die gewone eerstevlak module in Programmering.*

Module code: STTF115	Semester 1	NQF level: 5

Title: **Descriptive Statistics / *Beskrywende Statistiek***

Module outcomes:

Students should be able to:

- Demonstrate fundamental knowledge of the most important elementary statistical techniques that are used daily, such as sampling methods, graphical representation of data, descriptive measures of location and spread, least squares line fitting, prediction from least squares lines, the coefficient of correlation, multiple linear regression with applications in prediction, time series data, movement components to predict future outcomes, practical considerations regarding sample surveys and sample sizes;
- Demonstrate problem solving skills by analysing known and unknown problems, using knowledge to apply sampling methods, graphical representation of data, descriptive measures of location and spread, least squares line fits, predictions using least squares fits, correlation coefficients, interpretation of multiple linear regression output, movement component calculations, prediction of future outcomes time series data and sample size determination to real life data.

Module uitkomste:

Studente moet in staat wees om:

- *Fundamentele kennis te demonstreer van die belangrikste elementêre statistiese tegnieke wat daagliks gebruik word soos byvoorbeeld steekproef metodes, grafiese voorstelling van data, beskrywende maatstawwe van lokaliteit en spreiding, kleinste-kwadrate lynpassing, voorspelling van kleinste-kwadrate lyne, korrelasiekoëffisiënt, meervoudige lineêre regressie met toepassings in voorspellings, tydreeks data, bewegingskomponente om toekomstige uitkomste te voorspel, praktiese oorwegings aangaande steekproefnemings en steekproefgroottes;*
- *Probleemoplossingsvaardighede te demonstreer deur bekende en onbekende probleme te analiseer, kennis toepas op steekproefmetodes, grafiese voorstellings van data, beskrywende maatstawwe van lokaliteit en spreiding, kleinste-kwadrate lynpassing, voorspelling deur die gebruik van kleinste-kwadratelynpassings, korrelasiekoëffisiënt, interpretasie van meervoudige lineêre regressie uitvoer, bewegingskomponent berekenings, voorstelling van toekomstige uitkomste, tydreeks data en steekproefgrootte bepaling met lewenswerklike data.*

Method of delivery: Full Time
Metode van aflewering: *Voltyds*

Assessment modes:
Summative: 1 × 2 Hour Examination; Weight – 50
This is a guideline and can change.
Assesseringsmetodes:
Summatief: *1 × 2 Uur Eksamen; Gewig – 50*
Hierdie is slegs 'n riglyn en kan verander.

Module code: STTF125	Semester 2	NQF level: 5

Title: **Introductory Statistical Inference / *Inleidende Statistiese Inferensie***

Module outcomes:

Students should be able to:

- Demonstrate fundamental knowledge of probability and probability distributions, the central limit theorem, estimation of population parameters by the use of point and interval estimation, hypotheses testing for population means and proportions for one and two samples, one-way analysis of variance (ANOVA) and categorical data analysis, contingency tables and basic tests on categorical data;

- Demonstrate problem solving skills by analysing known and unknown problems, using knowledge to do simple probability calculations, apply the central limit theorem, estimate population parameters using point and interval estimation, test hypotheses for population means and population proportions for one and two samples, apply one-way analysis of variance (ANOVA) methods and interpret computer output, apply methods for categorical data analysis such as contingency tables and basic tests on categorical data.

Module uitkomste:

Studente moet in staat wees om:

- *Fundamentele kennis te demonstreer van die belangrikste elementêre statistiese tegnieke wat daagliks gebruik word soos byvoorbeeld steekproef metodes, grafiese voorstelling van data, beskrywende maatstawwe van lokaliteit en spreiding, kleinste-kwadrate lynpassing, voorspelling van kleinste-kwadrate lyne, korrelasiekoëffisiënt, meervoudige lineêre regressie met toepassings in voorspellings, tydreeksdata, bewegingskomponente om toekomstige uitkomste te voorspel, praktiese oorwegings aangaande steekproefnemings en steekproefgroottes;*
- *Probleemoplossingsvaardighede te demonstreer deur bekende en onbekende probleme te analiseer, kennis toepas op steekproefmetodes, grafiese voorstellings van data, beskrywende maatstawwe van lokaliteit en spreiding, kleinste-kwadrate lynpassing, voorspelling deur die gebruik van kleinste-kwadratelynpassings, korrelasiekoëffisiënt, interpretasie van meervoudige lineêre regressie uitvoer, bewegingskomponent berekenings, voorstelling van toekomstige uitkomste, tydreeks data en steekproefgrootte bepaling met lewenswerklike data.*

Method of delivery: Full Time
Metode van aflewering: *Voltyds*

Assessment modes:
Summative: 1 ×2 Hour Examination; Weight – 50
This is a guideline and can change.
Assesseringsmetodes:
Summatief: *1 × 2 Uur Eksamen; Gewig – 50*
Hierdie is slegs 'n riglyn en kan verander.

Module code: STTF215	**Semester 1**	**NQF level: 6**

Title: **Practical Statistics /** ***Praktiese Statistiek***

Module uitkomste:

Studente moet in staat wees om:

- *Die belangrike vereistes vir vraelys ontwerp te verstaan;*
- *Stappe in data voorbereiding voor data analise te identifiseer en toe te pas;*
- *Rekenaaruitdrukke te interpreteer; nl. Grafieke, tabelle, beskrywende statistiek maatstawwe en waarskynlikhede;*
- *'n Statistiek pakket te gebruik om data te analiseer;*
- *Die eenvoudige en meervoudige lineêre regressiemodel te verstaan, sowel as die beredenering agter die aannames in die regressiemodel;*
- *Enige afwykings van die aannames te diagnoseer en dan regstellende aksies toe te pas om die afwykings te korrigeer;*
- *Tydreeks data te analiseer en te voorspel;*
- *'n Suksevolle statistese projek uit te voer vanf ontwerp tot analise*

Method of delivery: Full Time
Metode van aflewering: *Voltyds*

Assessment modes:

Summative: 1 × 3 Hour Examination; Weight – 50
This is a guideline and can change.
Assesserings metodes:
Summatief: *1 ×2 Uur Eksamen; Gewig – 50*
Hierdie is slegs 'n riglyn en kan verander.

Module code: STTF225	**Semester 2**	**NQF level: 6**

Title: **Introduction to Probability / *Inleiding tot Waarskynlikheidsleer***

Module outcomes:
Students should be able to:

- Demonstrate knowledge of concepts such as outcome space, events, probability measures, counting processes, stochastic outcomes of events and the independence of events;
- Demonstrate knowledge of important probability theorems, such as the law of total probability and the theorem of bayes;
- Demonstrate knowledge of stochastic variables, distribution functions and mass functions (special attention will be given to discrete stochastic variables and the following distributions will be discussed in depth: binomial, geometric, negative binomial, hyper geometric and poisson distributions. The following continuous random variables, together with their distribution functions will be discussed in detail: exponential, gamma and normal distributions. Functions of these variables will also be discussed.);
- Demonstrate knowledge of probability structures of two or more stochastic variables defined in the same outcome space and functions of joint distributions.
-

Module uitkomste:
Studente moet in staat wees om:

- *'n Begrip te demonstreer vir konsepte soos die uitkomsruimte, gebeurtenisse, waarskynlikheidmate, telprosesse, stogastiese uitkoms van gebeurtenisse en die onafhanklikheid van gebeurtenisse;*
- *'n Begrip te demonstreer van belangrike waarskynlikheidsleerstelling soos die wet van die totale waarskynlikheid en die stellings van Bayes;*
- *'n Begrip van die stogastiese veranderlikes, verdelingsfunksies en massafunksie. (spesiale aandag sal geskenk word aan diskrete stogastiese veranderlikes en die volgende verdelings sal in diepte bespreek word: binomiaal, geometries, negatief binomiaal, hipergeometries en Poisson. Die volgende kontinue stogastiese veranderlikes tesame met hul verdelingsfunksies sal in detail bespreek word: eksponensieel, gamma en normaalverdelings. Funksies van hierdie veranderlikes sal ook bespreek word)*
- *Meervoudige regressie met toepassing in voorspellings*

Method of delivery: Full-time
Metode van aflewering: *Voltyds*

Assessment modes: Summative: 1 x 3 Hour Examination; Weight – 50
Project; Weight – 50
This is a guideline and can change.
Assesseringsmetodes: *Summatief: 1 x 3 uur Eksamen; Gewig – 50*
Projek; Gewig – 50
Hierdie is 'n riglyn en mag verander.

Module code: WISS111	**Semester 1**	**NQF level: 5**

Title: **Introduction to Mathematics I / *Inleiding tot Wiskunde I***

Module outcomes:
Students should be able to:

- Demonstrate knowledge on an introductory level of functions, exponential laws, logarithmic laws, limit laws and other basic theorems;

- Demonstrate knowledge on different types of graphs, solving systems of linear equations, linear programming problems in two variables, limits, analysing the rate of change of functions, the remainder theorem and factor theorem to factorize polynomials and solve equations;
- Apply and demonstrate mathematical concepts and properties by simplifying expressions and solving linear and quadratic equations and linear inequalities

Module-uitkomste:

Studente moet in staat wees om:

- *Kennis op inleidende vlak te demonstreer van funksies, eksponentwette, logaritmewette, limietwette en ander basiese stellings;*
- *Kennis te demonstreer van verskillende tipes grafieke, oplos van stelsels van lineêre vergelykings, lineêre programmering in twee veranderlikes, limiete, analisering van die tempo van verandering van funksies, die resstelling en die faktorstelling om polinome te faktoriseer en vergelykings op te los;*
- *Wiskundige eienskappe en konsepte toe te pas en te demonstreer deur uitdrukkings te vereenvoudig en lineêre en kwadratiese vergelykings en lineêre ongelykhede op te los..*

Method of delivery: Full Time
Metode van aflewering: *Voltyds*

Assessment modes:
Formative: Class Tests
Assesseringsmetodes:
Formatief: *Teoretiese Klastoetse.*

Module code: WISS113	**Semester 1**	**NQF level: 5**

Title**: Introduction to Mathematical Techniques I /** ***Inleiding tot Wiskundige Tegnieke I***

Module outcomes:

Students should be able to:

- Demonstrate knowledge on an introductory level of number systems and exponential laws;
- Write simple word problems in mathematical form;
- Apply and demonstrate mathematical concepts and properties by simplifying expressions and solving linear and quadratic equations and linear and quadratic inequalities.

Module-uitkomste:

Studente moet in staat wees om:

- *Kennis op inleidende vlak te demonstreer van getallestelsels en eksponentwette;*
- *Eenvoudige woordprobleme wiskundig te formuleer;*
- *Wiskundige konsepte en eienskappe toe te pas en te demonstreer deur uitdrukkings te vereenvoudig en lineêre en kwadratiese vergelykings en lineêre en kwadratiese ongelykhede op te los.*

Method of delivery: Full Time
Metode van aflewering: *Voltyds*

Assessment modes:
Formative: Class Tests
Assesseringsmetodes:
Formatief: *Teoretiese Klastoetse.*

Module code: WISS121	Semester 2	NQF level: 5

Title: **Introduction to Mathematics II / *Inleiding tot Wiskunde II***

Module outcomes:

Students should be able to:

- Demonstrate knowledge on an introductory level of absolute values and the nature of the roots of quadratic equations;
- Solve inequalities (in general) and equations with absolute values;
- Demonstrate knowledge on the inverse functions and graphs of polynomials;
- Demonstrate knowledge on trigonometric functions and identities;
- Find solutions to equations with trigonometric functions on a given interval as well as general solutions;
- Demonstrate knowledge on the transformation of functions.

Module-uitkomste:

Studente moet in staat wees om:

- *Kennis op inleidende vlak te demonstreer van absolute waardes en die aard van die wortels van kwadratiese vergelykings;*
- *Ongelykhede (in die algemeen) en vergelykings met absolute waardes op te los;*
- *Kennis te demonstreer van inverse funksies en die grafieke van polinome;*
- *Kennis te demonstreer van trigonometriese funksies en identiteite;*
- *Algemene oplossings sowel as oplossings op 'n gegewe interval te vind van vergelykings in trigonometriese funksies;*
- *Kennis te demonstreer van die transformasie van funksies.*

Method of delivery: Full Time
Metode van aflewering: *Voltyds*

Assessment modes:
Formative: Class Tests
Assesseringsmetodes:
Formatief: *Teoretiese Klastoetse.*

WISS111, 121 (Introduction to Mathematics I/II) are preparatory for the regular first level modules in Mathematics in order to achieve a level of mathematical skills.
WISS111,121 (Inleiding tot Wiskunde I/II) is ter voorbereiding vir die gewone eerstevlak modules in Wiskunde, om 'n vlak van wiskundige vaardigheid te bereik

Module code: WISS123	Semester 2	NQF level: 5

Title: **Introduction to Mathematical Techniques II / *Inleiding tot Wiskundige Tegnieke II***

Students should be able to:

- Demonstrate knowledge on an introductory level of functions, exponential laws, logarithmic laws and limit laws;
- Demonstrate knowledge on different types of graphs, solving systems of linear equations, linear programming problems in two variables, limits, analysing the rate of change of functions;
- Demonstrate knowledge on financial mathematics;
- Apply and demonstrate mathematical concepts and properties by simplifying expressions and solving linear and quadratic equations, linear inequalities, exponential equations and logarithmic equations.

Module-uitkomste:

Studente moet in staat wees om:

- *Kennis op inleidende vlak te demonstreer van funksies, eksponentwette, logaritmewette en limietwette;*
- *Kennis te demonstreer van verskillende tipes grafieke, oplos van stelsels van lineêre vergelykings, lineêre programmering in twee veranderlikes, limiete en die analisering van die tempo van verandering van funksies;*
- *Kennis te demonstreer van finansiële wiskunde;*
- *Wiskundige eienskappe en konsepte toe te pas en te demonstreer deur uitdrukkings te vereenvoudig, lineêre en kwadratiese vergelykings, lineêre ongelykhede, eksponensiële vergelykings en logaritmiese vergelykings op te los.*

Method of delivery: Full Time
Metode van aflewering: *Voltyds*

Assessment modes:
Formative: Class Tests
Assesseringsmetodes:
Formatief: *Teoretiese Klastoetse.*

WISS113,123 (Introduction to Mathematical Techniques I/II) are preparatory for the regular first level modules in Mathematics in order to achieve a level of mathematical skills.
WISS113,123 (Inleiding tot Wiskundige Tegnieke I/II) is , ter voorbereiding vir die gewone eerstevlak modules in Wiskunde, om 'n vlak van wiskundige vaardigheid te bereik.

NAS.2.7 MAINSTREAM MODULES / *HOOFSTROOM MODULES*

NAS.2.7.1 ACCOUNTING / *REKENINGKUNDE*

See the Faculty of Economic and Management Sciences yearbook for the module outcomes of ACCC; ACCF; ACCS; EKRP and FINM /
Sien die Fakulteit van Ekonomiese en Bestuurswetenskappe se jaarboek vir die module uitkomste van ACCC; ACCF; ACCS; *EKRP en FINM.*

NAS.2.7.2 ACADEMIC LITERACY / *AKADEMIESE GELETTERDHEID*

See the Faculty of Humanities yearbook for the module outcomes of ALDE and ALDA/
Sien die Fakulteit Geesteswetenskappe se jaarboek vir die module uitkomste van ALDE en ALDA.

NAS.2.7.3 BIOCHEMISTRY / *BIOCHEMIE*

Module code: BCHN213	**Semester 1**	**NQF Level: 6**

Title / *Titel*: **Introductory Biochemistry / *Inleidende Biochemie***

Module outcome:

After completion of the BCHN213 module, the student should:

- Demonstrate detailed knowledge on the flow of genetic information in the biosphere, including the structure and synthesis of nucleic acids and proteins.
- Be able to evaluate and apply selected biochemical analytical techniques to investigate nucleic acids and proteins.
- Be able to solve selected biochemical analytical problems.
- Evaluate, interpret and present data generated with selected biochemical analytical methods.
- Demonstrate an understanding of the ethical and professional conduct required of a biochemist.

Module-uitkomste:

Na voltooiing van die BCHN213 module, behoort die student die volgende te kan demonstreer:

- *In diepte kennis kennis van die vloei van genetiese informasie in die biosfeer, insluitende die struktuur en sintese van nukleïensure en proteïene.*
- *Die vermoë om geselekteerde biochemiese analitiese tegnieke te gebruik om nukleïensure en proteïene mee te ondersoek.*
- *Die vermoë om geselekteerde biochemiese analitiese probleme te kan oplos*
- *Evalueer, interpreteer en aanbied van data wat verkry is deur geselekteerde biochemiese analitiese tegnieke.*
- *Insig van die etiese en professionele gedrag wat van 'n biochemikus vereis word*

Method of delivery: Full Time
Metode van aflewering: *Voltyds*

Assessment Methods:

Formal Formative:

The student demonstrates his/her newly acquired knowledge and skills by submitting assignments, tutorials and practical reports on selected relevant topics.

Summative:

Summative assessments are in the form of written class tests, a semester test and a final exam to be completed by each candidate.

Assessment Plan:

Theory component (67%): The theory participation mark consists of the average of the class tests (50%) and the semester test (50%).

Practical component (33%): The practical participation mark consists of the average of the practical assignments (50%) and the average of the two practical exams (50%). A minimum practical participation mark of 40% is required for examination participation.
The theory (67%) and practical (33%) components contribute to the participation mark. A minimym participation mark of 40% is required for examination participation. The participation and examination mark each contribute 50% to the final module mark.

Assesseringsmetodes:
Formele Formatief:
Die student demonstreer sy / haar nuut verwerfde kennis en vaardighede deur opdragte, tutoriale en praktiese verslae oor geselekteerde relevante onderwerpe in te dien.
Opsommend:
Opsommende assesserings is in die vorm van skriftelike klastoetse, 'n semestertoets en 'n finale eksamen wat deur elke kandidaat voltooi moet word.
Assesseringsplan:
Teorie komponent (67%): Die teorie deelnamepunt bestaan uit die gemiddeld van die klastoetse (50%) en die semestertoets (50%).
Praktiese komponent (33%): Die praktiese deelnamepunt bestaan uit die gemiddeld van die praktiese werkopdragte (50%) en die gemiddeld van die twee praktiese eksamens (50%). 'n Minimum praktiese deelnamepunt van 40% word vereis vir eksaminering.
Die teorie (67%) en praktiese (33%) komponente dra by tot die deelnamepunt. 'n Minimum deelnamepunt van 40% word vereis vir eksaminering. Die deelnamepunt en eksamenpunt dra elk 50% by tot die finale modulepunt

Module code: BCHN222	**Semester 2**	**NQF Level: 6**

Title / *Titel*: **Metabolism / *Metabolisme***

Module outcomes:
After completion of the BCHN222 module, the student should demonstrate:

- Integrated knowledge of the core reactions of metabolism to form the basis to accumulate specialized knowledge in any of the biological sciences like microbiology, zoology, botany and physiology;
- Proficient knowledge to evaluate the contribution of food groups to energy productive metabolism under normal and abnormal conditions;
- Proficient knowledge to be able to predict the effect of an inherited or an induced change in the activity of an enzyme and the effect it would have on a metabolic pathway and eventually the total metabolism and;
- Proficient skills to compile a testing regime to test the change in the metabolic profile using initial simple screening tests followed by more complex diagnostic tests;
- The ability to demarcate the results of an abnormal metabolic profile according to known diagnostic profiles of abnormalities and which and how confirmation analyses could be done in selected cases;
- To have the ability to write a report as if in an advisory position (e.g. Doctor, pharmacists, biochemist, dietician) to explain abnormal results in layman's terms so that it can be understood, without having any background knowledge of the abnormality;
- And understanding of the safety, ethical and professional conduct required of a professional analytical biochemist. /

Module-uitkomste:
Na voltooiing van die module BCHN222, behoort die student:

- *Geïntegreerde kennis te hê van die kern reaksies van metabolisme om die basis te vorm vir die versameling van gespesialiseerde kennis in enige van die biologiese wetenskappe soos mikrobiologie, dierkunde, plantkunde en fisiologie;*

- *Voldoende kennis te hê om die bydrae van voedsel groepe tot energie produksie te evalueer onder normale en abnormale omstandighede;*
- *Die vermoë hê om te voorspel watter effek aangebore of geïnduseerde veranderinge van 'n ensiem se aktiwiteit sal hê op die metaboliese weë en die totale metabolisme;*
- *Voldoende vaardighede om 'n siftings program saam te stel om die verandering van 'n metaboliese profiel te evalueer gevolg deur meer komplekse diagnostiese toetse;*
- *Die vermoë hê om 'n abnormale metaboliese profiel te evalueer op grond van bekende diagnostiese profiele en abnormaliteite en die kennis van watter en hoe bevestigende analises uitgevoer kan word op geselekteerde gevalle;*
- *Om die vermoë te hê om 'n verslag te skryf in 'n raadgewende hoedanigheid (bv. Dokter, apteker, biochemikus, dieetkundige) om die abnormale resultate te verduidelik in eenvoudige terme;*
- *Begrip te hê van veiligheids-, etiese- en professionele gedrag wat verwag word van 'n professionele analitiese biochemikus.*

Method of delivery: Full Time
Metode van aflewering: *Voltyds*

Assessment Methods:

Formal Formative:

The student demonstrates his/her newly acquired knowledge and skills by submitting assignments, tutorials and practical reports on selected relevant topics.

Summative:

Summative assessments are in the form of written class tests, a semester test and a final exam to be completed by each candidate.

Assessment Plan:

The semester test will count one third, the practical examination a third and the other third will be compiled from the ongoing evaluation marks received inter alia for class tests and assignments. A minimym participation mark of 40% is required for examination participation. The participation and examination mark each contribute 50% to the final module mark.

Assesseringsmetodes:

Formele Formatief:

Die student demonstreer sy / haar nuut verwerfde kennis en vaardighede deur opdragte, tutoriale en praktiese verslae oor geselekteerde relevante onderwerpe in te dien.

Opsommend:

Opsommende assesserings is in die vorm van skriftelike klastoetse, 'n semestertoets en 'n finale eksamen wat deur elke kandidaat voltooi moet word.

Assesseringsplan:

Die semestertoets sal een derde tel, die praktiese eksamen 'n derde en die ander derde sal saamgestel word uit die deurlopende evalueringspunte wat onder andere ontvang word vir klastoetse en opdragte. 'n Minimum deelnamepunt van 40% word vereis vir eksaminering. Die deelnamepunt en eksamenpunt dra elk 50% by tot die finale modulepunt.

Module code: BCHS316	Semester 1	NQF Level: 7

Title / *Titel*: **Enzymology / *Ensiemologie***

Module outcomes:

After completion of the BCHS316 module, the student should demonstrate:

- Detailed knowledge and understanding of the following key areas of enzymology:
  - the history, nomenclature and structure-function relationship of enzymes;
  - the concepts of catalysis and kinetics of single- and multi-substrate enzyme-catalysed reactions;
  - enzyme inhibition and its relevance;
  - the characteristics of allosteric enzymes, sigmoidal behaviour of enzymes.
- An integrated knowledge of how these concepts play a role in metabolism.
- The skills to independently gather knowledge of these concepts using all available sources.
- Detailed knowledge and understanding of the various experimental approaches to characterise enzyme kinetics, the ability to theoretically solve enzyme kinetic problems and critically evaluate the methods used for solving these problems.
- Skills related to experimental practice, under appropriate supervision, by following the necessary procedures and methods to effectively execute and complete enzyme kinetics experiments, effectively report on the experimental findings, and to deduce conclusions accurately.
- An understanding of the ethical and professional conduct required of a biochemist and the ethical issues that arise from work where enzymology is applied. /

Module-uitkomste:

Na voltooiing van die BCHS316 module, behoort die student die volgende te demonstreer:

- *In diepte kennis en insig van die volgende hoof areas van ensiemologie:*
  - *die geskiedenis, nomenklatuur en struktuur-funksie verwantskap van ensieme;*
  - *die konsepte van katalise en kinetika van een- en multi-substraat ensiemgekataliseerde reaksies;*
  - *ensiem-inhibisie en die relevansie daarvan*
  - *die eienskappe van allosoteriese ensieme en sigmoïdale gedrag van ensieme.*
- *Geïntegreerde kennis van die rol wat hierdie konsepte in die metabolisme speel.*
- *Die vaardighede om op 'n onafhanklike wyse kennis te bekom deur van alle bestaande bronne gebruik te maak.*
- *In diepte kennis en insig van die onderskeie eksperimentele benaderings om ensiemkinetika te karakteriseer, die vermoë om teoretiese probleme in ensiemkinetika te kan oplos asook die vermoë om die metodes wat gebruik word om hierdie probleem op te los krities te kan evalueer.*
- *Vaardighede beskik oor eksperimentele praktyke en, onder gepaste toesig, die nodige prosedures en metodes te volg ten einde ensiemkinetika eksperimente effektief uit te voer en te voltooi, eksperimentele bevindinge effektief te rapporteer en om konklusies akkuraat te maak;*
- *Insig van die etiese en professionele gedrag wat van 'n biochemikus vereis word, asook die etiese kwessies wat mag voortspruit uit toepassings van ensiemologie*

Method of delivery: Full Time
Metode van aflewering: *Voltyds*

Assessment Methods:

Formal Formative:

The student demonstrates his/her newly acquired knowledge and skills by submitting assignments, tutorials and practical reports on selected relevant topics.

Summative:

Summative assessments are in the form of written class tests, a semester test and a final exam to be completed by each candidate.

Assessment Plan:

The semester test will count one third, the practical examination a third and the other third will be compiled from the ongoing evaluation marks received inter alia for class tests and assignments. A minimym participation mark of 40% is required for examination participation. The participation and examination mark each contribute 50% to the final module mark. /

Assesseringsmetodes:

Formele Formatief:

Die student demonstreer sy / haar nuut verwerfde kennis en vaardighede deur opdragte, tutoriale en praktiese verslae oor geselekteerde relevante onderwerpe in te dien.

Opsommend:

Opsommende assesserings is in die vorm van skriftelike klastoetse, 'n semestertoets en 'n finale eksamen wat deur elke kandidaat voltooi moet word.

Assesseringsplan :

Die semestertoets sal een derde tel, die praktiese eksamen 'n derde en die ander derde sal saamgestel word uit die deurlopende evalueringspunte wat onder andere ontvang word vir klastoetse en opdragte. 'n Minimum deelnamepunt van 40% word vereis vir eksaminering. Die deelnamepunt en eksamenpunt dra elk 50% by tot die finale modulepunt.

Module code: BCHS317	**Semester 1**	**NQF Level: 7**

Title / *Titel:* **Molecular Biology / *Molekulêre Biologie***

Module outcomes:

After completion of the BCHS317 module, the student should demonstrate:

- Detailed knowledge and understanding of the following key areas of biochemistry: 1) the genome structure of eukaryotes; 2) the unlocking of genetic information in eukaryotic cells; 3) the regulation of unlocking of genetic information in eukaryotic cells; 4) the fundamentals and applications of recombinant DNA technology
- An integrated knowledge of how these concepts play a role in biochemistry and biotechnology
- Detailed knowledge and understanding of the various experimental methods and approaches in molecular biology, the ability to theoretically solve biological problems and critically evaluate the methods used for solving these problems
- Skills related to experimental practice, under appropriate supervision, by following the necessary procedures and methods to effectively execute and complete experiments to obtain, manipulate and transfer genetic material between organisms, determine the methylation status of genomic dna and the ability to effectively interpret, report on the experimental findings, and to deduce conclusions accurately.
- An understanding of the ethical and professional conduct required of a biochemist and the ethical issues that arises from work where biochemistry and molecular biology is applied./

Module-uitkomste:

Na voltooiing van die BCHS317 module, behoort die student die volgende te demonstreer:

- *In diepte kennis en insig van die volgende hoof areas van biochemie: 1) die genoomstruktuur van eukariote; 2) die ontsluiting van genetiese inligting in eukariotiese selle; 3) die regulering van die ontsluiting van genetiese inligting in eukariotiese selle; 4) die beginsels en toepassings van rekombinante DNA tegnologie*
- *'n Geïntegreerde kennis van die rol wat hierdie konsepte in biochemie en biotegnologie speel*
- *In diepte kennis en insig van die onderskeie eksperimentele metodes en benaderings in molekulêre biologie, die vermoë om biologiese probleme teoreties op te los asook die vermoë om die metodes wat gebruik word om hierdie probleme op te los krities te kan evalueer*

- *Vaardighede om eksperimentele praktyke en, onder gepaste toesig, die nodige prosedures en metodes te volg ten einde eksperimente om genetiese materiaal te bekom, te manipuleer en tussen organismes oor te dra en die metilerings status van genomiese DNA te bepaal, effektief uit te voer en te voltooi, eksperimentele bevindinge effektief te rapporteer en om gevolgtrekkings akkuraat te maak*
- *Insig van die etiese en professionele gedrag wat van 'n biochemikus vereis word, asook die etiese kwessies wat vanuit toepassings van biochemie en molekulêre biologie mag onstaan*

Method of delivery: Full Time
Metode van aflewering: *Voltyds*

Assessment Methods:
Formal Formative:
The student demonstrates his/her newly acquired knowledge and skills by submitting assignments, tutorials and practical reports on selected relevant topics.
Summative:
Summative assessments are in the form of written class tests, a semester test and a final exam to be completed by each candidate.
Assessment Plan:
The semester test will count one third, the practical examination a third and the other third will be compiled from the ongoing evaluation marks received inter alia for class tests and assignments. A minimym participation mark of 40% is required for examination participation. The participation and examination mark each contribute 50% to the final module mark./
Assesseringsmetodes:
Formele Formatief:
Die student demonstreer sy / haar nuut verwerfde kennis en vaardighede deur opdragte, tutoriale en praktiese verslae oor geselekteerde relevante onderwerpe in te dien.
Opsommend:
Opsommende assesserings is in die vorm van skriftelike klastoetse, 'n semestertoets en 'n finale eksamen wat deur elke kandidaat voltooi moet word.
Assesseringsplan:
Die semestertoets sal een derde tel, die praktiese eksamen 'n derde en die ander derde sal saamgestel word uit die deurlopende evalueringspunte wat onder andere ontvang word vir klastoetse en opdragte. 'n Minimum deelnamepunt van 40% word vereis vir eksaminering. Die deelnamepunt en eksamenpunt dra elk 50% by tot die finale modulepunt.

Module code: BCHS321	**Semester 2**	**NQF Level: 7**

Title / *Titel:* **Analytical Biochemistry / *Analitiese Biochemie***

Module outcomes:
After completion of the BCHS321 module, the student should be able to demonstrate:
- He/she has detailed knowledge to (i) use important characteristics of proteins for the process of protein isolation and characterization and isolation efficacy evaluation, (ii) understand the concept of chromatographic separation and to demonstrate how knowledge of chemical characteristics of unknown compounds can be applied to predict chromatographic elution order of complex biological mixtures under specific chromatographic conditions, (iii) apply knowledge of centrifugation techniques to separate cell organelles and more specifically to progress to the level of protein separation by applying certain concepts of centrifugation, (iv) basic functioning of mass spectrometry, description of specific ionization techniques, application in the analytical environment and the types of molecules which can be analysed with mass spectrometry and the application of mass spectrometry to identify and quantify unknown metabolites. (v) application of electrophoresis techniques for the separation and identification of biological molecules, (vi) evaluation and selection of the most suitable

analytical technique for a specific technique based on detailed knowledge of analytical biochemistry;

- He/she has problem solving skills with regard to the application of analytical techniques in practice. This includes the interpretation of data on qualitative and quantitative level and the ability to critically evaluate the results;
- He/she can apply the concept of good laboratory practice in the experimental process, in data generation and communication of results with good supportive arguments;
- He/she can independently use additional sources of knowledge and information like scientific publications, books and the internet to evaluate results critically;
- He/she is familiar with the implication of ethics and professional practice in the application of analytical biochemistry./

Module-uitkomste:

Na voltooiing van die BCHS321 module, behoort die student te kan demonstreer dat:

- *Hy/sy oor geïntegreerde kennis beskik om (i) belangrike eienskappe van proteïene te kan benut vir die proses van proteïen isolasie en karakterisering en die mate van sukses in die isolasie proses te kan evalueer (ii) die beginsels waarop chromatografiese skeidings berus te verstaan en aan te toon hoedat chemiese eienskappe van onbekende verbindings gebruik kan word om chromatografiese skeiding te voorspel van komplekse biologiese mengsels onder spesifieke chromatografiese kondisies (iii) kennis van sentrifugerings tegnieke te kan aanwend om selorganelle van mekaar te kan skei en meer spesifiek tot op die vlak van proteïen skeiding te kan vorder deur sekere beginsels van sentrifugering toe te pas. (iv) massaspektrometrie se basiese werking te kan beskryf en meer spesifiek sekere ionisasie tegnieke in detail te kan beskryf, hoedat hierdie tegniek aangewend kan word in die analitiese omgewing, tipes verbindings wat hierdeur geïdentifiseer kan word en die gebruik van hierdie tegniek om onbekende metaboliete te identifiseer en te kwantifiseer. (v) elektroforetiese tegnieke te kan aanwend vir die skeiding en identifisering van biologiese molekules. (vi) evaluering van die mees geskikste analitiese tegniek vir 'n spesifieke eksperiment te kan uitvoer en motiveer op grond van in diepte kennis van analitiese biochemie;*
- *Hy/sy oor probleemoplossing vaardighede beskik met betrekking tot die toepassing van die analitiese tegnieke in die praktyk. Dit sluit verder die vermoë in om data beide op kwalitatiewe en kwantitatiewe vlak te kan interpreteer en krities te besin oor die resultaat;*
- *Hy/sy, die beginsels van goeie laboratorium praktyk sal toepas in die eksperimentele proses, in data generering en kommunikasie en afleidings oor resultate te staaf met deurdagte argumente;*
- *Hy/sy addisionele kernbronne soos boeke, wetenskaplike publikasies en die internet selfstandig te kan raadpleeg om resultate krities te beoordeel;*
- *Hy/sy die implikasie van etiek en professionele praktyk in die toepassing van analitiese biochemie begryp en in beginsel kan aanwend.*

Method of delivery: Full Time
Metode van aflewering: *Voltyds*

Assessment Methods –
Formal Formative:
The student demonstrates his/her newly acquired knowledge and skills by submitting assignments, tutorials and practical reports on selected relevant topics.
Summative:
Summative assessments are in the form of written class tests, a semester test and a final exam to be completed by each candidate.
Assessment Plan:
Class tests will form 40% of the participation mark and 60% will be compiled from the ongoing evaluation marks received inter alia for assignments. A minimym participation mark of 40% is

required for examination participation. The participation and examination mark each contribute 50% to the final module mark./

Assesseringsmetodes:
Formele Formatief
Die student demonstreer sy / haar nuut verwerfde kennis en vaardighede deur opdragte, tutoriale en praktiese verslae oor geselekteerde relevante onderwerpe in te dien.
Opsommend:
Opsommende assesserings is in die vorm van skriftelike klastoetse, 'n semestertoets en 'n finale eksamen wat deur elke kandidaat voltooi moet word.
Assesseringsplan:
Klastoetse sal 40% van die deelname punt uitmaak en 60% sal saamgestel word uit die deurlopende evalueringspunte wat onder andere ontvang word vir opdragte. 'n Minimum deelnamepunt van 40% word vereis vir eksaminering. Die deelnamepunt en eksamenpunt dra elk 50% by tot die finale modulepunt.

Module code: BCHS322	**Semester 2**	**NQF Level: 7**

Title / *Titel*: **Biochemistry Research Project / *Biochemie Navorsingsprojek***

Module outcomes:
After completion of the module BCHS322, the student should demonstrate:

- Sufficient knowledge of the integrated theoretic and practical principles and considerations for planning and carrying out a research project in Biochemistry;
- The ability to assimilate multiple sources of knowledge such as books, journals and the internet on particular topics within the field of Biochemistry, and critically evaluate, review and integrate this knowledge to prepare a literature study and motivate a research proposal;
- Integrated knowledge and understanding of the theoretical basis and applications of appropriate analytical equipment and methods that are used in the projects
- The ability to design project-oriented experiments, identify appropriate methods and perform experiments and carry out a small research project in group context, under appropriate supervision;
- The ability to critically evaluate, interpret, present and communicate results of experiments in the form of preparing and presenting a research poster
- The ability to identify ethical issues in biological research and have an understanding of professional conduct required of a professional biochemist./

Module-uitkomste:
Na voltooiing van die module BCHS322, behoort die student bewys te lewer van:

- *Genoegsame kennis van die geïntegreerde teoretiese en praktiese beginsels en oorwegings vir die beplanning en uitvoering van `n navorsingsprojek in Biochemie;*
- *Die vermoë om 'n verskeidenheid bronne wat inligting en kennis bevat, soos boeke, joernale en die internet oor 'n spesifieke onderwerp in Biochemie saam te stel, krities die inligting te evalueer en die kennis te kan integreer in 'n literatuuroorsig en 'n navorsingsvoorstel te kan motiveer;*
- *Geïntegreerde kennis en begrip van die teoretiese basis en toepassings van geskikte analitiese apparaat en metodes wat in die projekte gebruik word;*
- *Die vermoë om projek georiënteerde eksperimente te kan ontwerp, toepaslike metodes te identifiseer en 'n klein navorsingsprojek in groepesverband onder geskikte toesig te kan uitvoer;*
- *Die vermoë om resultate van eksperimente krities te kan evalueer, interpreteer, aanbied en kommunikeer in die vorm van die voorbereiding van en aanbied van 'n plakkaat;*

- *Die vermoë om etiese kwessies in biologiese navorsing te kan identifiseer en 'n begrip te hê van die etiese en professionele gedrag wat van 'n professionele biochemikus verwag kan word.*

Method of delivery: Full Time
Metode van aflewering: *Voltyds*

Assessment Methods:

Formal Formative

The student demonstrates his/her newly acquired knowledge and skills by submitting assignments, tutorials and practical reports on selected relevant topics.

Summative:

Summative assessments are in the form of written class tests, a semester test and a final exam to be completed by each candidate.

Assessment Plan:

Class tests will form 40% of the participation mark and 60% will be compiled from the oral presentation of the research project. A minimym participation mark of 40% is required for examination participation. The participation and examination mark each contribute 50% to the final module mark./

Assesseringsmetodes:

Formele Formatief:

Die student demonstreer sy / haar nuut verwerfde kennis en vaardighede deur opdragte, tutoriale en praktiese verslae oor geselekteerde relevante onderwerpe in te dien.

Opsommend:

Opsommende assesserings is in die vorm van skriftelike klastoetse, 'n semestertoets en 'n finale eksamen wat deur elke kandidaat voltooi moet word.

Assesseringsplan:

Klastoetse sal 40% van die deelname punt uitmaak en 60% sal saamgestel word uit die mondelinge voordrag van die navorsings projek. 'n Minimum deelnamepunt van 40% word vereis vir eksaminering. Die deelnamepunt en eksamenpunt dra elk 50% by tot die finale modulepunt.

Module code / *-kode*: MCBN111/ MCBN171	**Semester 1**	**NQF Level 5**

Title / *Titel:* **Molecular and Cell Biology I / *Molekulêre en Selbiologie I***

Module outcomes:

After completion of the MCBN111 module, the student should:

- Know and be able to use the relevant terminology of Cell Biology
- Demonstrate basic knowledge of the biology of the cell, including (1) the composition of the cell, (2) functions and organisation of various cellular components such as the cell membrane, organelles, cell wall and the cytoskeleton (3) cell-cell interactions.
- Be able to demonstrate basic theoretical skills regarding cell biology investigation techniques and scientific approaches
- Have a basic knowledge of the scientific method in science.

Module-uitkomste:

Na voltooiing van die MCBN111 module, behoort die student die volgende te kan demonstreer:

- *Kennis van, en die vermoë om, relevante terminologie van Selbiologie te gebruik.*
- *Basiese kennis van die biologie van die sel, insluitende (1) die samestelling van die sel, (2) funksies en organisasie van verskeie sellulêre komponente soos die selmembraan, organelle, die selwand en die sitoskelet (3) sel-sel interaksies.*
- *Basiese teoretiese vaardighede kan demonstreer soos gebruik in selbiologiese ondersoeke asook wetenskaplike benaderinge.*
- *'n Basiese kennis te hê van die wetenskaplike metode*

Method of delivery: Full Time
Metode van aflewering: *Voltyds*

Assessment Criteria

Candidates have mastered the outcomes if they are able to:

- Use the relevant terminology of Cell Biology
- Demonstrate basic knowledge of the biology of the cell, including (1) the composition of the cell, (2) functions and organisation of various cellular components such as the cell membrane, organelles, cell wall and the cytoskeleton (3) cell-cell interactions.
- Demonstrate basic theoretical skills regarding cell biology investigation techniques and scientific approaches
- Demonstrate a basic knowledge of the scientific method in science.

Assesseringskriteria

Kandidate het die uitkomste bemeester indien hulle in staat is om:

- *Die relevante terminologie van selbiologie te gebruik*
- *Basiese kennis van die biologie van die sel te demonstreer, insluitende (1) die samestelling van die sel, (2) funksies en organisasie van verskeie sellulêre komponente soos die selmembraan, organelle, selwand en die sitoskelet (3) sel-sel interaksies.*
- *Basiese teoretiese vaardighede rakende selbiologie-ondersoektegnieke en wetenskaplike benaderings te demonstreer*
- *'n Basiese kennis van die wetenskaplike metode in die wetenskap te demonstreer.*

Assessment Methods:

Formal Formative

The student demonstrates his/her newly acquired knowledge and skills by submitting reports on selected relevant cell biology topics.

Summative:

Summative assessments are in the form of written class tests, a semester test and a final exam to be completed by each candidate.

Assesseringsmetodes:

Formele Formatief:

Die student demonstreer sy / haar nuut verwerfde kennis en vaardighede deur verslae oor geselekteerde relevante selbiologie onderwerpe in te dien.

Opsommend:

Opsommende assesserings is in die vorm van skriftelike klastoetse, 'n semestertoets en 'n finale eksamen wat deur elke kandidaat voltooi moet word.

Assessment Plan

- The participation mark consists of the average of the class tests, assignments and tutorials (50%) and the semester test (50 %)
- A minimum participation mark of 40 % is required for examination participation.
- The participation mark and exam will each contribute 50 % to the module mark.

Asseseringsplan

- *Die deelnamepunt bestaan uit die gemiddeld van die klastoetse, opdragte en tutoriale (50%) en die semestertoets (50%).*
- *'n Minimum deelnamepunt van 40 % word benodig vir eksamentoelating.*
- *Die deelnamepunt en eksamen dra elk 50 % by tot die modulepunt.*

Module code / *-kode*: MCBN121/ MCBN172	**Semester 2**	**NQF Level 5**

Title /Titel: **Molecular and Cell Biology II / *Molekulêre en Selbiologie II***

Module outcomes:

Students should be able to:

- Demonstrate basic knowledge on the cell, including (1) biomolecules, (2) molecular genetics, (3) energetics, and (4) metabolic reactions and enzymes;

- Demonstrate basic theoretical skills regarding cell biology investigation techniques and scientific approaches;
- Have a basic knowledge of the scientific method in science.

Module uitkomste:
Studente moet in staat wees om:
- *Basiese kennis van die sel, insluitende (1) biomolekules, (2) molekulêre genetika, (3) energetika,en (4) metaboliese reaksies en ensieme te openbaar;*
- *Basiese teoretiese vaardighede kan demonstreer, soos gebruik in selbiologiese ondersoeke asook wetenskaplike benaderinge*
- *'n Basiese kennis te hê van die wetenskaplike metode.*

Method of delivery: Full Time
Metode van aflewering: *Voltyds*

Assessment Criteria
Candidates have mastered the outcomes if they are able to:
- Demonstrate basic knowledge on the cell, including (1) biomolecules, (2) molecular genetics, (3) energetics, (4) metabolic reactions and enzymes.
- Demonstrate basic theoretical skills regarding cell biology investigation techniques and scientific approaches
- Demonstrate a basic knowledge of the scientific method in science./

Assesseringskriteria
Kandidate het die uitkomste bemeester indien hulle in staat is om:
- *Basiese kennis van die sel te demonstreer, insluitend (1) biomolekules, (2) molekulêre genetika, (3) energetika, (4) metaboliese reaksies en ensieme.*
- *Basiese teoretiese vaardighede rakende selbiologie-ondersoektegnieke en wetenskaplike benaderings te demonstreer*
- *Basiese kennis van die wetenskaplike metode in die wetenskap te demonstreer*.

Assessment Methods – Formal Formative
The student demonstrates his/her newly acquired knowledge and skills by submitting assignments and tutorials on selected relevant cell biology topics. /
Assessment Methods – Summative
Summative assessments are in the form of written class tests, a semester test and a final exam to be completed by each candidate./

Assesseringsmetodes - Formele Formatief
Die student demonstreer sy / haar nuut verwerfde kennis en vaardighede deur opdragte en tutorial verslae oor geselekteerde relevante selbiologie-onderwerpe in te dien.
Assesseringsmetodes - Opsommend
Opsommende assesserings is in die vorm van skriftelike klastoetse, 'n semestertoets en 'n finale eksamen wat deur elke kandidaat voltooi moet word.

Assessment Plan
- The participation mark consists of the average of the class tests, assignments and tutorials (50%) and the semester test (50 %)
- A minimum participation mark of 40 % is required for examination participation.
- The participation mark and exam will each contribute 50 % to the module mark./

Assesseringsplan
- *Die deelnamepunt bestaan uit die gemiddeld van die klastoetse, opdragte en tutoriale (50%) en die semestertoets (50%).*
- *'n Minimum deelnamepunt van 40 % is nodig vir eksamentoelating.*
- *Die deelnamepunt en eksamen dra elk 50 % by tot die modulepunt.*

NAS.2.7.4 BUSINESS MATHEMATICS AND INFORMATICS / *BEDRYFSWISKUNDE EN INFORMATIKA*

Module code: BWIA111	**Semester 1**	**NQF Level: 5**

Title / *Titel*: **Introduction to Financial Mathematics / *Inleiding tot Finansiële Wiskunde***

Module outcomes:

After completion of the module, the student should be able to:

- Demonstrate knowledge and informed understanding of the time value of money, present and future values, nominal and effective interest rates, annuities and loans.
- Demonstrate an ability to select, apply and interpret standard compound interest functions to calculate the present value and accumulated value of a single and recurring cash flows at a specified rate of interest.

Module-uitkomste:

Na voltooiing van die module moet die student in staat wees om:

- *Kennis en ingeligte begrip van die tydwaarde van geld, huidige en toekomstige waardes, nominale en effektiewe rentekoerse, annuïteite en lenings te demonstreer.*
- *'n Vermoë te demonstreer om standaardfunksies van saamgestelde rente vir die berekening van huidige en geakkumuleerde waarde van 'n enkele en herhalende kontantvloei te selekteer, toe te pas en te interpreteer.*

Method of delivery: Full Time
Metode van aflewering: *Voltyds*

Assessment criteria

Students have mastered the outcomes if they are able to:

- Explain the basic principles of interest rates and the time value of money.
- Calculate the present value and accumulated value of a single and recurring cash flows at a specified rate of interest.
- Calculate the repayments due under different types of loan structures.
- Use continuous interest rates to calculate the present value and accumulated value of a single and recurring cash flows./

Assesseringskriteria

Studente het die uitkomste bemeester as hulle in staat is om:

- *Die basiese beginsels van rentekoerse en die tydwaarde van geld te verduidelik.*
- *Die huidige en geakkumuleerde waarde van 'n enkele en herhalende kontantvloei teen 'n spesifieke rentekoers te bereken.*
- *Die terugbetalings in terme van verskillende tipes leningstrukture te bereken.*
- *Kontinue rentekoerse te gebruik om die huidige en geakkumuleerde waarde van 'n enkele en herhalende kontantvloei te bereken.*

Assessment modes:

Formative: Class tests and Practical assignments. Summative: Formal examination.

Assesseringsmetodes:

Formatief: *Klastoetse en Praktiese Take. Summatief: Formele eksamen**:***

Module code: BWIA121	**Semester 2**	**NQF Level: 5**

Title/ *Titel*: **Introduction to Actuarial Science / *Inleiding tot Aktuariële Wetenskap***

Module outcomes

After completion of the module, the student should be able to:

- Demonstrate knowledge and informed understanding of the time value of money, present and future values, nominal and effective interest rates, annuities and loans and use standard actuarial notation to describe these.
- Demonstrate the ability to formulate and mathematically model financial planning problems by means of a suitable computer-based implementation and the ability to communicate the results in an effective way.

- Demonstrate knowledge and informed understanding of financial risk and how it applies to different financial institutions, including insurance companies, banks and pension schemes.

Module-uitkomste

Na voltooiing van die module moet die student in staat wees om:

- *Kennis en ingeligte begrip van die tydwaarde van geld, huidige en toekomstige waardes, nominale en effektiewe rentekoerse, annuïteite en lenings te demonstreer en standaard aktuariële notasie te gebruik om dit te beskryf.*
- *Die vermoë te demonstreer om finansiële beplanningsprobleme te formuleer en wiskundig te modelleer deur die gebruik van 'n toepaslike rekenaargebaseerde toepassing, en die resultate op 'n effektiewe wyse te kommunikeer.*
- *Kennis en ingeligte begrip te demonstreer van finansiële risiko en hoe dit van toepassing is op verskillende finansiële instellings, insluitende versekeringsmaatskappye, banke en pensioenskemas.*

Method of delivery: Full Time
Metode van aflewering: *Voltyds*

Assessment criteria

Students have mastered the outcomes if they are able to:

- Define and use standard actuarial notation to calculate the present value and accumulated value of a single and recurring cash flows at a specified rate of interest, including continuous interest rates.
- Solve simple financial planning problems by means of a suitable software-based implementation and communicate the results in written and verbal form.
- Describe fundamental financial terms and explain the use and function of basic financial products.
- Identify the different types of financial risks faced by the providers of financial products and different ways in which there can be managed.
- Explain the role of actuaries, risk managers and data scientists in the financial sector./

Assesseringskriteria

Studente het die uitkomste bemeester as hulle in staat is om:

- *Standaard aktuariële notasie vir die berekening van die huidige en geakkumuleerde waarde van 'n enkele en herhalende kontantvloei teen 'n spesifieke rentekoers, insluitend kontinue rentekoerse, te definieer en te gebruik.*
- *Eenvoudige finansiële beplanningsprobleme deur middel van 'n toepaslike programgebaseerde toepassing op te los en die resultate in skriftelike en mondelinge vorm te kommunikeer.*
- *Fundamentele finansiële terme te beskryf en die gebruik en funksies van basiese finansiële produkte te verduidelik.*
- *Die verskillende tipes finansiële risiko's vir verskaffers van finansiële produkte, en die wyses waarop dit bestuur kan word, te identifiseer.*
- *Die rol van aktuarisse, risikobestuurders en datawetenskaplikes in die finansiële sektor te verduidelik.*

Assessment modes:

Formative: Class tests and Practical Project. Summative: Formal examination.

Assesseringsmetodes:

Formatief: *Klastoetse en Praktiese Projek. Summatief: Formele eksamen.*

Module code: BWIA272	Year module	NQF Level: 6

Title/ *Titel*: **Financial Mathematics / *Finansiële Wiskunde***

Module outcomes:

After completion of the module, the student should be able to:

- Describe the basic principles of financial modelling, including how to use a generalised cashflow model to describe and value financial transactions.
- Demonstrate detailed knowledge and understanding of the process of data analysis and the characteristics of different data sources, including extremely large data sets.
- Demonstrate detailed knowledge and understanding of the time value of money, real and money interest rates, the term structure of interest rates.
- Demonstrate detailed knowledge and understanding of duration, convexity and how these can be used in the immunisation of cashflows.
- Use discounted cashflows and the concept of equation of value to solve various practical problems of varying complexity.

Method of delivery: Full Time
Metode van aflewering: *Voltyds*

Assessment criteria

Students have mastered the outcomes if they are able to:

- Conduct data analyses to solve real-world problems in a scientific manner and describe tools suitable for each stage.
- Show how interest rates can be expressed in different time periods.
- Define and derive commonly used compound interest functions and use these to calculate the present value and accumulated value for a given stream of cashflows under a combination of scenarios.
- Apply discounted cash flow techniques to the valuation of securities, including the effects of taxation.
- Evaluate the duration and convexity of a cashflow sequence and explain how these are used in the immunisation of a portfolio of liabilities.
- Calculate different financial metrics to evaluate the profitability and suitability of an investment projects, including net present value, internal rate of return, payback period and discounted payback period.

Assessment modes:
Formative: Class tests and Practical assignments. Summative: Formal examination.
Assesseringsmetodes:
Formatief: *Klastoetse en Praktiese Take. Summatief: Formele eksamen****.***

Module code: BWIA273	Year module	NQF Level: 6

Title/ *Titel*: **Basics of Financial Mathematics / *Basiese Finansiële Wiskunde***

Module outcomes:

After completion of the module, the student should be able to:

- Describe the basic principles of financial modelling, including how to use a generalised cashflow model to describe and value simple financial transactions.
- Demonstrate knowledge and understanding of the process of data analysis and the characteristics of different data sources, including extremely large data sets.
- Demonstrate knowledge and understanding of the time value of money, real and money interest rates and the term structure of interest rates.
- Use discounted cashflows and the concept of equation of value to solve various practical problems.

Module-uitkomste

Na voltooiing van die module moet die student in staat wees om:

- *Die basiese beginsels van finansiële modellering te kan beskryf en finansiële transaksies met behulp van 'n algemene kontantvloeimodel te beskryf en te waardeer.*
- *Kennis en begrip van die proses van data-ontleding asook die eienskappe van verskillende databronne, insluitend uiters groot datastelle, te toon.*
- *Kennis en begrip van die tydwaarde van geld, reële en geld rentekoerse, die termynstruktuur van rentekoerse te toon.*
- *Verdiskonteerde kontantvloei en die konsep van waardevergelyking te gebruik om verskeie praktiese probleme van wisselende kompleksiteit op te los.*

Method of delivery: Full Time
Metode van aflewering: *Voltyds*

Assessment criteria:

- Students have mastered the outcomes if they are able to:
- Show a basic understanding of data analysis to solve real-world problems in a scientific manner and describe tools suitable for each stage.
- Show how interest rates can be expressed in different time periods.
- Define and derive commonly used compound interest functions and use these to calculate the present value and accumulated value for a given stream of cashflows under a combination of scenarios.
- Apply discounted cash flow techniques to the valuation of securities.
- Calculate different financial metrics to evaluate the profitability and suitability of an investment projects, including net present value, internal rate of return, payback period and discounted payback period./

Assesseringskriteria

Studente het die uitkomste bemeester indien hulle in staat is om:

- *'n Basiese begrip van data-analise kan toon om werklike probleme op wetenskaplike wyse op te en tegnieke kan beskryf wat geskik is vir elke stadium.*
- *Aan te toon hoe rentekoerse in verskillende tydperke uitgedruk kan word.*
- *Algemeen gebruikte saamgestelde rente funksies te kan definieer en af te lei en dit kan gebruik om die huidige waarde en opgehoopte waarde vir 'n gegewe stroom kontantvloei te bereken onder 'n kombinasie van scenario's.*
- *Verdiskonteerde kontantvloeistegnieke vir die waardasie van sekuriteite te kan gebruik.*

- *Verskillende finansiële statistieke kan bereken om die winsgewendheid en geskiktheid van 'n beleggingsprojek te evalueer, insluitend netto huidige waarde, interne opbrengskoers terugbetalingsperiode en verdiskonteerde terugbetalingsperiode.*

Assessment modes:
Formative: Class tests and Practical assignments.
Summative: Formal examination.
Assesseringsmetodes:
Formatief: *Klastoetse en Praktiese Take.*
Summatief: *Formele eksamen.*

Module code: BWIA313	**Semester 1**	**NQF Level: 7**

Title/ *Titel*: **Actuarial Statistical Models / *Aktuariële Statistiese Modelle***

Module outcomes
After completion of the module, the student should be able to:
- Demonstrate integrated knowledge and understanding of statistical distributions for risk modelling, with and without risk sharing, including the assumptions underlying different statistical models.
- Demonstrate the ability to identify and apply the most suitable statistical methods for a broad range of general insurance problems.

Module-uitkomste
Na voltooiing van die module moet die student in staat wees om:
- *Geïntegreerde kennis en begrip te demonstreer van statistiese verspreidings vir risikomodellering, met en sonder risikodeling, insluitende die aannames onderliggend aan verskillende statistiese modelle.*
- *Die vermoë te demonstreer om die mees toepaslike statistiese metodes te identifiseer en toe te pas vir 'n breë spektrum van korttermyn versekeringsprobleme.*

Method of delivery: Full Time
Metode van aflewering: *Voltyds*

Assessment criteria
Students have mastered the outcomes if they are able to:
- Describe the properties of the statistical distributions which are suitable for modelling individual and aggregate losses.
- Use an appropriate statistical software package to fit a statistical distribution to a dataset and calculate appropriate goodness of fit measures.
- Describe the effect of risk-sharing arrangements such as excesses and simple forms of proportional and excess of loss reinsurance.
- Discuss the concepts of risk models and compound distributions and apply these to practical actuarial problems.
- Recognise extreme value distributions, suitable for modelling the distribution of severity of loss and their relationships.
- Explain and apply elementary principles of machine learning./

Assesseringskriteria
Studente het die uitkomste bemeester as hulle in staat is om:
- *Die kenmerke van statistiese verspreidings te beskryf wat paslik is vir die modellering van individuele en totale verliese.*
- *'n Gepaste programpakket te gebruik om 'n passing van 'n statistiese verspreiding op 'n datastel te maak en gepaste passingmetings te bereken.*
- *Die effek te beskryf van risikodelingsooreenkomste soos bybetalings en eenvoudige vorms van proposionele en verliesoorskotversekering.*
- *Die konsepte van risikomodelle en saamgestelde verdelings te bespreek en dit toe te pas op praktiese aktuariële probleme.*

- *Ekstreemwaarde verdelings wat gepas is vir die modellering van die verdeling van die omvang van verlies en hulle verhoudings, te herken*
- *Basiese beginsels van outomatiese leer te verduidelik en toe te pas.*

Assessment modes:
Formative: Class tests and Practical assignments.
Summative: Formal examination.
Assesseringsmetodes:
Formatief: *Klastoetse en Praktiese Take.*
Summatief: *Formele eksamen**.***

Module code: BWIA314	**Semester 1**	**NQF Level: 7**

Title/ *Titel*: **Stochastic Processes / *Stogastiese Prosesse***

Module outcomes
After completion of the module, the student should be able to:
- Demonstrate integrated knowledge and understanding of the concepts involved in stochastic modelling and the various types of stochastic processes available to model actuarial problems.
- Demonstrate the ability to solve a variety of practical problems to which stochastic process techniques can be applied.

Module-uitkomste
Na voltooiing van die module moet die student in staat wees om:
- *Geïntegreerde kennis en begrip te demonstreer van die konsepte van stogastiese modellering en die verskillende tipes stogastiese prosesse wat beskikbaar is vir die modellering van aktuariële probleme.*
- *Die vermoë te demonstreer om 'n verskeidenheid praktiese probleme op te los waar stogastiese prosestegnieke gebruik kan word.*

Method of delivery: Full Time
Metode van aflewering: *Voltyds*

Assessment criteria
Students have mastered the outcomes if they are able to:
- Describe and classify stochastic processes (discrete or continuous time, discrete or continuous state space) and describe possible applications of mixed processes.
- Define, apply and simulate a Markov chain and demonstrate how it can be used as a tool for modelling.
- Define, apply and simulate a Markov process and demonstrate how it can be used as a tool for modelling./

Assesseringskriteria
Studente het die uitkomste bemeester as hulle in staat is om:
- *Stogastiese prosesse (diskrete of deurlopende tyd, diskrete of deurlopende ruimte) te beskryf en te klassifiseer, en moontlike toepassings vir gemengde prosesse te beskryf.*
- *'n Markov-ketting te definieer, toe te pas en te simuleer en te demonstreer hoe dit as 'n modelleringshulpmiddel gebruik kan word.*
- *'n Markov-proses te definieer, toe te pas en te simuleer en te demonstreer hoe dit as 'n modelleringshulpmiddel gebruik kan word.*

Assessment modes:
Formative: Class tests and Practical assignments.
Summative: Formal examination.
Assesseringsmetodes:
Formatief: *Klastoetse en Praktiese Take.*
Summatief: *Formele eksamen**.***

Module code BWIA324	Semester 2	NQF Level: 7

Title/ *Titel*: **Survival Models / *Oorlewingsmodelle***

Module outcomes

After completion of the module, the student should be able to:

- Demonstrate integrated knowledge and understanding of the concept of survival models and use survival models to model actuarial problems.
- Demonstrate the ability to solve a variety of practical problems to which survival models can be applied.

Module-uitkomste

Na voltooiing van die module moet die student in staat wees om:

- *Geïntegreerde kennis en begrip van die konsep van oorlewingsmodelle te demonstreer en oorlewingsmodelle te gebruik om aktuariële probleme te modelleer.*
- *Die vermoë te demonstreer om 'n verskeidenheid praktiese probleme op te los waar oorlewingsmodelle toegepas kan word.*

Method of delivery: Full Time
Metode van aflewering: *Voltyds*

Assessment criteria

Students have mastered the outcomes if they are able to:

- Define and describe the model of lifetime or failure time as a random variable.
- Describe estimation procedures for lifetime distributions including empirical survival functions and proportional hazard models.
- Derive maximum likelihood estimators for transition intensities.
- Develop census formulae and estimate age-dependent transition intensities.
- Describe the process of graduation and discuss appropriate statistical methods and graduation tests.
- Describe the approaches to the forecasting of future mortality and use a suitable software-based implementation to apply the models to a suitable mortality dataset./

Assesseringskriteria

Studente het die uitkomste bemeester as hulle in staat is om:

- *Die model van leeftyd of falingstyd as 'n ewekansige veranderlike te definieer en te beskryf.*
- *Beramingsprosedures vir leeftydverspreidings, insluitende empiriese oorlewingsfunksies en proposionele uitvalmodelle te beskryf.*
- *Maksimum aanneemlikheidsberamers vir oorgangsintensiteite af te lei.*
- *Sensusformules te ontwikkel en ouderdomsafhanklike oorgangsintensiteite te ontwikkel.*
- *Die gladstrykingsproses te beskryf en toepaslike statistiese toetse en gladstrykingstoetse te beskryf.*
- *Die benaderings tot die voorspelling van toekomstige mortaliteit te beskryf en 'n paslike programtoepassing te gebruik om die modelle op 'n paslike mortaliteit-datastel toe te pas.*

Assessment modes:
Formative: Class tests and Practical assignments.
Summative: Formal examination.
Assesseringsmetodes:
Formatief: *Klastoetse en Praktiese Take.*
Summatief: *Formele eksamen.*

Module code: BWIA371	Year Module	NQF Level: 7

Title/ *Titel*: **Contingencies / *Gebeurlikhede***

Module outcomes:

After completion of the module, the student should be able to:

- Demonstrate integrated knowledge and understanding of data analysis and the principles of actuarial modelling.

- Demonstrate integrated knowledge and understanding of a broad range of life insurance products for single and multiple lives and of their pricing and reserving.
- Demonstrate the ability to develop formulae for the means and variances of the payments under various assurance and annuity contracts

Module-uitkomste:
Na voltooiing van die module moet die student in staat wees om:
- *Geïntegreerde kennis en begrip van dataontleding en die beginsels van aktuariële modellering te demonstreer.*
- *Geïntegreerde kennis en begrip van 'n breë spektrum van lewensversekeringsprodukte vir enkele en meerdere lewens en vir hulle pryse en voorsienings te demonstreer.*
- *Die vermoë te demonstreer om formules vir die gemiddelde en variansies van betalings by verskillende versekerings- en annuïteitskontrakte te ontwikkel.*

Method of delivery: Full Time
Metode van aflewering: *Voltyds*

Assessment criteria
Students have mastered the outcomes if they are able to:
- Describe the stages of conducting a data analysis to solve real world problems in a scientific manner, explain the characteristics of different data sources and describe tools suitable for each stage of data analysis.
- Describe why and how models are used including, in general terms, the use of models for pricing, reserving, and capital modelling.
- Define and describe the operation of various assurance and annuity contracts, including conventional with-profits and unit-linked contracts and accumulating with-profits contracts,
- Develop formulae for the means and variances of the payments under various assurance and annuity contracts, assuming constant deterministic interest rate.
- Apply actuarial techniques to price and reserve for life insurance products, and to fund pension benefits.
- Project expected future cashflows and perform profit testing for various assurance and annuity contracts, incorporating multiple decrement models as appropriate./

Assesseringskriteria
Studente het die uitkomste bemeester as hulle in staat is om:
- *Die stadia te beskryf van die uitvoer van 'n data-analise om realistiese probleme op 'n wetenskaplike manier uit te voer, die kenmerke van verskillende databronne te verduidelik, en paslike hulpmiddels vir elke stadium van data-analise te beskryf.*
- *Te beskryf waarom en hoe modelle gebruik word, insluitende, in algemene terme, die gebruik van modelle vir beprysing, voorsiening en kapitaalmodellering.*
- *Die werking van verskillende versekerings- en annuïteitskontrakte te definieer en te beskryf, insluitende konvensionele met-wins en eenheidsgekoppelde kontrakte en akkumulerende met-wins kontrakte.*
- *Formule vir die gemiddeldes en variansies van betalings by verskillende versekerings- en annuïteitskontrakte te ontwikkel, met veronderstelde konstante deterministiese rentekoers.*
- *Aktuariële tegnieke toe te pas vir die prysing en voorsiening van lewensversekeringsprodukte, en om pensioenvoordele te befonds.*
- *Verwagte toekomstige kontantvloei te projekteer en winsgewendheidstoetsing vir verskillende versekerings- en annuïteitskontrakte uit te voer, met die insluiting van meerdere uitvalmodelle soos toepaslik.*

Assessment modes:
Formative: Class tests and Practical assignments.
Summative: Formal examination.
Assesseringsmetodes:
Formatief: *Klastoetse en Praktiese Take.*
Summatief: *Formele eksamen.*

NAS.2.7.5 BUSINESS MATHEMATICS AND INFORMATICS / *BEDRYFSWISKUNDE EN INFORMATIKA*

Module code: BWIN321	**Semester 2**	**NQF Level: 7**

Title/ *Titel*: **BMI Project: Capital Markets Modelling and Analysis / *Bedryfswiskunde Projek: Effektebeurs Modellering en Analise***

Module outcomes:

After completion of the module, the student should be able to:

- Demonstrate integrated knowledge and understanding of mathematical modelling and analysis of financial instruments.
- Demonstrate the ability to derive and apply mathematical formulae to price simple derivative securities.
- Demonstrate the ability to manage a team in an unfamiliar context in order to solve a problem in the field of capital markets modelling and analysis, monitoring the progress of the team and taking responsibility for task outcomes and application of appropriate resources where necessary.

Module-uitkomste:

Na voltooiing van die module moet die student in staat wees om:

- *Geïntegreerde kennis en begrip van wiskundige modellering en analise van finansiële instrumente te demonstreer.*
- *Die vermoë te demonstreer om wiskundige formules af te lei en toe te pas om eenvoudige afgeleide sekuriteite te prys.*
- *Die vermoë te demonstreer om 'n span in 'n onbekende konteks te bestuur ten einde 'n probleem op die gebied van modellering en analise van kapitaalmarkte op te los, die vordering van die span te monitor en verantwoordelikheid vir taakuitkomste te aanvaar en toepaslike bronne toe te pas waar nodig.*

Method of delivery: Full Time
Metode van aflewering: *Voltyds*

Assessment criteria

Students have mastered the outcomes if they are able to:

- Price and hedge linear claims such as futures contracts and swaps, using appropriate software, if applicable.
- Derive and apply binomial pricing of options, using appropriate software, if applicable
- As a member of a group plan and conduct research according to standard protocol and to employ appropriate techniques to solve problems in the field of capital markets modelling and analysis and produce a written report./

Assesseringskriteria

Studente het die uitkomste bemeester as hulle in staat is om:

- *Lineêre eise soos termynkontrakte en ruiltransaksies te kan pryse en verskans, met toepaslike sagteware, indien van toepassing.*
- *Binomiale prysing van opsies af te lei en toe te pas, met toepaslike sagteware, indien van toepassing*
- *As lid van 'n groep beplanning en navorsing, volgens standaardprotokol en toepaslike tegnieke te kan doen om kapitaalmarkmodellering en -analise probleme op te los en skriftelike daarvan verslag te doen.*

Assessment modes:

Formative: Class tests, Practical assignments.
Summative: Formal examination.
Assesseringsmetodes:
Formatief: *Klastoetse en Praktiese Take.*
Summatief: *Formele eksamen.*

NAS.2.7.6 CHEMISTRY/ *CHEMIE*

Module code: NCHE111	**Semester 1**	**NQF Level: 5**

Title / *Titel:* **Introductory Inorganic and Physical Chemistry / *Inleidende Anorganiese en Fisiese Chemie***

Module outcomes:

Students should be able to:

- Demonstrate fundamental knowledge and insight of the properties of substances and compounds, inter molecular interaction, aqueous solutions, chemical equilibria, acids and bases, precipitation and electron transfer reactions (should be able to apply this knowledge to write down and name chemical formula);
- Balance chemical reactions, use and apply stoichiometric and other calculations to find an unknown quantity;
- Recognize and apply tendencies from the periodic table (main group elements);
- Apply laboratory technique and safety rules;
- Explain chemical phenomena, do calculations connected with the phenomena, report results scientifically and to better understand the applications of scientific results in industry and the environment;
- Manage chemical reactions by calculating the enthalpy of reactions, determining the rate of reactions, equilibrium constants, and other aspects of aqueous equilibria such as buffer solutions and solubility products./

Module uitkomste:

Studente moet in staat wees om:

- *Fundamentele kennis en insig te demonstreer van die eienskappe van stowwe en verbindings, intermolekulêre wisselwerking, waterige oplossings, chemiese ewewigte, sure en basisse, neerslagvorming en elektronoordragreaksies en hierdie kennis te kan toepas om chemiese formules te skryf en te benoem,*
- *Reaksievergelykings te balanseer, stoïgiometriese en ander berekenings te gebruik om 'n onbekende grootheid te vind;*
- *Om tendense en verbande uit die periodieke tabel (hoofgroepe) te verklaar;*
- *Vaardighede te demonstreer in die toepassing van laboratorium- en veiligheidsreëls;*
- *Waargenome chemiese verskynsels te verklaar, berekenings in verband daarmee uit te voer, resultate wetenskaplik te kommunikeer en toepassings daarvan in die nywerheid en omgewing beter te kan begryp.*
- *Chemiese reaksies te bestuur deur die entalpie van reaksies te bereken, die tempo van reaksies te bepaal, ewewigskonstantes te bepaal en ander aspekte van waterige ewewigte soos bufferoplossings en oplosbaarheidsprodukte te bereken*

Method of delivery: Full Time
Metode van aflewering: *Voltyds*

Assessment modes:

Formative:

Class tests, online tests, a semester test.

Summative:

The summative assessment consists of an exam paper that will be written at an appointed time by every student.

Module code: NCHE121	Semester 2	NQF Level: 5

Title: / *Titel:* **Introductory Organic Chemistry / *Inleidende Organiese Chemie***

Module outcomes:

Students should be able to:

- Demonstrate knowledge and informed understanding of the concepts underpinning the subthemes of atomic structure, chemical bonding, molecular geometry, organic nomenclature, and intermolecular forces as well as the most important classes of organic compounds, including alkanes, alkenes, benzenes, haloalkanes, alcohols, amines, ethers, carboxylic acids, acyl halides, anhydrides, esters and amides;
- Evaluate the structures of organic compounds and thereby identify suitable synthesis procedures with a limited number of steps;
- Display conduct in the academic environment that adheres to the rules as stipulated by the north-west university code of conduct;
- Utilise basic research skills, such as sourcing and verifying information from various sources and use this information to construct a coherent body of knowledge;
- Communicate these discipline-specific ideas in writing in an accurate and coherent way while showing respect for conventions around copyright and plagiarism;
- Apply the green chemistry approach to organic chemistry and to show the relation between our approach to chemistry and the long-term survival of the human race;
- Manage his or her learning and implement the discipline-specific learning strategies given in the NCHE 121 study guide to improve learning problems./

Module uitkomste:

Studente moet in staat wees om:

- *Kennis en ingeligte begrip van die konsepte wat die volgende subtemas van organiese chemie onderlê atoomstruktuur, chemiese binding, molekulêre geometrie, organiese nomenklatuur en intermolekulêre kragte, sowel as die belangrikste klasse van organiese verbindings, insluitende alkane, alkene, bensene haloalkane, alkohole, amiene, eters, karboksielsure, asielhaliede, anhidriede, ester en amiede te demonstreer;*
- *Die strukture van organiese verbindings te evalueer en sodoende geskikte sinteseprosedures met 'n beperkte aantal stappe te identifiseer;*
- *Optrede in die akademiese omgewing openbaar wat voldoen aan die gedragskode van die noordwes-universiteit;*
- *Basiese navorsingsvaardighede soos insameling en verifikasie van inligting vanuit verskillende bronne en die gebruik van hierdie inligting om 'n koherente geheel saam te stel, toe te pas;*
- *Vakspesifieke idees skriftelik te kommunikeer op 'n koherente wyse met inagneming van die konvensies rakende kopiereg en plagiaat;*
- *Die groen chemie benadering toe te pas op organiese chemie en die verwantskap tussen ons benadering tot chemie en die langtermyn oorlewing van die mensdom aan te toon;*
- *Sy of haar leeraktiwiteite te bestuur en vakspesifieke leerstrategieë, soos aangetoon in die NCHE121 studiegids, te implementeer om leerprobleme te verbeter*

Method of delivery: Full Time
Metode van aflewering: *Voltyds*

Assessment modes:
Formative:
Class tests, online tests, a semester test, pre-practical preparation tests and practical reports.
Summative:
The summative assessment consists of an exam paper that will be written at an appointed time by every student.

Module code: NCHE171	**Semester 2**	**NQF Level: 6**

Title/ *Titel*: **Introductory Inorganic and Physical Chemistry**

Module outcomes:
Students should be able to:

- Demonstrate fundamental knowledge and insight of the properties of substances and compounds, inter molecular interaction, aqueous solutions, chemical equilibria, acids and bases, precipitation and electron transfer reactions (should be able to apply this knowledge to write down and name chemical formula);
- Balance chemical reactions, use and apply stoichiometric and other calculations to find an unknown quantity;
- Recognize and apply tendencies from the periodic table (main group elements);
- Apply laboratory technique and safety rules;
- Explain chemical phenomena, do calculations connected with the phenomena, report results scientifically and to better understand the applications of scientific results in industry and the environment;
- Manage chemical reactions by calculating the enthalpy of reactions, determining the rate of reactions, equilibrium constants, and other aspects of aqueous equilibria such as buffer solutions and solubility products./

Module uitkomste:
Studente moet in staat wees om:

- *Fundamentele kennis en insig te demonstreer van die eienskappe van stowwe en verbindings, intermolekulêre wisselwerking, waterige oplossings, chemiese ewewigte, sure en basisse, neerslagvorming en elektronoordragreaksies en hierdie kennis te kan toepas om chemiese formules te skryf en te benoem,*
- *Reaksievergelykings te balanseer, stoïgiometriese en ander berekenings te gebruik om 'n onbekende grootheid te vind;*
- *Om tendense en verbande uit die periodieke tabel (hoofgroepe) te verklaar;*
- *Vaardighede te demonstreer in die toepassing van laboratorium- en veiligheidsreëls;*
- *Waargenome chemiese verskynsels te verklaar, berekenings in verband daarmee uit te voer, resultate wetenskaplik te kommunikeer en toepassings daarvan in die nywerheid en omgewing beter te kan begryp.*
- *Chemiese reaksies te bestuur deur die entalpie van reaksies te bereken, die tempo van reaksies te bepaal, ewewigskonstantes te bepaal en ander aspekte van waterige ewewigte soos bufferoplossings en oplosbaarheidsprodukte te bereken*

Method of delivery: Full Time
Metode van aflewering: *Voltyds*

Assessment modes:
Formative:
Class tests, online tests, a semester test, pre-practical preparation tests and practical repors.
Summative:
The summative assessment consists of an exam paper that will be written at an appointed time by every student.

Module code: NCHE172	**Semester 2**	**NQF Level: 6**

Title/ *Titel*: **Introductory Organic Chemistry**

Module outcomes:
Students should be able to:

- Demonstrate knowledge and informed understanding of the concepts underpinning the subthemes of atomic structure, chemical bonding, molecular geometry, organic nomenclature, and intermolecular forces as well as the most important classes of organic compounds, including alkanes, alkenes, benzenes, haloalkanes, alcohols, amines, ethers, carboxylic acids, acyl halides, anhydrides, esters and amides;
- Evaluate the structures of organic compounds and thereby identify suitable synthesis procedures with a limited number of steps;
- Display conduct in the academic environment that adheres to the rules as stipulated by the north-west university code of conduct;
- Utilise basic research skills, such as sourcing and verifying information from various sources and use this information to construct a coherent body of knowledge;
- Communicate these discipline-specific ideas in writing in an accurate and coherent way while showing respect for conventions around copyright and plagiarism;
- Apply the green chemistry approach to organic chemistry and to show the relation between our approach to chemistry and the long-term survival of the human race;
- Manage his or her learning and implement the discipline-specific learning strategies given in the study guide to improve learning problems./

Module uitkomste:
Studente moet in staat wees om:

- *Kennis en ingeligte begrip van die konsepte wat die volgende subtemas van organiese chemie onderlê atoomstruktuur, chemiese binding, molekulêre geometrie, organiese nomenklatuur en intermolekulêre kragte, sowel as die belangrikste klasse van organiese verbindings, insluitende alkane, alkene, bensene haloalkane, alkohole, amiene, eters, karboksielsure, asielhaliede, anhidriede, ester en amiede te demonstreer;*
- *Die strukture van organiese verbindings te evalueer en sodoende geskikte sinteseprosedures met 'n beperkte aantal stappe te identifiseer;*
- *Optrede in die akademiese omgewing openbaar wat voldoen aan die gedragskode van die noordwes-universiteit;*
- *Basiese navorsingsvaardighede soos insameling en verifikasie van inligting vanuit verskillende bronne en die gebruik van hierdie inligting om 'n koherente geheel saam te stel, toe te pas;*
- *Vakspesifieke idees skriftelik te kommunikeer op 'n koherente wyse met inagneming van die konvensies rakende kopiereg en plagiaat;*
- *Die groen chemie benadering toe te pas op organiese chemie en die verwantskap tussen ons benadering tot chemie en die langtermyn oorlewing van die mensdom aan te toon;*

Sy of haar leeraktiwiteite te bestuur en vakspesifieke leerstrategieë, soos aangetoon in die studiegids, te implementeer om leerprobleme te verbeter

Method of delivery: Full Time
Metode van aflewering: *Voltyds*

Assessment modes:
Formative:
Class tests, online tests, a semester test, pre-practical preparation tests and practical repors.
Summative:
The summative assessment consists of an exam paper that will be written at an appointed time by every student.

Module code: NCHE211	**Semester 1**	**NQF Level: 6**

Title/ *Titel*: **Analytical Chemistry II / *Analitiese Chemie II***

Module outcomes:
Students should be able to:

- Demonstrate integrated knowledge of the basic theories underlying types of errors occurring during chemical analyses, statistics applied on analytical results, taking and preparing samples, quality control, acid-base and complexometric titrations, gravimetry, surface characterisation techniques, atomic spectroscopy, liquid extraction, ion exchange and chromatography;
- Display appropriate laboratory skills in order to conduct measurements associated with all of the above-mentioned theoretical aspects;
- Demarcate and effectively solve problems associated with the theoretical and practical (experimental) aspects;
- Demonstrate an understanding of the safety, ethical and professional conduct required of a professional analytical chemist.

Module uitkomste:
Studente moet in staat wees om:

- *Geïntegreerde kennis van die basiese teorieë onderliggend tot tipes foute wat tydens chemiese ontledings gemaak word, statistieke berekeninge op analitiese resultate, neem en voorbereiding van monsters, kwaliteitsbetuur, suur-basis en kompleksometriese titrasies, gravimetrie, oppervlakkarakterisering tegnieke, atoomspektroskopie, vloeistof ekstraksie, ioonuitruiling en chromatografie, te demonstreer;*
- *Toepaslike laboratorium vaardighede te hê om metinge wat verband hou met al die bogenoemde teoretiese aspekte uit te voer;*
- *Probleme af te baken en doeltreffend op te los wat verband hou met die teoretiese en praktiese (eksperimentele) aspekte;*
- *'n Begrip te hê van die veiligheid, etiese en professionele gedrag wat van 'n professionele analitiese chemikus verwag word.*

Method of delivery: Full Time
Metode van aflewering: *Voltyds*

Assessment modes:
Formative:
Class tests, online tests, a semester test, pre-practical preparation tests and practical reports.
Summative:
The summative assessment consists of an exam paper that will be written at an appointed time by every student.

Module code: NCHE212	Semester 1	NQF Level: 6

Title/ *Titel:* **Physical Chemistry II / *Fisiese Chemie II***

Module outcomes:

Students should be able to:

- Demonstrate integrated knowledge of the theories underlying the thermodynamic and kinetic approaches through which chemical reactions in Physical Chemistry are studied;
- Demonstrate detailed knowledge of the fundamental laws of thermodynamics and the ability to theoretically calculate thermodynamic quantities, as well as to interpret and critically evaluate these values in terms of process characteristics;
- Demonstrate detailed knowledge of kinetic quantities measured and calculated, and interpreting kinetic quantities in terms of the reaction mechanism;
- Demonstrate knowledge of experimental methods and techniques typically utilized to determine thermodynamic and kinetic quantities, as well as the ability to effectively use appropriate laboratory skills in order to conduct these measurements;
- Demarcate and effectively solve complex problems related to thermodynamic and kinetic studies in Physical Chemistry, and to apply experimental measurements with theory-driven arguments;
- Critically judge the ethical/professional conduct of others within different professional/ academic environments in chemistry, and to effect change in conduct where necessary./

Module uitkomste:

Studente moet in staat wees om:

- *Geïntegreerde kennis van die teorieë onderliggend aan die termodinamiese en kinetiese benaderings waardeur chemiese reaksies in Fisiese Chemie bestudeer word, te demonstreer;*
- *Gedetailleerde kennis van die fundamentele wette van termodinamika te hê en oor die vermoë beskik om termodinamiese groothede teoreties te bereken, sowel as om hierdie groothede te interpreteer en krities te evalueer in terme van proseseienskappe;*
- *Gedetailleerde kennis van gemete en berekende kinetiese groothede te hê en hierdie kinetiese groothede te interpreteer ten opsigte van die reaksiemeganisme;*
- *Kennis van eksperimentele metodes en tegnieke wat tipies gebruik word om termodinamiese en kinetiese groothede te hê, sowel as oor die vermoë beskik om gepaste laboratoriumvaardighede effektief te gebruik om hierdie metinge uit te voer;*
- *Af te baken en komplekse probleme wat verband hou met termodinamiese en kinetiese studies in Fisiese Chemie effektief op te los, en om eksperimentele metings op teoriegedrewe argumente toe te pas;*
- *Die etiese/professionele gedrag van ander binne verskillende professionele/akademiese omgewings in chemie krities te beoordeel, en om verandering in gedrag teweeg te bring waar nodig*

Method of delivery: Full Time
Metode van aflewering: *Voltyds*

Assessment modes:

Formative:

Class tests, online tests, a semester test, pre-practical preparation tests and practical reports.

Summative:

The summative assessment consists of an exam paper that will be written at an appointed time by every student.

Module code: NCHE213	Semester 1	NQF Level: 6

Title/ *Titel:* **Organic Chemistry II (Pharmacy/ Biological Sciences) /** ***Organiese Chemie II (Farmasie/ Biologiese Wetenskappe)***

Module outcomes:

After completion of module, the student should demonstrate:

- Detailed knowledge and a clear understanding of i) factors influencing electron density and reactivity of organic molecules and ii) aromatic, heterocyclic and polyfunctional organic molecules, their properties and reactivity.
- Critical understanding of the principles of aromaticity applied to aromatic and heterocyclic compounds, knowledge of classic reactions of aromatic and heterocyclic compounds and the ability to explain reactivity trends.
- Critical understanding of polyfunctional organic molecules, their reactivity and mechanistic aspects.
- Ability to select, implement and evaluate the correct mechanism to demonstrate the possible progression of specific aromatic and polyfunctional reactions.
- The ability to effectively use appropriate laboratory skills to synthesise and purify selected aromatic and polyfunctional compounds.
- Understanding of the ethical and environmental impact that chemistry has on society.

Module uitkomste:

Na voltooiing van die module, behoort die student:

- *Gedetailleerde kennis en 'n duidelike begrip van i) die faktore wat elektrondigtheid en die reaktiwiteit van organiese molekules beïnvloed en ii) aromatiese, heterosikliese en polifunksionele molekules, hul eienskappe en reaktiwiteit.*
- *Kritiese begrip te toon van die beginsels van aromatisiteit toegepas op aromatiese en heterosikliese verbindings; kennis van klassieke reaksies van aromatiese en heterosikliese verbindings te hê en die vermoë om tendense in reaktiwiteit te voorspel.*
- *Kritiese begrip te toon van die chemiese eienskappe en meganistiese aspekte van polifunksionele molekules.*
- *Korrekte meganismes te selekteer, toe te pas en te evalueer om sodoende die moontlike progressie van spesifieke aromatiese en polifunksionele reaksies te voorspel.*
- *Begrip te toon van die etiese- en omgewingsimpak van chemie op die samelewing.*

Method of delivery: Full Time
Metode van aflewering: *Voltyds*

Assessment modes:

Formative:

Class tests, online tests, a semester test, pre-practical preparation tests and practical reports.

Summative:

The summative assessment consists of an exam paper that will be written at an appointed time by every student.

Module code: NCHE221	Semester 2	NQF Level: 6

Title/ *Titel:* **Inorganic Chemistry II /** ***Anorganiese Chemie II***

Module outcomes:

Students should be able to:

- Demonstrate detailed knowledge and a clear understanding of models used to present structure and bonding of atoms and molecules, as well as the reaction properties pertaining to the chemistry of the main group elements;
- Derive chemical and atomic properties, as well as to predict important chemical reactions of main group elements from basic principles;
- Demonstrate detailed knowledge of intermolecular forces in solutions and the ability to reproduce the properties, forms of bonding and reactions of s-block and p-block elements;

- Effectively use appropriate laboratory skills and master practical techniques to synthesize and purify specific inorganic compounds of the main group elements;
- Solve a multi-step reaction using suitable reagents and products to ensure the manufacturing of the desired compound, while planning and executing a work schedule;
- Display a sense of responsibility for fellow humans and the environment in scientific investigations while acting responsible and in accordance with the code of conduct relevant to chemistry./

Module uitkomste:

Studente moet in staat wees om:

- *Gedetaïlleerde kennis en 'n duidelike begrip van die modelle wat gebruik word om struktuur en binding van atome en molekules voor te stel, sowel as die reaksie eienskappe wat van toepassing is op die chemie van hoofgroepelemente te demonstreer;*
- *Chemiese- en atoomeienskappe uit basiese beginsels te kan aflei en belangrike reaksies van hoofgroepelemente te kan voorspel;*
- *Gedetaïlleerde kennis van intermolekulêre kragte in oplossings en die vermoë om eienskappe, bindingsvorme en reaksies van s- en p-blok elemente te kan weergee, te demonstreer;*
- *Toepaslike laboratoriumvaardighede effektief te kan gebruik om spesifieke anorganiese verbindings van die hoofgroeplemente te vervaardig en te suiwer;*
- *'n Multi-Stap reaksie te kan weergee deur die nodige reagense en produkte aan te dui om die vervaardiging van die korrekte produk te verseker, terwyl 'n werksskedule beplan en uitgevoer moet kan word;*
- *'n Verantwoordelikheidsgevoel in sy/haar chemiese ondersoeke vir sy/haar medemens en die omgewing te hê, terwyl hy/sy volgens die gedragskode van chemici optree.*

Method of delivery: Full Time
Metode van aflewering: *Voltyds*

Assessment modes:
Formative:
Class tests, online tests, a semester test, pre-practical preparation tests and practical reports.
Summative:
The summative assessment consists of an exam paper that will be written at an appointed time by every student.

Module code: NCHE222	**Semester 2**	**NQF Level: 6**

Title/ *Titel:* **Organic Chemistry II / *Organiese Chemie II***

Module outcomes:
Students should be able to:

- Demonstrate detailed knowledge and a clear understanding of models used to present atoms and molecules as well as the properties, reactions and mechanisms pertaining to aromatic chemistry;
- Demonstrate a clear understanding of prevalent schools of thought that determined the progress within the field of molecular models;
- Select, implement and evaluate the correct mechanism to demonstrate the possible progression of specific aromatic based reactions;
- Effectively use appropriate laboratory skills to synthesize and purify specific compounds;
- Solve a multi-step reaction using suitable reagents and products to ensure the manufacture of the desired compound;
- Have a sense of responsibility for fellow humans and the environment in scientific investigations while acting in accordance with the code of conduct relevant to chemistry./

Module uitkomste:

Studente moet in staat wees om:

- *Gedetaïlleerde kennis en 'n duidelike begrip van die modelle wat gebruik word om atome en molekules voor te stel, sowel as die einskappe, reaksies en meganismes wat van toepassing is op aromatiese chemie, te hê;*
- *Die huidiglike denkskole wat die ontwikkeling binne die veld van molekulêre modelle bepaal het, te verstaan;*
- *Die korrekte meganisme te kan kies, toe te pas en te evalueer om sodoende die moontlike progressie van spesifieke aromatiese reaksies weer te gee;*
- *Die toepaslike laboratoriumvaardighede effektief te gebruik om spesifieke verbindings te vervaardig en te suiwer;*
- *'n Multi-Stap reaksie te kan weergee deur die nodige reagense en produkte aan te dui om die vervaardiging van die korrekte produk te verseker;*
- *'n Verantwoordelikheidsgevoel in sy chemiese ondersoeke vir sy medemens en die omgewing te hê, terwyl hy volgens die gedragskode van chemici optree.*

Method of delivery: Full Time
Metode van aflewering: *Voltyds*

Assessment modes:
Formative:
Class tests, online tests, a semester test, pre-practical preparation tests and practical reports.
Summative:
The summative assessment consists of an exam paper that will be written at an appointed time by every student.

Module code: NCHE311	**Semester 2**	**NQF Level: 6**

Title/ *Titel:* **Analytic Methods III / *Analitiese Metodes III***

Module outcomes:
After completion of the module NCHE 311, the student should demonstrate:

- Integrated knowledge and understanding of the theory of the following: chromatographic separation techniques [general theory and gas chromatography], molecular spectroscopic techniques [infrared spectroscopy (IR), nuclear magnetic resonance spectroscopy (NMR)], mass spectrometry (MS), thermal methods [TG, TGA, DSC] and electrochemical methods;
- The ability to determine the structures of organic compounds using data from infrared spectroscopy, mass spectrometry and nuclear magnetic resonance spectroscopy (^{1}H and ^{13}C).
- Be able to address his or her learning needs in a self-addressed manner;
- To demonstrate the ability to take decisions and act ethically and professionally within a supported environment.

Module uitkomste:

Na voltooiing van die NCHE 311 module, behoort die student die volgende te kan aantoon:

- *Geïntegreerde kennis en begrip van die teorie van die volgende: chromatografiese skeidingstegnieke [algemene teorie en gaschromatografie], molekulêre spektroskopiese tegnieke [infrarooi spektroskopie (IR), kernmagnetiese resonansspektroskopie (NMR)], massaspektrometrie (MS), termiese metodes [TG, TGA, DSC] en elektrochemiese metodes;*
- *Die struktuur van organiese verbindings met behulp van data vanaf infrarooi spektroskopie, massaspektrometrie en kernmagnetiese resonansspektroskopie (1H en 13C) te kan bepaal.*
- *Die vermoë om sy of haar leerbehoeftes op 'n selfgerigte manier kan aanspreek;*
- *Die vermoë om besluite te neem en eties en professioneel op te tree binne 'n ondersteunde omgewing.*

Method of delivery: Full Time
Metode van aflewering: *Voltyds*

Assessment modes:
Formative:
Class tests, online tests, a semester test.
Summative:
The summative assessment consists of an exam paper that will be written at an appointed time by every student.

Module code: NCHE312	**Semester 2**	**NQF Level: 6**

Title/ *Titel:* **Physical Chemistry III / *Fisiese Chemie III***

Module outcomes:
After completion of the NCHE312 module, the student should demonstrate:

- Knowledge, insight and understanding to (i) perform calculations based on introductory quantum chemical principles, (ii) explain the origin of vibration, rotation and vibration-rotation spectra, and to calculate molecular quantities and spectroscopic constants from these spectra, (iii) calculate thermodynamic quantities for real (non-ideal) gases by using tabled data in equations based on deviations from ideal gas behaviour, (iv) utilise the debye-hückel and related theories to determine thermodynamic quantities for real (non-ideal) solutions, and (v) determine kinetic quantities and activation parameters for reactions of a more complex nature both numerically and graphically;
- An ability to critically interrogate multiple sources of knowledge such as textbooks and the internet within the field of physical chemistry, with specific reference to the above-mentioned topics, so as to critically review and evaluate that knowledge with a view of obtaining a deeper understanding and appreciation of theory and practice;
- Skills related to experimental practice, under appropriate supervision, by following the necessary procedures and methods to effectively execute and complete experiments (related to the above-mentioned topics), effectively report on the experimental findings, and extract relevant conclusions as requested;
- Problem solving skills related to the interface between theory and application and to analyse and critically reflect on the outcome/result; and
- An understanding of the ethical and professional conduct required of a professional chemist and the ethical application of physical chemistry.

Method of delivery: Full Time
Metode van aflewering: *Voltyds*

Assessment modes:
Formative:
Class tests, a semester test, pre-practical preparation tests and practical reports.
Summative:
The summative assessment consists of an exam paper that will be written at an appointed time by every student.

Module code: NCHE321	Semester 2	NQF Level: 6

Title/ *Titel:* **Inorganic Chemistry III / *Anorganiese Chemie III***

Module outcomes:

After completion of the NCHE312 module, the student should demonstrate:

- Knowledge, insight and understanding to (i) perfrm calculations based on introductory quantum chemical principles, (ii) explain the origin of vibration, rotation and vibration-rotatio spectra, and to calculate molecular quantities and spectroscopic constants from these spectra, (iii) calculate thermodynamic quantities for real (non-ideal) gases by using tabled data in equations based on deviations from the ideal gas behaviour, (iv) utilise the Debye- Höckel and related theories to determine kinetic quantities and activation parameters for reactions of a more complex nature both numerically and graphically;
- An ability to critically interrogate multiple sources of knowledge such as textbooks and the internet within the field of physical chemistry, with specific reference to the above-mentioned topics, so as to critically review and evaluate that knowledge with a view of obtaining a deeper understanding and appreciation of theory and practice;
- Skills related to experimental practice, under appropriate supervision, by following the necessary procedures and methods to effectively execute and complete experiments (related to the above-mentioned topics), effectiviely report on the experimental findings, and relevant conclusions as requested;
- Problem solving skills related to the interface between theory and application and to analyse and critically reflect on the outcome/ result; and
- An understanding of the ethical and professional conduct required of a professional chemist and the ethical application of physical chemistry.

Method of delivery: Full Time
Metode van aflewering: *Voltyds*

Assessment modes:

Formative:

Class tests, a semester test, pre-practical preparation tests and practical reports.

Summative:

The summative assessment consists of an exam paper that will be written at an appointed time by every student.

Module code: NCHE322	Semester 2	NQF Level: 6

Title/ *Titel:* **Organic Chemistry III / *Organiese Chemie III***

Module outcomes:

After completion of the NCHE 322 module, the student should demonstrate

- Integrated knowledge and understanding of the theory of the following: aromatic heterocyclic chemistry, stereochemistry, chemistry of the carbonyl compound and rearrangement reactions;
- An ability to assimilate multiple sources of knowledge such as books, general scientific journals and the internet within the field of organic chemistry, and critically evaluate and review that knowledge to deepen the understanding of organic chemistry;
- Supervised experimental skills by performing a number of synthesis and analytical tasks, to effectively execute a planned research design, communicate findings and conclusions by means of a written report in a scientific manner;
- The ability to identify, demarcate, analyse, critically reflect on and effectively solve problems in organic chemistry by using appropriate methods;
- An understanding of the ethical and professional conduct required of a professional chemist.

Module uitkomste:

Na voltooiing van die NCHE 322 module, behoort die student:

- *'n Geïntegreerde kennis en begrip van die teorie van die volgende te hê: aromatiese heterosikliese chemie, stereochemie, chemie van die karbonielverbinding en herrangskikkingsreaksies;*

- *Die vermoë ontwikkel om 'n verskeidenheid bronne van kennis soos boeke, algemene wetenskaplike tydskrifte en die internet binne die veld van organiese chemie te assimileer en krities die inligting te evalueer en te hersien om sodoende die begrip van organiese chemie te verdiep;*
- *Onder toesig navorsingsvaardighede te kan demonstreer deur 'n aantal sintese- en analitiese take te verrig, effektief 'n beplande navorsingsontwerp uit te voer en die resultate en gevolgtrekkings m.b.v. 'N wetenskaplik geskrewe verslag te kommunikeer;*
- *Die vermoë te hê om probleme in organiese chemie met toepaslike metodes te identifiseer, af te baken, te analiseer, krities te bedink en dan effektief op te los;*
- *'n Begrip te hê van die etiese en professionele gedrag wat van 'n professionele chemikus verwag kan word.*

Method of delivery: Full Time
Metode van aflewering: *Voltyds*

Assessment modes:
Formative:
Class tests, a semester test, pre-practical preparation tests and practical reports.
Summative:
The summative assessment consists of an exam paper that will be written at an appointed time by every student.

NAS.2.7.7 ZOOLOGY / *DIERKUNDE*

Module code: DRKN211	Semester 1	NQF Level: 6

Title/ *Titel*: **Developmental Biology / *Ontwikkelingsbiologie***

Module outcomes:
Students should be able to:

- Demonstrate a detailed knowledge of chordate embryology, the principles of evolutionary theory and basic cytogenetics as well as understand the origin and development of knowledge within the field of embryology, evolutionary theory and cytogenetics;
- Evaluate, select and apply appropriate methods, procedures and techniques in processes of investigation chordate embryology; investigating opinions, approaches and principles of evolutionary theory; and understand applications in the field of cytogenetics;
- Identify and evaluate problems in unfamiliar contexts, gathering evidence appropriate to the field of developmental biology;
- Demonstrate an understanding of the ethical implications of aspects typical of the field of developmental biology, such as research on foetuses, abortion, the extent of genetic manipulation of man and animal and the relationship between religion and evolution as well as an taking responsibility of their own actions pertaining a scientist-in-training: integrity in all aspects of their studies;
- Evaluate different sources of information and to present and communicate complex information reliably and coherently;
- Demonstrate an understanding of the relationships between systems of developmental biology.
- Evaluate his/her own performance against given criteria.

Module uitkomste:
Studente moet in staat wees om:

- *Te demonstreer dat hy/sy oor gedetailleerde kennis van chordaatembriologie, die beginsels van evolusieteorie en basiese sitogenetika beskik, asook die oorsprong en ontwikkeling van die kennis in die veld van embriologie, evolusieteorie en sitogenetika verstaan;*
- *Toepaslike metodes, prosedures en tegnieke in die ondersoekproses van chordaatembriologie te evalueer, selekteer en toe te pas; opinies, benaderings en beginsels van evolusieteorie te ondersoek entoepassings in die veld van sitogenetika te begryp;*
- *Probleme in onbekende konteks te kan identifiseer en evalueer, en bewyse van toepassing in die veld van ontwikkelingsbiologie, te kan insamel;*
- *' Begrip te toon vir die etiese implikasies van aspekte wat tipies is vir die veld van ontwikkelingsbiologie, soos navorsing op fetusse, aborsie, die omvang van genetiese manipulasies op mens en dier en die verhouding tussen religie en evolusie asook om verantwoordelikheid te aanvaar vir sy/haar eie aksies met betrekking tot wetenskaplike-in-opleiding: integriteit in alle aspekte van hulle studie;*
- *Verskillende inligtingsbronne te kan evalueer en komplekse inligting betroubaar en koherent kan kommunikeer;*
- *Begrip te toon vir die verwantskappe tussen stelsels in ontwikkelingsbiologie;*
- *Sy/haar eie vermoë aan die hand van gegewe kriteria te kan meet.*

Method of delivery: Full Time
Metode van aflewering: *Voltyds*

Assessment modes:
Class tests, practical tests, assignments in groups or individually.
Semester tests.
Exam at the end of the semester.
Assesseringsmetodes:
Klastoetse, praktiese toetse, opdragte in groepe of individueel.
Semestertoets.
Eksamen aan die einde van die semester.

Module code: DRKN321	**Semester 2**	**NQF Level: 7**

Title / *Titel*: **Animal Parasitology / *Dier Parasitologie***

Module outcomes:
Students should be able to:

- Demonstrate an integrated knowledge and understanding of, as well as an ability to correctly evaluate and apply concepts, facts and principles to different areas of specialization including the classification, life cycles, biology, pathogenesis, epidemiology immunology, diagnosis and treatment in the field of parasitology and an understanding of how the knowledge relates to other fields or practices such as hygiene with a view to control pathogenesis caused by the parasites;
- Display an understanding of contested knowledge with regard to epidemiology within the field of parasitology and a critical evaluation of the applicability of aforementioned principles and theories to this field;
- Select, evaluate and apply a range of different but appropriate theories and scientific methods of enquiry (qualitative, as well as quantitative), to do focused research and resolve problems that will effect change within practice of parasitology;
- Reflect on all values, ethical conduct and justifiable decision making when people are in involved studies regarding parasitology./

Module uitkomste:
Studente moet in staat wees om:

- *Kennis en begrip te integreer, die vermoë demonstreer om konsepte, feite en beginsels van toepassing op verskillende gebiede van spesialisasie insluitende klassifikasie, lewensiklusse patogenese, epidemiologie immunologie, diagnose en behandeling in die veld van parasitologie te maak, dat hy/sy begryp van hoe om die kennis in verband te bring met ander velde of praktyke soos higiëne met die oog daarop om die patogenese wat deur die parasiete veroorsaak word te beheer;*
- *Betwiste kennis met betrekking tot epidemiologie binne die veld van parasitologie in ag te neem en krities te evalueer tydens die toepassing van reeds genoemde beginsels en teorieë met betrekking tot parasitology;*
- *Verskillende maar toegepaste teorieë en wetenskaplike metodes van inligtingverkryging te selekteer (kwalitatief sowel as kwantitatief) om gefokusde navorsing te doen en probleme op te los wat tot verandering in uitvoering van die praktyk sal lei;*
- *Oor alle waardes rakende dierparasitologie te kan reflekteer, aan etiese beginsels voldoen en regverdigbare besluite maak wanneer mense betrokke is tydens toepassing van geskikte praktyke met betrekking tot parasitologie.*

Method of delivery: Full Time
Metode van aflewering: *Voltyds*

Assessment modes:
Class tests, practical tests, assignments in groups or individually.
Semester tests.
Exam at the end of the semester.
Assesseringsmetodes:
Klastoetse, praktiese toetse, opdragte in groepe of individueel.
Semestertoets.
Eksamen aan die einde van die semester.

Module code: DRKS111	**Semester 1**	**NQF Level: 5**

Title / *Titel*: **Invertebrates / *Invertebrate***

Module outcomes:
Students should be able to:

- Demonstrate a basic knowledge and informed understanding of the systematics and classification of animals, form and function of animals in general and of invertebrates in particular, as well as being able to identify and classify these animals and indicate phylogenetic relationships;
- Distinguish between examples of invertebrates and to sort them in taxonomic and phylogenetic frameworks;
- Differentiate between animals based on their hierarchical organisation, complexity and body plan as well as apply this to demonstrate relationships between groups of invertebrates/taxa;
- Explain what a species is and give an overview of the different species concepts;
- Display an awareness of the economic importance of invertebrates as a source of food, as parasites of humans, animals and plants, or as biological or mechanical carriers of pathogens;
- Report on their skills in respect of the use of microscopes, dichotomous keys and the accessing of sources; with a respect for conventions around intellectual property, copyright and plagiarism;
- Account for the role of humans in conservation of the environment and in particular invertebrate biodiversity./

Module uitkomste:
Studente moet in staat wees om:

- *Basiese kennis en ingeligte begrip te hê van sistematiek en die klassifikasie van diere, vorm en funksie van diere in die algemeen en van ongewerweldes in die besonder, asook as in staat wees om hierdie diere te identifiseer, te klassifiseer en te dui op filogenetiese verwantskappe;*
- *Te onderskei tussen voorbeelde van ongewerweldes en om hulle te sorteer in taksonomiese en filogenetiese raamwerke;*
- *Te onderskei tussen diere op grond van hul hiërargiese organisasie, kompleksiteit en liggaamsplan asook hoe om hierdie inligting toe te pas om verhoudings tussen groepe ongewerweldes/taksons te demonstreer;*
- *Te kan verduidelik wat 'n spesie is en 'n oorsig kan bied van die verskillende spesiekonsepte;*
- *'n Bewustheid te hê van die ekonomiese belangrikheid van ongewerweldes as 'n bron van voedsel, parasiete van mense, diere en plante, of as biologiese of meganiese draers van patogene;*
- *Verslag te doen oor vaardighede ten opsigte van die gebruik van mikroskope, digotome sleutels en die ontsluiting van bronne; met respek vir konvensies rondom intellektuele eiendom, kopiereg en plagiaat;*
- *Rekenskap te gee van die rol van die mens in die bewaring van die omgewing en in die besonder invertebraatbiodiversiteit.*

Method of delivery: Full Time
Metode van aflewering: *Voltyds*

Assessment modes:
Class tests, practical tests, assignments in groups or individually.
Semester tests.
Exam at the end of the semester.
Assesseringsmetodes:
Klastoetse, praktiese toetse, opdragte in groepe of individueel.
Semestertoets.
Eksamen aan die einde van die semester.

Module code: DRKS121	**Semester 2**	**NQF Level: 5**

Title/ *Titel*: **Chordates / *Chordata***

Module outcomes:
Students should be able to:

- Demonstrate an informed understanding of the different aspects of form and function of deuterostome animals , and southern African chordate diversity;
- Select and apply basic processes of analysis, synthesis and evaluation to unlock existing and additional knowledge;
- Work with a microscope and obtain in-focus images at a required magnification;
- Interpret a microscope image and prepare annotated drawings;
- Report on their skills in respect of field identification guides and keys to identify chordates to the required taxonomic level;
- Account for the role of humans in conservation of the environment and in particular higher invertebrate and Chordate biodiversity;
- Display an awareness of ethical issues related to the use and study of higher invertebrates and Chordata./

Module uitkomste:
Studente moet in staat wees om:

- *Ingeligte begrip van die verskillende aspekte van sistematiek, klassifikasie van diere, vorm en funksie van deuterostoom diere in die algemeen en suider-Afrikaanse chordaat diversiteit te demonstreer;*
- *Basiese prosesse van analise, sintese en evaluering te gebruik om bestaande en addisionele inligting te ontsluit;*
- *Mikroskoopbeelde te interpreteer en benaamde tekeninge te maak;*
- *Vaardigheid ten toon te stel rakende die gebruik van veld-identifikasiegidse en sleutels om Chordate tot die nodige taksonomiese vlakke te identifiseer;*
- *Rekenskap te gee van die rol van die mens in die bewaring van die omgewing en in die besonder hoer invertebraat- en chordaatbiodiversiteit;*
- *Bewustheid van etiese aspekte rakende die benutting en studie van hoër invertebrate en Chordata te openbaar.*

Method of delivery: Full Time
Metode van aflewering: *Voltyds*

Assessment modes:
Class tests, practical tests, assignments in groups or individually.
Semester tests.
Exam at the end of the semester.
Assesseringsmetodes:
Klastoetse, praktiese toetse, opdragte in groepe of individueel.
Semestertoets.
Eksamen aan die einde van die semester.

Module code: DRKS221	**Semester 2**	**NQF Level: 6**

Title / *Titel*: **Comparative Animal Physiology / *Vergelykende Dierfisiologie***

Module outcomes:
Students should be able to:

- Demonstrate a focussed knowledge of the fundamental theory of Animal Physiology;
- Demonstrate an understanding of the crucial relationships between environment, form and function and its influence on the physiology of animals;
- Use figures, tables and graphs to explain and supplement various aspects of Animal Physiology;
- Identify key differences in certain physiological processes among animals from different modes of life (aquatic vs. Terrestrial);
- Display an awareness of the scope of ethical and value systems when studying physiological processes in animals;
- Follow instructions to perform experimentation on animals or animal systems to demonstrate a particular physiological process./

Module uitkomste:
Studente moet in staat wees om:

- *Gefokusde kennis van die fundamentele teorie van Dierfisiologie te demonstreer.*
- *'n Begrip van die noodsaaklike verbande tussen omgewing, vorm en funksie en die invloed daarvan op fisiologie van diere te openbaar;*
- *Figure, tabelle en grafieke te gebruik om die verskeie aspekte van Dierfisiologie te verduidelik en aan te vul;*
- *Sleutelverskille in sekere fisiologiese prosesse te identifiseer tussen diere van verskillende lewenstipe (akwaties vs. Terrestrieel);*
- *Bewustheid van die omvang van etiese en waardestelsels in die studie van fisiologiese prosesse in diere te openbaar;*
- *Instruksies te volg om eksperimente op diere uit te voer om 'n spesifieke fisiologiese proses te demonstreer.*

Method of delivery: Full Time
Metode van aflewering: *Voltyds*

Assessment modes:
Class tests, practical tests, assignments in groups or individually.
Semester tests.
Exam at the end of the semester.
Assesseringsmetodes:
Klastoetse, praktiese toetse, opdragte in groepe of individueel.
Semestertoets.
Eksamen aan die einde van die semester.

Module code: DRKS311	**Semester 1**	**NQF Level: 7**

Title / *Titel*: **Ecology / *Ekologie***

Module outcomes:
On completion of the module the student should be able to demonstrate:

- Demonstrate how knowledge and theories within the field of aquatic and terrestrial ecology relate to knowledge within other fields with a view to understand the interrelatedness thereof.
- Integrate knowledge of the principles of aquatic and terrestrial ecology and be able to evaluate knowledge and explanations provided in the field of ecology.
- Identify the basic research methodologies relevant to terrestrial and aquatic ecology, select appropriate methods and apply a range of methods used in ecological studies.
- Demonstrate an advanced ability to effectively apply practical skills in research projects to survey and critique aquatic and terrestrial ecosystem health and diversity with a view to suggest interventions and improvements in management systems.
- Analyse and evaluate academic literature to demarcate a researchable problem within the field of ecology and specify an appropriate scientific method that can be used to address the identified problem.
- Reflect on the values, ethical conduct and justifiability of decisions appropriate to ecological studies.
- Produce and communicate accurately and coherently both verbally and in written reports on academic principles in ecology and on ecological research projects.

Third year Zoology students registered for **DRKS311** must attend a compulsory field trip during March/April (that can include the recess time). The report generated from results obtained during the field trip will contribute to the participation mark. No excuses for absence from the field trip will be accepted, except in the event of illness in which case a medical certificate must be presented./

Module uitkomste:
Na suksesvolle voltooiing van hierdie module sal die student die volgende kan demonstreer:

- *Kennis en teorie in die veld van akwatiese en terrestriële ekologie en die verband met kennis in ander velde en die interafhanklikheid tussen stelsels.*
- *Geïntegreerde kennis van die beginsels van akwatiese en terrestriële ekologie en in staat wees om kennis en verduidelikings wat in ekologie verskaf word, te evalueer.*
- *Die vermoë om basiese navorsingsmetodologie wat relevant is tot terrestriële en akwatiese ekologie te identifiseer, toepaslike metodes te selekteer en 'n reeks metodes toe te pas in ekologiese studies.*
- *Gevorderde vermoë om praktiese vaardighede toe te pas in navorsingsprojekte en opnames wat daarop gemik is om akwatiese- en terrestriële ekostelselgesondheid te evalueer, en ingrepe en verbeterings voor te stel.*
- *Die vermoë om akademiese literatuur te analiseer en te evalueer om 'n navorsingsvrae in die veld van ekologie te ontwikkel en om toepaslike wetenskaplike metodes voor te stel om hierdie vrae aan te spreek.*
- *Etiese waardes en gedrag en regverdigbaarheid van toepaslike besluite in die studie van ekologie.*

- *Die vermoë om akademiese beginsels in ekologie asook oor navorsingsprojekte, akkuraat en samehangend te kommunikeer, beide in mondelinge voordragte en skriftelike verslae.*

*Derdejaar Dierkunde studente wat vir **DRKS311** registreer moet 'n verpligte veldekskursie gedurende Maart/April (dit kan die reses insluit) bywoon. Die resultate wat verkry word, moet in verslagvorm ingehandig word en dit sal bydra tot die deelnamepunt. Geen verskonings sal aanvaar word nie, behalwe in die geval van siekte in welke geval 'n mediese sertifikaat voorgelê moet word.*

Method of delivery: Full Time
Metode van aflewering: *Voltyds*

Assessment modes:
Class tests, practical tests, assignments in groups or individually.
Semester tests.
Exam at the end of the semester.
Assesseringsmetodes:
Klastoetse, praktiese toetse, opdragte in groepe of individueel.
Semestertoets.
Eksamen aan die einde van die semester.

Module code: DRKS322	**Semester 2**	**NQF Level: 7**

Title / *Titel*: **Ethology** ***/ Etologie***

Module outcomes:
Students should be able to:
- Demonstrate an integrated knowledge and critical understanding of ethology and associated theories;
- Locate and interrogate multiple sources of knowledge related to ethology;
- Evaluate and contextualize the knowledge and accompanying insights, as well as integrating this with the field project;
- Correctly select and apply knowledge and skills to make use of appropriate methods and techniques relevant to ethology.
- Initiate, plan, develop and execute a project on the behavior of any wild animal, and integrate the data and observations with the relevant ethological theories;
- Display presentation skills by presenting and discussing research;
- Identify and formulate the ethical considerations of working and research on wild animal behaviour./

Module uitkomste:
Studente moet in staat wees om:
- *'n Grondige kennis en kritiese begrip van etologie te openbaar;*
- *Verskeie inligtingsbronne oor etologie te ontsluit;*
- *Hierdie kennis en insigte te kan evalueer en kontekstualiseer, en om dit te integreer met die veldprojek;*
- *Te besluit welke tegniek of vaardigheid in 'n spesifieke situasie toegepas behoort te word in die konteks van etologie;*
- *Die bevindinge van projekte voor te dra.*
- *Die etiese aspekte relevant tot werk en navorsing oor die gedrag van wilde diere te identifiseer en formuleer.*

Method of delivery: Full Time
Metode van aflewering: *Voltyds*

Assessment modes:
Class tests, practical tests, assignments in groups or individually.
Semester tests.
Exam at the end of the semester.
Assesseringsmetodes:
Klastoetse, praktiese toetse, opdragte in groepe of individueel.
Semestertoets.
Eksamen aan die einde van die semester.

NAS.2.7.8 ECONOMICS / *EKONOMIE*

See the Faculty of Economic and Management Sciences yearbook for the module outcomes of ECON and EKRP / *Sien die Fakulteit van Ekonomiese en Bestuurswetenskappe se jaarboek vir die module uitkomste van ECON en EKRP.*

NAS.2.7.9 ELECTRONICS

Module code: SFEM171	**Year module 1**	**NQF Level: 5**

Title: **Electricity, Magnetism and Circuits**

Module outcomes:
The learner should be able to:
- Demonstrate understanding and application of electric and magnetic field quantities.
- Demonstrate understanding and application of basic concepts in DC circuit analysis
- Solve simple DC circuits using general DC circuit analysis methods.
- Demonstrate an understanding of capacitors and inductors.
- Solve simple RC and RL time dependent circuits.
- Demonstrate a hands-on ability to utilise basic electronic equipment with respect to measurement and interpretation of electronic data.

Module content:
Unit 1: Electric Current and Resistance: Current in a conductor, Resistivity
1. Resistance
2. Electric Field Strength and Potential Difference
3. Ohm's Law
4. The Drude's Model of conduction.

Unit 2: Electric Circuits
1. Electromotive Force (EMF)
2. Series and parallel resistor combinations
3. Kirchhoff's rules for circuits
4. Circuit reduction techniques

Unit 3: Basic electrical dc circuit analysis
1. Cramer's rule
2. Branch current method
3. Mesh analysis
4. Nodal analysis

Unit 4: Capacitors and dielectrics
1. Capacitors and capacitance
2. Combinations of capacitors – Series and Parallel
3. The energy stored in a capacitor
4. Dielectrics
5. RC circuits.

Unit 5: Magnetic Circuits, Inductance and Inductors

1. Magnetic Field and magnetic flux
2. Faraday's Law and Lenz's Law
3. Inductance
4. Combinations of Inductors– Series and Parallel
5. Energy stored inductors
6. RL circuits.

Method of delivery:

Assessment modes:

Module code: SFEM172	**Year module**	**NQF Level: 5**

Title: **Introduction to Electronics**

Module outcomes:

The learner should be able to:

- Demonstrate an understanding of circuit theorems, and their application in the analysis of direct current circuits
- Demonstrate an understanding of basic semiconductor theory and be able to distinguish between metals, semiconductors and insulators using the band gap theory
- Demonstrate an understanding of p-n junction and the diode.
- Calculate and predict the operation of simple diode application circuits.
- Explain the operation of simple diode circuit applications.
- Demonstrate an understanding of the npn and pnp bjt transistors.
- Demonstrate an understanding of transistor biasing and the load line analysis
- Calculate and predict the operation of simple bjt circuits.
- Explain the operation of simple bjt transistor circuit applications
- Demonstrate an understanding of the fet transistor operation and biasing
- Demonstrate a hands-on ability to utilise basic electronic equipment for measurement, display and interpretation of electronic data and information.

Module content:

Unit 1: Circuit Theorems

1. Independent and Dependent Sources
2. Source transformation
3. Superposition Theorem
4. Thevenin's Theorem
5. Norton's Theorem
6. Maximum Power Transfer Theorem

Unit 2: Basic Semiconductor Theory

1. Conductors, Insulators and Semiconductors
2. Intrinsic and Extrinsic Semiconductors.

Unit 3: Diodes and Applications

1. P-N Junction, Junction Diode and Biasing
2. Diode Models
3. Circuit Analysis Using Diodes
4. Types of Diodes
5. Diode Applications: Rectifiers, Clippers, Clampers and Logic Gates.

Unit 4: Transistors and Applications

1. BJT Structure: NPN and PNP
2. Operation of NPN BJT
3. I-V Characteristics of NPN Transistor
4. BJT Model
5. DC Circuit Analysis and Biasing of Transistors

6. BJT Basic Applications: Transistor Switch, Common Emitter Amplifier, Common Collector Amplifier, Darlington Pair Transistors, Logic Gates
7. Basic JFET operation and biasing.

Method of delivery:

Assessment modes:

Module code: ELYM115	**Semester 1**	**NQF Level: 5**

Title: **Electricity, Magnetism and Circuits**

Module outcomes:

The learner should be able to:

- Demonstrate understanding and application of electric and magnetic field quantities.
- Demonstrate understanding and application of basic concepts in DC circuit analysis
- Solve simple DC circuits using general DC circuit analysis methods.
- Demonstrate an understanding of capacitors and inductors.
- Solve simple RC and RL time dependent circuits.
- Demonstrate a hands-on ability to utilise basic electronic equipment with respect to measurement and interpretation of electronic data.

Module content:

Unit 1: Electric Current and Resistance: Current in a conductor, Resistivity

5. Resistance
6. Electric Field Strength and Potential Difference
7. Ohm's Law
8. The Drude's Model of conduction.

Unit 2: Electric Circuits

5. Electromotive Force (EMF)
6. Series and parallel resistor combinations
7. Kirchhoff's rules for circuits
8. Circuit reduction techniques

Unit 3: Basic electrical dc circuit analysis

5. Cramer's rule
6. Branch current method
7. Mesh analysis
8. Nodal analysis

Unit 4: Capacitors and dielectrics

6. Capacitors and capacitance
7. Combinations of capacitors – Series and Parallel
8. The energy stored in a capacitor
9. Dielectrics
10. RC circuits.

Unit 5: Magnetic Circuits, Inductance and Inductors

7. Magnetic Field and magnetic flux
8. Faraday's Law and Lenz's Law
9. Inductance
10. Combinations of Inductors– Series and Parallel
11. Energy stored inductors
12. RL circuits.

Method of delivery:

Assessment modes:

Module code: ELYM127	**Semester 2**	**NQF Level: 5**

Title: **Introduction to Electronics**

Module outcomes:

The learner should be able to:

- Demonstrate an understanding of circuit theorems, and their application in the analysis of direct current circuits
- Demonstrate an understanding of basic semiconductor theory and be able to distinguish between metals, semiconductors and insulators using the band gap theory
- Demonstrate an understanding of p-n junction and the diode.
- Calculate and predict the operation of simple diode application circuits.
- Explain the operation of simple diode circuit applications.
- Demonstrate an understanding of the npn and pnp bjt transistors.
- Demonstrate an understanding of transistor biasing and the load line analysis
- Calculate and predict the operation of simple bjt circuits.
- Explain the operation of simple bjt transistor circuit applications
- Demonstrate an understanding of the fet transistor operation and biasing
- Demonstrate a hands-on ability to utilise basic electronic equipment for measurement, display and interpretation of electronic data and information.

Module content:

Unit 1: Circuit Theorems

1. Independent and Dependent Sources
2. Source transformation
3. Superposition Theorem
4. Thevenin's Theorem
5. Norton's Theorem
6. Maximum Power Transfer Theorem

Unit 2: Basic Semiconductor Theory

1. Conductors, Insulators and Semiconductors
2. Intrinsic and Extrinsic Semiconductors.

Unit 3: Diodes and Applications

1. P-N Junction, Junction Diode and Biasing
2. Diode Models
3. Circuit Analysis Using Diodes
4. Types of Diodes
5. Diode Applications: Rectifiers, Clippers, Clampers and Logic Gates.

Unit 4: Transistors and Applications

1. BJT Structure: NPN and PNP
2. Operation of NPN BJT
3. I-V Characteristics of NPN Transistor
4. BJT Model
5. DC Circuit Analysis and Biasing of Transistors
6. BJT Basic Applications: Transistor Switch, Common Emitter Amplifier, Common Collector Amplifier, Darlington Pair Transistors, Logic Gates
7. Basic JFET operation and biasing.

Method of delivery:

Assessment modes:

Module code: ELYM215	**Semester 1**	**NQF Level: 6**

Title: **Analogue Electronics and Sytems**

Module outcomes:

The learner should be able to:

- Demonstrate an understanding of BJT and FET transistor characteristics, transistor biasing and amplifier DC and AC equivalents models;
- Demonstrate an understanding of amplifiers as filters in terms of their frequency characteristics and transfer functions;

- Demonstrate a hands-on ability to apply basic electronic measurement and test equipment and techniques to the measurement, display, and interpretation of electronic quantities in AC and DC circuits and circuits containing active devices.

Module content:

Unit 1: Transistors

1. Independent and Dependent Sources
2. BJT Transistor I-V characteristics
3. Basic Bipolar Junction Transistor (BJT) circuits and biasing
4. Load lines and the operating point
5. AC equivalent circuits for BJT amplifiers
6. Large signal analysis of BJT transistors- amplifiers and amplifier building blocks.
7. Field Effect Transistor (FET) circuits and biasing
8. Small signal analysis of FET transistors

Unit 2: AC Theory

1. Frequency, Phase, Impedance, RLC series and parallel circuits, Phasor diagrams
2. Energy storage in capacitors and capacitor circuits
3. Filters - low-pass, band-pass and high-pass
4. Resonant circuits
5. Transformers

Method of delivery:

Assessment modes:

Module code: ELYM227	**Semester 2**	**NQF Level: 6**

Title: **Digital Electronics and Systems**

Module outcomes:

The learner should be able to:

- Demonstrate an understanding of basic logic concepts and elements;
- Apply boolean algebra and karnaugh map techniques to logic minimisation and circuit realisation of logic expressions;
- Demonstrate an understanding of combinational systems such arithmetic circuits, digital building blocks, and memory devices
- Demonstrate a hands-on ability to apply basic electronic equipment and techniques to the measurement and interpretation of electronic quantities in digital electronics

Module content:

1. Review of basic logic concepts and logic gates
2. Combinational logic including logic identities
3. Introduction to Boolean algebra, Karnaugh maps and logic minimization
4. Circuit implementation of logical expressions, TTL logic specifications.
5. Functions of Combinational logic such as half and full adders, decoders, comparator, multiplexer, de-multiplexers, decoders, encoders
6. Sequential logic circuits including memory devices: latches and flip-flops
7. Sequential Logic Design – counters

Method of delivery:

Assessment modes:

Module code: ELYM315	**Semester 1**	**NQF Level: 7**

Title: **Advanced Analogue Electronics**

Module outcomes:

The learner should be able to:

- demonstrate an understanding of feedback and its implementation and effect in amplifiers

- employ operational amplifiers and related circuit configurations to achieve certain operational objectives
- design and apply passive and active filter configurations
- acquire an understanding of the high-frequency behaviour of active devices;
- apply high-frequency techniques in the design of oscillators and other high-frequency circuits
- demonstrate a hands-on ability to apply electronic test equipment and techniques to the measurement, display and interpretation of electronic quantities in feedback, operational amplifiers, filters and high frequency circuits.

Module content:

1. Feedback Theory including basic feedback concepts, definitions, configurations and classifications, advantages and disadvantages.
2. Frequency response and stability of feedback amplifiers.
3. Advanced operational amplifier circuits,
4. Active Filters and Oscillators,
5. Voltage Regulation and Power Circuits,
6. High Frequency Techniques including HF amplifiers and modulation.
7. An introduction to amplitude and frequency modulation techniques
8. An introduction to power electronics devices

Method of delivery:

Assessment modes:

Module code: ELYM316	**Semester 1**	**NQF Level: 7**

Title**: Introduction to Signal and Systems**

Module outcomes:

The learner should be able to demonstrate an understanding of:

- Electronic signals in continuous-time and discrete-time;
- The manner in which these can be transformed using the laplace transform and the fourier transform;
- Systems in general and linear time-invariant systems in particular;
- The manner in which signals are processed by lti systems;
- The application of fourier and laplace transform techniques in the design and analysis of discrete-time and continuous-time lti systems; basic filtering, signal sampling and reconstruction.

Module content:

1. Continuous-Time Signals and Systems,
2. Discrete-Time Signals and Systems,
3. Continuous-Time Linear Time-Invariant Systems,
4. Discrete-Time Linear Time-Invariant Systems
5. Laplace Analysis for Continuous Signals and Systems
6. Fourier Analysis for Continuous Signals and Systems,
7. Laplace Analysis of Discrete-Time Linear Time-Invariant Systems
8. Continuous- and Discrete-Time Filtering, and
9. Modulation and Sampling

Method of delivery:

Assessment modes:

Module code: ELYM325	**Semester: 2**	**NQF-Level: 7**

Title: **Microprocessors and Computer Systems**

Module outcomes:

(Not Received)

Method of delivery:		
Assessment modes:		
Module code: ELYM327	**Semester: 2**	**NQF-Level: 7**
Title: **Advanced Digital Techniques and Systems**		

Module outcomes:

The learner should be able to:

- Demonstrate an understanding and application of advanced logic concepts and techniques;
- Understand and apply practical considerations in the interconnection of logic elements to form logic circuits and modules for specific operation;
- Understand and apply practical considerations in the interfacing of cmos and ttl devices;
- Apply methods for digital to analogue and analogue to digital conversion;
- Demonstrate familiarity with the characteristics of common integrated circuit chips;
- Acquire basic skills in programmable logic devices and tools;
- Acquire hands-on ability to apply basic electronic test gear and techniques to the measurement and interpretation of electronic quantities in advanced digital electronics;

Module content:

1. Sequential Circuit Design – case of counters
2. Counters, Registers and Memories
3. Introduction Digital Signal Processing, including DACs, ADCs and Sampling
4. Interfacing Basics
5. Assertion-level logic notation, TTL and CMOS, common gates, characteristics
6. Tristate and open-collector devices, Reduction techniques
7. Digital/Analogue interfacing of CMOS and TTL devices
8. Introduction to Programmable Logic Devices and Languages – FPGAs, CPLDs using VHDL

Method of delivery:		
Assessment modes:		
Module code: ELYM328	**Semester: 2**	**NQF-Level: 7**
Title: **Introduction to Microcontroller Systems**		

Module outcomes:

The learner should be able to:

- Describe the differentiating factors between micro-processors and micro-controllers in general;
- Appreciate the circumstances for preferences between the two;
- Design and program simple systems based on a micro-controller.

Module content:

1. Computer architecture
2. Assembly language concepts
3. Bus systems and Interfacing
4. Software systems concepts including programming, operating systems, files, memory
5. Data communications concepts

Introduction to microcontrollers - an introduction based on a case study of a popular family of microcontrollers such as the PIC16F84 family plus support hardware for microcontrollers

Method of delivery:
Assessment modes:

NAS.2.7.10 PHYSIOLOGY / *FISIOLOGIE*

See the Faculty of Health Sciences yearbook for the module outcomes of FLGX /

Sien die Fakulteit Gesondheidswetenskappe se jaarboek vir die module uitkomste van FLGX.

Module code / *-kode*: FKLT331	**Semester 1**	**NQF Level / *vlak*: 7**
Title /*Titel:*		
Module outcomes: (Not received.)		
Method of delivery:		
Assessment modes:		

NAS.2.7.11 PHYSICS / *FISIKA*

Module code: NPHY111	**Semester 1**	**NQF Level: 5**
Title / *Titel*: **Basic Physics I / *Basiese Fisika I***		

Module outcomes:

On completing the module the student must have:

- Formal mathematical knowledge and informed understanding of the fundamental concepts underpinning the sub-themes of physics, i.e., kinematics, Newtonian laws of motion, work and energy, momentum, rotation and rolling, equilibrium, gravity, fluid mechanics, simple harmonic motion, waves, the study of heat, and thermodynamics.
- An awareness of the development of physical measurements and theories that shaped the progress of physics;
- The ability and skills to explain certain parts of the theory by means of the basic differential and integral calculus; to solve a variety of natural science problems in the above-mentioned sub themes and to evaluate the answers and apply them to phenomena within a well-defined and familiar environment.
- Effective utilization of basic research skills, such as conducting experiments, measuring basic observable quantities related to special and controlled cases of natural processes, and processing these data. The ability to reliably communicate these discipline-specific ideas by writing a report in an accurate and coherent way while showing respect for conventions related to copyright and plagiarism.
- The ability to manage his or her learning and implement the discipline-specific learning strategies given in the NPHY111 study guide to address learning problems.
- The ability to work in a group and make appropriate contributions and sharing resources to successfully complete the practical sessions and thereby taking co-responsibility for the attainment of the outcomes by the group.
- Conduct in the academic environment that adheres to the rules as stipulated by the North-West University code of conduct./

Module Uitkomste

Na voltooiing van die module moet die student:

- *Formele wiskundige kennis en grondige begrip hê van die fundamentele konsepte wat voorkom binne die volgende subtemas van Fisika, nl. kinematika, Newton se bewegingswette, arbeid en energie, momentum, rotasie en rolbeweging, ewewig, gravitasie, fluïdemeganika, enkelvoudige harmoniese beweging, golwe, warmteleer en termodinamika;*
- *'n Bewustheid hê van die ontwikkeling van fisiese waarnemings en teorieë wat die vooruitgang van Fisika gerig het;*
- *Die vermoë en vaardigheid hê om sekere gedeeltes van die teorie met behulp van basiese differensiaal- en integraalrekene te beskryf; om 'n verskeidenheid van natuurkundige probleme in bogenoemde subtemas op te los sowel as die evaluering van die antwoorde en toepassing daarvan m.b.t. verskynsels binne 'n goed-gedefineerde en bekende omgewing.*

- *Aanwending van basiese navorsingsvaardighede, soos die uitvoering van eksperimente, meting van basiese waarneembare groothede en dataverwerking. Die vermoë omvakspesifieke idees skriftelik in 'n verslag te kommunikeer op 'n koherente, akkurate en betroubare wyse met inagneming van die konvensies rakende kopiereg en plagiaat.*
- *Die vermoë hê om sy of haar leeraktiwiteite te bestuur en vakspesifieke leerstrategieë, soos bespreek in die NPHY111-studiegids, te implementeer om leerprobleme aan te spreek.*
- *Die vermoë hê om in 'n groep te kan werk en gepaste bydraes te maak en hulpbronne te deel om die praktiese sessies suksesvol af te handel; om sodoende mede-verantwoordelikheid te neem vir die bereiking van die gestelde uitkomste deur die groep.*
- *Gedrag binne 'n akademiese konteks toon wat voldoen aan die reëls soos gestipuleer in die Noorwes-Universiteit se gedragskode.*

Method of delivery: Full Time
Metode van aflewering: *Voltyds*

Assessment modes:
The participation mark is calculated using formal assessment activities that could include, but might not be limited to the following:
Class tests, principle tests, assignments, e-assignments/ quizzes, scheduled tests and practical tutorials and reports.
The weightings will be communicated to students in class and in the study guide.
A participation mark of 40% allows a student admission to the final examination (summative assessment).
Additional proof of participation requirements may also be set out in the module study guide, wich must also be satisfied before the examination admission is allowed.
The final module mark is calculated using the following weightings:
- Participation mark (50%)
- Final Examination mark (50%)

Module code: NPHY121	**Semester 2**	**NQF Level: 5**

Title / *Titel*: **Basiese Fisika II / *Basiese Fisika II***

Module outcomes:
On completing of the module the student must have:
- Formal mathematical knowledge and informed understanding of the fundamental concepts underpinning the sub-themes of physics, i.e. electricity, magnetism, optics and topics from quantum, atom and nuclear physics;
- An awareness of the development of physical measurements and theories that shaped the progress of physics;
- Strengthening of his/her ability and skills to explain certain parts of the theory by means of the basic differential and integral calculus; to solve a variety of natural science problems in the above-mentioned sub-themes and to evaluate the answers and apply them to phenomena within a well-defined and familiar environment.
- Effective utilization of basic research skills, such as conducting experiments, measuring basic observable quantities related to special and controlled cases of natural processes, and processing these data. The ability to reliably communicate these discipline-specific ideas by writing a report in an accurate and coherent way while showing respect for conventions related to copyright and plagiarism.
- The ability to manage his or her learning and implement the discipline-specific learning strategies given in the NPHY121 study guide to address learning problems.
- The ability to work in a group and make appropriate contributions and sharing resources to successfully complete the practical sessions and thereby taking co-responsibility for the attainment of the outcomes by the group.
- Conduct in the academic environment that adheres to the rules as stipulated by the North-West University code of conduct./

Module Uitkomste:

Na voltooiing van die module moet die student:

- *Formele wiskundige kennis en grondige begrip van die fundamentele konsepte van die volgende subtemas van Fisika hê, nl. elektrisiteit en magnetisme, optika en onderwerpe uit die kwantum-, atoom- en kernfisika;*
- *'n Bewustheid van die ontwikkeling van fisiese waarnemings en teorieë wat die vooruitgang van Fisika gerig het;*
- *Die versterking van sy/haar vermoë en vaardigheid om sekere gedeeltes van die teorie met behulp van basiese differensiaal- en integraalrekene te beskryf; om 'n verskeidenheid van natuurkundige probleme in bogenoemde subtemas op te los sowel as die evaluering van die antwoorde en toepassing m.b.t. verskynsels binne 'n goed-gedefineerde en bekende omgewing.*
- *Aanwending van basiese navorsingsvaardighede, soos die uitvoering van eksperimente, meting van basiese waarneembare groothede en dataverwerking. Die vermoë om vakspesifieke idees skriftelik in 'n verslag te kommunikeer op 'n koherente, akkurate en betroubare wyse met inagneming van die konvensies rakende kopiereg en plagiaat.*
- *Die vermoë hê om sy of haar leeraktiwiteite te bestuur en vakspesifieke leerstrategieë, soos bespreek in die NPHY121-studiegids, te implementeer om leerprobleme aan te spreek.*
- *Die vermoë om in 'n groep te kan werk en gepaste bydraes te maak en hulpbronne te deel om die praktiese sessies suksesvol af te handel; om sodoende mede-verantwoordelikheid te neem vir die bereiking van die uitkomste deur die groep.*
- *Gedrag in die akademiese omgewing te toon wat voldoen aan die gedragskode van die Noordwes-Universiteit.*

Method of delivery: Full Time
Metode van aflewering: *Voltyds*

Assessment modes:
The participation mark is calculated using formal assessment activities that could include, but might not be limited to the following:
Class tests, principle tests, assignments, e-assignments/ quizzes, scheduled tests and practical tutorials and reports.
The weightings will be communicated to students in class and in the study guide.
A participation mark of 40% allows a student admission to the final examination (summative assessment).
Additional proof of participation requirements may also be set out in the module study guide, wich must also be satisfied before the examination admission is allowed.
The final module mark is calculated using the following weightings:

- Participation mark (50%)
- Final Examination mark (50%)

Module code: NPHY123	**Semester 2**	**NQF-Level: 5**

Title: **Introduction to Physics**

Module Outcomes
Upon completion of this course the student would:

- Have a detailed and integrated knowledge of Basic Physics, as especially applicable to the specialized fields of Mechanics, electricity and magnetism.
- Be able to demonstrate mathematical knowledge of the fundamental principles i.e. force, work, energy, momentum, electrostatics, direct currents circuits, magnetostatics, electromagnetic induction and alternating currents
- Derive and understand the awareness of the development of physical measurements and theories that shaped the progress of physics.
- Demonstrate a detailed knowledge of applying vector skills to solve kinematics problems and to evaluate the answers and apply them to phenomena within a well-defined and familiar environment.

- Apply the above specialized skills and integrated knowledge to identify and creatively solve complex and unfamiliar problems at the forefront of the field in mechanics and electromagnetism by selecting and applying the correct problem solving techniques, and evaluating and critically reviewing the rigorous solutions acquired by referring to multiple sources in the scientific literature, taking full responsibility for the work done.

Method of delivery: Full Time

Assessment modes:

The participation mark is calculated using formal assessment activities that could include, but might not be limited to the following:

Class tests, principle tests, assignments, e-assignments/ quizzes, scheduled tests and practical tutorials and reports.

The weightings will be communicated to students in class and in the study guide.

A participation mark of 40% allows a student admission to the final examination (summative assessment).

Additional proof of participation requirements may also be set out in the module study guide, wich must also be satisfied before the examination admission is allowed.

The final module mark is calculated using the following weightings:

- Participation mark (50%)
- Final Examination mark (50%)

Module code: NPHY124	**Semester 2**	**NQF Level: 8**

Title *:* **Introduction to Basic Physics Concepts**

Module outcomes:

Students should be able to:

- Have a detailed and integrated knowledge of Basic Physics, as especially applicable to the specialized fields of Mechanics, electricity and magnetism;
- Demonstrate mathematical knowledge of the fundamental principles i.e. Force, work, energy, momentum, electrostatics, direct currents circuits, magnetostatics, electromagnetic induction and alternating currents;
- Derive and understand the awareness of the development of physical measurements and theories that shaped the progress of physics;
- Demonstrate a detailed knowledge of applying vector skills to solve kinematics problems and to evaluate the answers and apply them to phenomena within a well-defined and familiar environment;
- Apply the above specialized skills and integrated knowledge to identify and creatively solve complex and unfamiliar problems at the forefront of the field in mechanics and electromagnetism by selecting and applying the correct problem solving techniques, and evaluating and critically reviewing the rigorous solutions acquired by referring to multiple sources in the scientific literature, taking full responsibility for the work done.

Method of delivery: Full Time

Assessment modes:

The participation mark is calculated using formal assessment activities that could include, but might not be limited to the following:

Class tests, principle tests, assignments, e-assignments/ quizzes, scheduled tests and practical tutorials and reports.

The weightings will be communicated to students in class and in the study guide.

A participation mark of 40% allows a student admission to the final examination (summative assessment).

Additional proof of participation requirements may also be set out in the module study guide, wich must also be satisfied before the examination admission is allowed.

The final module mark is calculated using the following weightings:

- Participation mark (50%)
- Final Examination mark (50%)

Module code: NPHY171	Year Module 1	NQF-Level: 5

Title: **Basic Physics I**

Module outcomes

On completing of the module the student must have:

- Formal mathematical knowledge and informed understanding of the fundamental concepts underpinning the subthemes of physics, i.e., kinematics, Newtonian laws of motion, work and energy, momentum, rotation and rolling, equilibrium, gravity, fluid mechanics, simple harmonic motion, waves, the study of heat, and thermodynamics.
- An awareness of the development of physical measurements and theories that shaped the progress of physics;
- The ability and skills to explain certain parts of the theory by means of the basic differential and integral calculus; to solve a variety of natural science problems in the above-mentioned subthemes and to evaluate the answers and apply them to phenomena within a well-defined and familiar environment.
- Effective utilisation of basic research skills, such as conducting experiments, measuring basic observable quantities related to special and controlled cases of natural processes, and processing these data. The ability to reliably communicate these discipline-specific ideas by writing a report in an accurate and coherent way while showing respect for conventions related to copyright and plagiarism.
- The ability to manage his or her learning and implement the discipline-specific learning strategies given in the FSKS111 study guide to address learning problems.
- The ability to work in a group and make appropriate contributions and sharing resources to successfully complete the practical sessions and thereby taking co-responsibility for the attainment of the outcomes by the group.
- Conduct in the academic environment that adheres to the rules as stipulated by the North-West University code of conduct.

Method of delivery: Full Time

Assessment modes:

The participation mark is calculated using formal assessment activities that could include, but might not be limited to the following:

Class tests, principle tests, assignments, e-assignments/ quizzes, scheduled tests and practical tutorials and reports.

The weightings will be communicated to students in class and in the study guide.

A participation mark of 40% allows a student admission to the final examination (summative assessment).

Additional proof of participation requirements may also be set out in the module study guide, wich must also be satisfied before the examination admission is allowed.

The final module mark is calculated using the following weightings:

- Participation mark (50%)
- Final Examination mark (50%)

Module code: NPHY172	Year Module 2	NQF-Level: 5

Title: **Basic Physics II**

Module outcomes

On completing of the module the student must have

- Formal mathematical knowledge and informed understanding of the fundamental concepts underpinning the subthemes of physics, i.e. electricity, magnetism, optics and topics from the quantum, atom and nuclear physics;
- An awareness of the development of physical measurements and theories that shaped the progress of physics;
- Strengthening of his/her ability and skills to explain certain parts of the theory by means of the basic differential and integral calculus; to solve a variety of natural science problems

in the above-mentioned subthemes and to evaluate the answers and apply them to phenomena within a well-defined and familiar environment.
- Effective utilisation of basic research skills, such as conducting experiments, measuring basic observable quantities related to special and controlled cases of natural processes, and processing these data. The ability to reliably communicate these discipline-specific ideas by writing a report in an accurate and coherent way while showing respect for conventions related to copyright and plagiarism.
- The ability to manage his or her learning and implement the discipline-specific learning strategies given in the FSKS121 study guide to address learning problems.
- The ability to work in a group and make appropriate contributions and sharing resources to successfully complete the practical sessions and thereby taking co-responsibility for the attainment of the outcomes by the group.
- Conduct in the academic environment that adheres to the rules as stipulated by the North-West University code of conduct.

Method of Delivery: Full Time

Assessment modes:
The participation mark is calculated using formal assessment activities that could include, but might not be limited to the following:
Class tests, principle tests, assignments, e-assignments/ quizzes, scheduled tests and practical tutorials and reports.
The weightings will be communicated to students in class and in the study guide.
A participation mark of 40% allows a student admission to the final examination (summative assessment).
Additional proof of participation requirements may also be set out in the module study guide, wich must also be satisfied before the examination admission is allowed.
The final module mark is calculated using the following weightings:
- Participation mark (50%)
- Final Examination mark (50%)

Module code: FSKS113	**Semester 1**	**NQF Level: 5**

Title / *Titel*: **Physics for Biology I / *Fisika vir Biologie***

Module outcomes:
Students should be able to:
Knowledge:
- Knowledge and insight in how physics underlies natural science phenomena that are selected mainly from biological sciences by explaining and discussing topics such as kinematics, Newtonian laws of motion, torques, work, energy and power, with applications to the human body, fluid mechanics, pressure, surface tension, viscosity, with applications to the flow of blood, theory of heat, and thermodynamics.

Skills:
- Skills in measuring, processing and reporting on natural science processes.

Module Uitkomste
Die student moet instaat wees om:
Kennis:
- *Kennis en insig t.o.v. hoe Fisika natuurwetenskaplike verskynsels, hoofsaaklik vanuit die biologiese wetenskappe, onderlê deur die volgende onderwerpe te verduidelik en te bespreek: kinematika, Newton se bewegingswette, wringkragte, arbeid, energie en drywing met toepassings op die menslike liggaam, fluïdemeganika, druk, oppervlakspanning, viskositeit, met toepassings in bloedvloei, warmteleer en termodinamika.*

Vaardighede:
- *Vaardighede in die meting, verwerking en verslaggewing van natuurwetenskaplike prosesse.*

Method of delivery: Full Time
Metode van aflewering: *Voltyds*

Assessment modes:
The participation mark is calculated using formal assessment activities that could include, but might not be limited to the following:
Class tests, principle tests, assignments, e-assignments/ quizzes, scheduled tests and practical tutorials and reports.
The weightings will be communicated to students in class and in the study guide.
A participation mark of 40% allows a student admission to the final examination (summative assessment).
Additional proof of participation requirements may also be set out in the module study guide, wich must also be satisfied before the examination admission is allowed.
The final module mark is calculated using the following weightings:

- Participation mark (50%)
- Final Examination mark (50%)

Module code: FSKS123	**Semester 2**	**NQF Level: 5**

Title / *Titel*: **Physics for Biology II / *Fisika vir Biologie II***

Module outcomes:
Students should be able to:
Knowledge:

- Knowledge and insight in how physics occurs in natural science phenomena so that he/she can explain and discuss electrostatics, electric potential, electric circuits, magnetism and electromagnetic waves, with applications to apparatus used in biological sciences, as well as waves, sound optics and nuclear physics.

Skills:

- Skills to solve problems in measuring, processing and reporting natural science processes..

Method of delivery: Full Time

Assessment modes:
The participation mark is calculated using formal assessment activities that could include, but might not be limited to the following:
Class tests, principle tests, assignments, e-assignments/ quizzes, scheduled tests and practical tutorials and reports.
The weightings will be communicated to students in class and in the study guide.
A participation mark of 40% allows a student admission to the final examination (summative assessment).
Additional proof of participation requirements may also be set out in the module study guide, wich must also be satisfied before the examination admission is allowed.
The final module mark is calculated using the following weightings:

- Participation mark (50%)
- Final Examination mark (50%)

Module code: NPHY211	**Semester 1**	**NQF Level: 6**

Title / *Titel*: **Electricity and Magnetism / *Elektrisiteit en Magnetisme***

Module outcomes:
On completing of the module the student must:

- Be able to demonstrate understanding and detailed knowledge of the fundamental concepts underpinning the sub-themes of electricity and magnetism, i.e. the laws of electrostatics and magneto-statics in a vacuum and in matter as well as introductory electrodynamics, which includes the electromotive force and electromagnetic induction.
- Have a clear understanding of prevalent schools of thought that determined the progress within the field of electricity and magnetism.
- Have the ability to evaluate, select and apply the correct laws to describe different phenomena in the context of electricity and magnetism.

- Have the ability to solve different problems by calculating electrostatic potentials and fields, magneto-static fields as well as basic problems in electrodynamics like the electromotive force and electromagnetic induction.
- Be able to use discipline-specific methods of scientific enquiry, decision-making and information gathering to execute practical work. Analyse the results and produce an accurate and coherent written and/or oral account of the information using an appropriate discipline-specific format. Understand the ethical implications of decisions and actions in this context.
- In the practical sessions, students will work on several problems with emphasis being put on presenting scientific data analysis in the form of a written report.

Module uitkomste:

Na voltooiing van die module moet die student:

- *Instaat wees om grondige begriup en gedetailleerde kennis te toon van die fundamentele begrippe onderliggend aan die subtemas van elektrisiteit en magnetisme, nl. Die wette van elektrostatika en magnetostatika in vacuum en in materie sowel as inleidende elektrodinamika, insluitend elektromotoriese krag en elektromagnetiese induksie.*
- *'n Duidelike begrip hê om die korrekte wette, wat verskillende verskynsels beskryf, te evalueer, selekteer en toe te pas, binne die konteks van elektrisiteit en magnetisme.*
- *Die vermoë hê om problem in elektrodinamika, soos elektromotoriese krag en elektromagnetiese induksie op te los.*
- *Gebruik te maak van vakspesifieke metodes van wetenskaplike ondersoek, besluitneming en versameling van inligitng, om praktiese werk uit te voer.*
- *Analisering van die resultate en saamstel van akkurate en koherent-geskrewe en/of mondelingse aanbieding van die inligting deur gebruik te maak van toepaslike vakspesifieke format.*
- *Verstaan van die etiese implikasies van besluite en optrede binne hierdie konteks.*
- *In praktiese sessies sal student werk op sekere problem met focus op die voordra van wetenskaplike data in die vorm van 'n skriftelike verslag.*

Method of delivery: Full Time
Metode van aflewering: *Voltyds*

Assessment modes:

The participation mark is calculated using formal assessment activities that could include, but might not be limited to the following:

Class tests, principle tests, assignments, e-assignments/ quizzes, scheduled tests and practical tutorials and reports.

The weightings will be communicated to students in class and in the study guide.

A participation mark of 40% allows a student admission to the final examination (summative assessment).

Additional proof of participation requirements may also be set out in the module study guide, wich must also be satisfied before the examination admission is allowed.

The final module mark is calculated using the following weightings:

- Participation mark (50%)
- Final Examination mark (50%)

Module code: NPHY212	**Semester 1**	**NQF Level: 6**

Title / *Titel*: **Modern Physics / *Moderne Fisika***

Module outcomes:

On completing of the module the student must have

- Detailed knowledge of and the ability to apply the fundamental concepts and theories underpinning Modern Physics at an introductory level, i.e., Special Relativity, Lorentz's Transformations, Time Dilation, Length Contraction, the Doppler Effect, the Particle

Properties of Waves, Blackbody Radiation, the Photoelectric Effect, the properties of X-Rays in unfamiliar, but relevant contexts.

- In the practical sessions, students will work on several problems with emphasis being put on presenting scientific data analysis in the form of a written report. /

Module uitkomste:

Na voltooiing van die module behoort die student

- *'n Gedetailleerde kennis en vermoë tot die toepassing van die fundamentele begrippe en teorieë onderliggend aan Moderne Fisika op inleidende vlak, d.i. Spesiale Relatiwiteit, Lorentztransformasies, Tyddilatasie, Lengtekontraksie, die Doppler Effek, die Deeltjie-eienskappe van golwe, Swartstraling, die Foto-elektriese effek, eienskappe van X-strale in onbekende, maar relevante konteks.*
- *In die praktiese sessies sal studente werk op sekere probleme met fokus op die voordra van wetenskaplike data in die vorm van 'n skriftelike verslag.*

Method of delivery: Full Time
Metode van aflewering: *Voltyds*

Assessment modes:

The participation mark is calculated using formal assessment activities that could include, but might not be limited to the following:
Class tests, principle tests, assignments, e-assignments/ quizzes, scheduled tests and practical tutorials and reports.
The weightings will be communicated to students in class and in the study guide.
A participation mark of 40% allows a student admission to the final examination (summative assessment).
Additional proof of participation requirements may also be set out in the module study guide, wich must also be satisfied before the examination admission is allowed.
The final module mark is calculated using the following weightings:

- Participation mark (50%)
- Final Examination mark (50%)***:***

Module code: NPHY221	**Semester 2**	**NQF Level: 6**

Title / *Titel*: **Introductory Quantum Physics / *Inleidende Kwantumfisika***

Module outcomes:

On completing the module the student must have

- A theoretical understanding of the phenomenon of waves
- A solid grounding for the study and application of concepts in quantum mechanics.
- A formal mathematical knowledge of the topics covered, e.g., how to solve simple oscillation problems that involve damped and driven harmonic motion; a mathematical description ofthe superposition of waves; study and apply fundamental concepts in quantum mechanics.
- State the laws, definitions and principles of above-mentioned concepts concisely in their own words, without excluding any relevant information.
- Solve the aforementioned differential equations as initial value problems.
- Discuss the evolution of the aforementioned situations with time.
- Discuss the Heisenberg uncertainty principle meaningfully.
- Solve Schrödinger's equation for (i) a free particle, and (ii) a particle in an infinite square well.
- Solve problems similar to those in they have encountered in the examples; the problems to be solved are applications of the above-mentioned topics.
- In the practical sessions, students will work on several problems with emphasis being put on presenting scientific data analysis in the form of a written report.

Module uitkomste:
Na voltooiing van hierdie kursus behoort studente:

- Teoretiese begrip van die verskynsel van golwe verwerf het.
- 'n Deeglike grondslag vir die studie en toepassing van die begrippe in kwantummeganika ontwikkel het.
- Formele wiskundige kennis van die onderwerpe wat behandel is, te hê ten einde eenvoudige ossillasieprobleme, wat gedempte en gedrewe harmoniese beweging insluit, te kan oplos.
- In staat wees om die fundamentele wetmatighede, definisies en begrippe van bogenoemde beginsels in hul eie woorde te stel, sonder om enige relevante inligting uit te laat.
- In staat te wees om bogenoemde differensiaalvergelykings as aanvangswaarde-probleme op te los.
- In staat wees om die evolusie van bogenoemde situasies met tyd te bespreek.
- In staat wees om Heisenberg se onsekerheidsbeginsel betekenisvol te bespreek.
- In staat wees om die Schrödingervergelyking op te los vir (i) 'n vrye deeltjie, en (ii) 'n deeltjie in oneindige diep potensiaal put.
- In staat wees om probleme, soortgelyk aan dié wat hulle in voorbeelde behandel het, en wat toepassings van bogenoemde onderwerpe is, te kan oplos.
- In die praktiese sessies sal studente werk op sekere probleme met fokus op die voordra van wetenskaplike data in die vorm van 'n skriftelike verslag.

Method of delivery: Full Time
Metode van aflewering: *Voltyds*

Assessment modes:
The participation mark is calculated using formal assessment activities that could include, but might not be limited to the following:
Class tests, principle tests, assignments, e-assignments/ quizzes, scheduled tests and practical tutorials and reports.
The weightings will be communicated to students in class and in the study guide.
A participation mark of 40% allows a student admission to the final examination (summative assessment).
Additional proof of participation requirements may also be set out in the module study guide, wich must also be satisfied before the examination admission is allowed.
The final module mark is calculated using the following weightings:

- Participation mark (50%)
- Final Examination mark (50%)

Module code: NPHY222	**Semester 2**	**NQF-Level: 6**

Title / *Titel*: **Optics and Waves / *Optika en Golwe***

Module outcomes:
On completion of the module the student must have:

- Detailed knowledge of, and the ability to apply, the fundamental concepts and theories underpinning the physics of optics and waves, i.e., geometrical optics, electromagnetic wave properties and propagation, interference, diffraction and polarization in unfamiliar, but relevant contexts.
- A critical understanding of the development of knowledge within the physics sub-fields optics and waves as a result of the existence of different schools of thought.
- The ability and skill to evaluate, select, and effectively apply methods, procedures and applications typical to optics and waves to solve problems within unfamiliar contexts.
- The ability and skill to use discipline-specific methods of scientific enquiry to investigate relevant problems within optics and waves through well-developed processes of analysis, synthesis and evaluation.

- Apply the results of a scientific investigation or experiment in a given context in optics and waves and communicate these findings accurately and coherently with an understanding of and respect for intellectual property conventions, copyright and rules on plagiarism.
- The ability to make decisions and show appropriate behaviour in familiar and new subject-specific contexts guided by an appreciation for the interdependence of different systems.
- Take responsibility for his or her learning progress by application of relevant learning strategies and as measured against given criteria as stipulated in the NPHY222 (formerly FSKS212) study guide.
- The ability to work in a group and make appropriate contributions and sharing resources to successfully complete the practical sessions and thereby taking co-responsibility for the attainment of the outcomes by the group within a well-defined context./

Module uitkomste:
Na voltooiing van die module behoort die student

- *'n In-diepte kennis van die konsepte en teorieë hê binne die vakgebied Fisika, en spesifiek die subtemas optika en golwe, d.i., geometriese optika, eienskappe en voortplanting van elektromagnetiese straling, interferensie, diffraksie en polarisasie en die vermoë om dit binne onbekende, maar relevante situasies toe te pas.*
- *Kritiese begrip hê van die ontwikkeling van kennis binne die Fsika-subtemas van optika en golwe as gevolg van die bestaan van verskillende denkskole.*
- *Die vermoë om tipiese metodes en prosedures van optika en golwe te evalueer, selekteer, en effektief toe te pas om probleme in 'n onbekende konteks op te los.*
- *Die vermoë om vakspesifieke ondersoek-en wetenskaplike metodes te gebruik om probleme van toepassing op optika en golwe te ondersoek deur middel van goed-ontwikkelde analise-, sintese- en evalueringsprosesse.*
- *Die vermoë om die bevindinge van 'n wetenskaplike ondersoek in 'n gegewe subtema van optika en golwe toe te pas en akkuraat en duidelik te kommunikeer met begrip en respek vir die konvensies rondom intellektuele eiendom, kopiereg en plagiaat.*
- *Die vermoë om besluite te neem en gepaste gedrag te toon binne bekende en nuwe vakspesifieke kontekste, gemotiveer deur 'n waardering vir die interafhanklikheid van die verskillende stelsels.*
- *Verantwoordelikheid neem vir sy of haar akademiese vordering deur die toepassing van relevante leerstrategieë en soos gemeet aan die gegewe kriteria wat volledig in die NPHYS222 studiegids uiteengesit is.*
- *Die vermoë om in 'n groep te kan werk en gepaste bydraes te maak en hulpbronne te deel om die praktiese sessies suksesvol af te handel; om sodoende mede-verantwoordelikheid te neem vir die bereiking van die uitkomste deur die groep binne 'n goed-afgebakende konteks.*

Method of delivery: Full Time
Metode van aflewering: *Voltyds*

Assessment modes:
The participation mark is calculated using formal assessment activities that could include, but might not be limited to the following:
Class tests, principle tests, assignments, e-assignments/ quizzes, scheduled tests and practical tutorials and reports.
The weightings will be communicated to students in class and in the study guide.
A participation mark of 40% allows a student admission to the final examination (summative assessment).
Additional proof of participation requirements may also be set out in the module study guide, wich must also be satisfied before the examination admission is allowed.
The final module mark is calculated using the following weightings:

- Participation mark (50%)
- Final Examination mark (50%)

Module code: NPHY311	Semester 1	NQF Level: 7

Title / *Titel*: **Electromagnetism**

Module outcomes:

- Initially, this module follows and builds on what was mastered in module NPHY211 (Electricity and Magnetism) by providing a firm theoretical background to describe previously learnt concepts, so that students gain a more mathematically formal understanding and integrated and detailed knowledge of electricity and magnetism while being able to relate previously learnt material with new concepts encountered in this module.
- Subsequently, the Maxwell equations in both a vacuum and matter in general are derived. These equations are fundamental to our understanding of all electromagnetic phenomena.
- Students proceed to master and evaluate solutions to these equations in various scenarios, such as for dielectrics, conductors, waveguides, and optical fibres, and resolve complex problems related to these applications by identifying, selecting and applying the correct problem-solving techniques.
- Furthermore, basic research skills will be acquired and applied in the practical component of this course, where some aspects of electromagnetism are experimentally investigated. Here students will conduct experiments effectively which measure basic observable quantities related to special and controlled cases of natural processes, processing and critically evaluating the data so acquired.
- Students will learn how to reliably demonstrate, develop and communicate discipline-specific ideas by planning and writing experimental reports in an accurate and coherent way, while respecting conventions related to copyright and plagiarism and taking full responsibility for their work with regards to this, thereby gaining valuable scientific writing skills./

Module uitkomste:

- *Aanvanklik volg hierdie module op kennis wat in NPHY211 (Elektrisiteit en Magnetisme) bemeester is en bou daarop, en verskaf dusdoende 'n grondige teoretiese agtergrond om en reeds-bekende konsepte te beskryf, sodat studente 'n meer wiskundig-formele begrip en geïntegreerde en gedetailleerde kennis van elektrisiteit en magnetisme kan verkry en ook in staat sal wees om vooraf-bekende materiaal met nuwe konsepte wat hulle teëkom, in verband te bring.*
- *Vervolgens word die algemene Maxwell-vergelykings in beide vakuum en in materie afgelei. Hierdie vergelykings is grondliggend tot ons begrip van elektromagnetiese verskynsels.*
- *Vervolgens bemeester en evalueer studente oplossings van hierdie vergelykings in verskeie scenario's, soos diëlektrika, geleiers, golfleiers, optiese vesels, en los komplekse probleme op in verband met hierdie toepassings deur die korrekte probleemoplossingstegnieke te identifiseer, selekteer en toe te pas.*
- *Verder word basiese navorsingsvaardighede bemeester en toegepas in die praktiese komponent van hierdie kursus, waarin sekere aspekte van elektromagnetisme eksperimenteel ondersoek word. Studente sal hier eksperimente effektief uitvoer, en basiese waarneembare groothede, in verband met spesiale en gekontroleerde gevalle van natuurlike prosesse, meet en sodoende die ingesamelde data verwerk en krities evalueer.*
- *Studente sal leer om betroubaar vakspesifieke idees te demonstreer, ontwikkel en te kommunikeer en om die beplanning en skryf van eksperimentele verslae op 'n akkurate en koherente manier, in ooreenstemming met die konvensies in verband met kopiereg en plagiaat, uit te voer en moet volle verantwoordelikheid aanvaar vir hul werk in hierdie verband, sodat hulle waardevolle wetenskaplike skryfvaardighede kan ontwikkel.*

Method of delivery: Full Time
Metode van aflewering: *Voltyds*

Assessment modes:
The participation mark is calculated using formal assessment activities that could include, but might not be limited to the following:
Class tests, principle tests, assignments, e-assignments/ quizzes, scheduled tests and practical tutorials and reports.
The weightings will be communicated to students in class and in the study guide.
A participation mark of 40% allows a student admission to the final examination (summative assessment).
Additional proof of participation requirements may also be set out in the module study guide, wich must also be satisfied before the examination admission is allowed.
The final module mark is calculated using the following weightings:

- Participation mark (50%)
- Final Examination mark (50%)

Module code: NPHY312	**Semester 1**	**NQF Level: 7**

Title / *Titel*: **Wave Mechanics / *Golfmeganika***

Module outcomes:
Students should be able to:
Knowledge:

- By the end of this module, students will have been introduced to the first principles of quantum physics in the form of wave mechanics on atomic scales as replacement of Newtonian mechanics. They will have solved Schrödinger's equation for a variety of cases and will have interpreted the results.

Skills:

- Students learn to do basic quantum mechanical calculations and to solve applicable differential equations. They will acquire a solid mathematical grounding necessary to perform quantum-mechanical calculations. In the practical sessions, they study quantum-mechanical phenomena and report on these by means of computerized reports./

Module uitkomste:
Studente moet in staat wees om:
Kennis:

- *Aan die einde van hierdie module het studente met die eerste beginsels van die Kwantumfisika in die vorm van Golfmeganika op atomiese skale as vervanging vir Newtonmeganika, kennis gemaak. Hulle sou die Schrödinger-vergelyking vir 'n verskeidenheid gevalle opgelos het en die resultate geïnterpreteer het..*

Vaardighede:

- *Studente leer om basiese Kwantummeganiese berekenings te doen, en om toepaslike differensiaalvergelykings op te los. Hulle ontvang 'n deeglike wiskundige grondslag om relevante Kwantum-meganiese probleme op te los. In die praktika word Kwantum-meganiese verskynsels bestudeer waaroor rekenaarmatig verslag gelewer word.*

Method of delivery: Full Time
Metode van aflewering: *Voltyds*

Assessment modes:
The participation mark is calculated using formal assessment activities that could include, but might not be limited to the following:
Class tests, principle tests, assignments, e-assignments/ quizzes, scheduled tests and practical tutorials and reports.
The weightings will be communicated to students in class and in the study guide.
A participation mark of 40% allows a student admission to the final examination (summative assessment).
Additional proof of participation requirements may also be set out in the module study guide, wich must also be satisfied before the examination admission is allowed.
The final module mark is calculated using the following weightings:

- Participation mark (50%)
- Final Examination mark (50%)

Module code: NPHY321	**Semester 2**	**NQF Level: 7**

Title / *Titel*: **Thermodynamics / *Termodinamika***

Module outcomes:
Students should be able to:
Knowledge:

- After the introduction in NPHY111, students receive a formal education in the following topics: the zeroth, first, second, and third laws of thermodynamics. The concepts of entropy, TdS-equations, Helmholtz and Gibbs functions, potential functions, equilibrium, and phase transitions are introduced by a simple statistical description of an isolated system, with emphasis on the example of an ideal gas.

Skills:

- Students learn how to develop and present abstract theory and to apply thermodynamic principles to systems like the atmosphere, and to certain cyclic processes like those of heat engines and refrigerators. Great emphasis is placed on problem solving as the outstanding method to apply physics practically. In the practical sessions, accurate measurements are made on pulsating stars, students learn how to measure heat capacity and they gain experience in applying their thermodynamic knowledge to astrophysical problems./

Module uitkomste:
Studente moet in staat wees om:
Kennis:

- *Na die inleiding in NPHY111 kry studente 'n formele opleiding in die volgende onderwerpe: die nulde, eerste, tweede, en derde wette van Termodinamika. Die begrippe entropie, TdS-vergelykings, Helmholtz-en Gibbsfunksies, potensiaalfunksies, asook ewewig en fase-oorgange word d.m.v. 'n eenvoudige statistiese beskrywing van 'n geïsoleerde sisteem ingevoer, met klem op die voorbeeld van 'n ideale gas.*

Vaardighede:

- *Studente leer hoe om abstrakte teorie te ontwikkel en weer te gee, en om Termodinamiese beginsels op stelsels soos die atmosfeer en bepaalde sikliese prosesse soos warmtemasjiene en verkoelers toe te pas. Groot klem word op probleemoplossing gelê as dié uitstaande manier om Fisika prakties te kan toepas. In die praktika word noukeurige metings op pulserende sterre gedoen, studente leer hoe om warmtekapasiteit te meet, en hulle kry ervaring om Termodinamiese kennis op astrofisiese probleme toe te pas.*

Method of delivery: Full Time
Metode van aflewering: *Voltyds*

Assessment modes:
The participation mark is calculated using formal assessment activities that could include, but might not be limited to the following:
Class tests, principle tests, assignments, e-assignments/ quizzes, scheduled tests and practical tutorials and reports.
The weightings will be communicated to students in class and in the study guide.
A participation mark of 40% allows a student admission to the final examination (summative assessment).
Additional proof of participation requirements may also be set out in the module study guide, wich must also be satisfied before the examination admission is allowed.
The final module mark is calculated using the following weightings:

- Participation mark (50%)
- Final Examination mark (50%)

Module code: NPHY322	**Semester 2**	**NQF Level: 7**

Title / *Titel*: **Nuclear Physics and Elementary Particles / *Kernfisika en Elementêre Deeltjies***

Module outcomes:
The course follows directly on NPHY312, which deals with introductory wave mechanics
Students should be able to:
Knowledge:

- This course follows directly on NPHY312, which deals with introductory wave mechanics. At the end of NPHY322 students have knowledge of nuclear structures and reactions, nuclear decay and models, groups of elementary particles, laws of conservation and the standard quark model for elementary particles.

Skills:

- In the theory, emphasis is placed on formal and conceptual knowledge and applications thereof. In the practical sessions, a talk on a popular topic is required, and projects on the contents of the course are discussed. Great emphasis is placed on the correct written and oral presentation of project reports. Proficiency in using computer graphics software and word processing is acquired./

Module uitkomste:
Hierdie kursus volg direk op NPHY312 wat oor inleidende Golfmeganika handel.
Studente moet in staat wees om:
Kennis:

- *Hierdie kursus volg direk op NPHY312 wat oor inleidende Golfmeganika handel. Aan die einde van NPHY322 het studente kennis van kernstrukture en -reaksies, kernverval en -modelle, groepe van elementêre deeltjies, behoudswette en die standaard kwarkmodel vir elementêre deeltjies*

Vaardighede:

- *In die teorie word klem gelê op formele en begripskennis en toepassings daarvan. 'n Voordrag oor 'n populêre onderwerp word vereis, terwyl projekte oor die inhoud van die kursus in die praktika behandel word, waar groot klem op die korrekte skriftelike en mondelinge aanbieding van projekverslae gelê word. Rekenaargebruik van grafika-pakkette en woordverwerking word aangeleer.*

Method of delivery: Full Time
Metode van aflewering: *Voltyds*

Assessment modes:
The participation mark is calculated using formal assessment activities that could include, but might not be limited to the following:
Class tests, principle tests, assignments, e-assignments/ quizzes, scheduled tests and practical tutorials and reports.
The weightings will be communicated to students in class and in the study guide.
A participation mark of 40% allows a student admission to the final examination (summative assessment).
Additional proof of participation requirements may also be set out in the module study guide, wich must also be satisfied before the examination admission is allowed.
The final module mark is calculated using the following weightings:

- Participation mark (50%)
- Final Examination mark (50%)

Module code: NPHY323	**Semester 2**	**NQF Level: 7**

Title / *Titel*: **Astro- and Space Physics / *Astro- en Ruimtefisika***

Module outcomes:
(Not Received)

Method of delivery: Full Time
Metode van aflewering: *Voltyds*

Assessment modes:
The participation mark is calculated using formal assessment activities that could include, but might not be limited to the following:
Class tests, principle tests, assignments, e-assignments/ quizzes, scheduled tests and practical tutorials and reports.
The weightings will be communicated to students in class and in the study guide.
A participation mark of 40% allows a student admission to the final examination (summative assessment).
Additional proof of participation requirements may also be set out in the module study guide, wich must also be satisfied before the examination admission is allowed.
The final module mark is calculated using the following weightings:

- Participation mark (50%)
- Final Examination mark (50%)

NAS.2.7.12 GEOGRAPHY / *GEOGRAFIE*

Module code: GEOG111 & GEOG171	**Semester 1**	**NQF Level: 5**

Title / *Titel*: **Introduction to Physical Geography / *Inleiding tot Fisiese Geografie***

Module outcomes:
On completion of the module the student should be able to demonstrate:

- A basic knowledge and informed understanding of systems in climatology and geomorphology:
- Appreciate the interactions between subsystems that include:
  - in climatology: the earth's radiation balance, the climate system, southern hemisphere and southern African synoptic scale circulation.;
  - in geomorphology: earth materials and tectonic plates; weathering and mass wasting; karst, fluvial, arid, coastal and glacial processes and landforms.
- The ability to explain climatic and geomorphological processes that are important in the southern African context;
- The ability to report on their skills in respect of identifying atmospheric circulation and geomorphological processes and landforms;

- Appropriate practical skills including map reading, basic aerial photo interpretation and visual representation of geographical data.

Module Uitkomste:

Na afhandeling van hierdie module moet student die volgende kan demonstreer:

- *Basiese kennis en ingeligde begrip van stelsels in klimatologie en geomorfologie;*
- *Waardering van die interaksies tussen subsisteme insluitende;*
  - *In klimatologie: die aarde se radiasiebalans, die klimaatsisteem, suidelike halfrond asook suidelike Afrika sinoptiese skaal sirkulasie;*
  - *In geomorfologie: grondstowwe, tektoniese plate, verwering en massaverplasing; karst-, fluviale-, woestyn-, kus-, gletserprosesse en –landvorme.*
- *Die vermoë om klimaats- en geomorfologiese prosesse wat belangrik is in 'n suidelike Afrikaanse konteks, te kan verduidelik;*
- *Die vermoë om hulle vaardighede met betrekking tot die identifisering van atmosferiese sirkulasie asook geomorfologiese prosesse en –landvorme te verwoord.*
- *Toepaslike praktiese vaardighede insluitend kartografiese vaardighede, basiese lugfotovertolking en visuele voorstelling van geografiese data.*

Method of delivery: Full Time
Metode van aflewering: *Voltyds*

Assessment Criteria:

Students have mastered the outcomes when they are able to:

- Write notes on, describe and discuss:
  - The nature, variability in space and time, and interaction of earth, atmosp[heric and biological processes;
  - The impact and interaction of human activities on earth, atmospheric and biological processes;
  - The ethical issues involved in the impact of human activities on earth, atmospheric and biological processes."
- Identify:
  - The important atmospheric circulation patterns;
  - The important geomorphological features;
  - The important ecological features."
- Explain:
  - The drivers of earth, atmospheric and ecological processes;
- Evaluate how changes in lithospheric, atmospheric, and ecological systems ar likely to impact on the human environment;
- Demonstrate capacity to use the basic tools of physical geographers;
- Prepare written essays that show an understanding of the fundamental principles of physical geography.

Module code: GEOG121 & GEOG172	**Semester 2**	**NQF Level: 5**

Title/ *Titel*: **Introduction to Human Geography / *Inleiding tot Menslike Geografie***

Module outcomes:

Students should be able to:

- Demonstrate integrated knowledge of the main areas of Human Geography, including an understanding of the key terms, concept, facts, principles, rules and theories of Human Geography;
- An ability to identify, evaluate and solve defined, routine and new problems within a familiar context, and to apply solutions based on relevant evidence and procedures or other forms of explanation appropriate to Human Geography.
- An ability to gather information from a range of sources, including oral, written or symbolic texts, to select information appropriate to the task, and to apply basic processes of analysis, synthesis and evaluation on that information in the field of Human Geography.

- An ability to communicate information reliably, accurately and coherently, using conventions appropriate to the context, either in writing, verbally or in practical demonstration, including an understanding of and repect for conventions around intellectual property, copyright and plagiarism in the field of Human Geography.
- An ability to operate in a range of familiar and new contexts, demonstrating an understanding of different kinds of systems, their constituent parts and the relationships amongst these parts, and to understand how actions on one geographical scale can impact on other scales within the same system in Human Geography.
- The ability to engage statistically with geographical data, to interpret the data spatially, and to present it in a comprehensible and coherent format./

Module uitkomste:
Na afhandeling van hierdie module moet student die volgende kan demonstreer:
- Geïntegreerde kennis in die hoofareas van Menslike Geografie, insluitende 'n begrip van sleutelterme, konsepte, feite, beginsels, reëls en teorieë relevant tot Menslike Geografie;
- Die vermoë om gedefinieerde, roetine en nuwe probleme binne bekende kontekste te identifiseer, evalueer en op te los; om oplossings toe te pas gebaseer op relevante bewyse en prosedures of ander vorme van verduideliking gepas vir Menslike Geografie;
- Die vermoë om inligting van verskeie bronne, insluitende mondelinge, geskrewe of simboliese tekste, te selekteer wat gepas is vir 'ntaak, asook om die basiese prosesse van analise, sintese en evaluering van daardie inligting toe te pas;
- Die vermoë om inligting betroubaar, akkuraat en samehangend te kommunikeer deur gebruik te maak van konvensies wat gepas is vir die konteks, in geskrewe vorm, of verbaal, of d.m.v. Praktiese demonstrasie, insluitend 'n begrip van en respek vir konvensies oor intellektuele eiendom, kopiereg en plagiaat;
- Die vermoë om in 'n reeks van bekende en nuwe kontekste te kan funksioneer, deur begrip te toon van verskillende tipes stelsels, hul samestellende dele en die verbande daartussen.

Method of delivery: Full Time
Metode van aflewering: *Voltyds*

Assessment Criteria:
Students have mastered the outcomes of this module if they are able to:
- Write notes on, describe and discuss
  - Ferent aspects and components of Human Gegraphy
  - The integrated nature of Geography and how it related to everyday phenomena in the world around us.
- Identify:
  - Human Geography problems on a higher cognitive level and present explanations for these problems.
  - Demonstrate the ability to statistically engage with geographical data, interpret spatially and present it in a comprehensible and coherent format.
- Explain
  - Everyday and current international events from a Human Geography perspective.
- Evaluate how events on one Geographical scale can impact on other Geographical scales.

Module code: GEOG211	**Semester 1**	**NQF Level: 6**

Title/ *Titel*: **Physical Geography / *Fisiese Geografie***

Module outcomes:
On completing the module, the student should have in-depth knowledge and understanding of earth and atmospheric processes and their South African context. In particular students should be able to demonstrate:
- In-depth knowledge and understanding of South African geomorphology, including controls on landforms, examples of fluvial, sedimentary, arid and coastal geomorphology, the relationship between landscapes, mankind and environmental change;

- In-depth knowledge and understanding of South African weather and climate, including typical synoptic conditions, weather forecasting, cloud and precipitation processes;
- Detailed knowledge and critical understanding of the use of observations and tools to forecast the weather, including synoptic charts, basic meteorological instrumentation, adiabatic maps like tephigrams, meteorological satellites, weather radar and the output of numerical weather models;
- Demonstrate skills to interpret data from basic meteorological instrumentation and meteorological satellites by carrying out weather measurements and processing and evaluating the data; by constructing and interpreting tephigrams and performing and interpreting computer-assisted statistical operations, individually but also as member of a group;
- The ability to identify and effectively implement acceptable information gathering techniques to do research on South African climatological and geomorphological problems of limited scope, and to communicate possible solutions orally or in writing.

Module Uitkomste:

Aan die einde van die module moet die student in staat wees om die volgende te demonstreer:

- *Grondige kennis en begrip van Suid-Afrikaanse geomorfologie, o.a. beheer op landvorme; voorbeelde van fluviale, sedimentêre, dorre en kusgeomorfologie; the verwantskap tussen landskappe, die mens en omgewingserandering;*
- *Grondige kennis en begrip van Suid-Afrikaanse weer en klimaat, insluitend tipiese sinoptiese toestande, weervoorspelling, wolk- en neerslagprosesse;*
- *Grondige kennis en kritiese begrip van die gebruik van waarnemings en gereedskap om die weer te voorspel, insluitend sinoptiese kaarte, basiese weerkundige instrumentasie, adiabaatkaarte soos tephigramme, weerkundige satelliete, weerradar en die uitset van syferkundige weermodelle;*
- *Vaardighede om data van basiese weerkundige instrumentasie en weerkundige satelliete te interpreteer deur die uitvoer van weerkundige metings, verwerking en evaluering van data; die konstruksie en interpretasie van tephigramme; uitvoer en interpretasie van rekenaarondersteunde statistiese prosedures, indivueel of as lid van 'n groep;*
- *Die vermoë om aanvaarbare inligtingversamelingstegnieke te identifiseer en effektief toe te pas ten einde navorsing te kan doen oor Suid-Afrikaanse klimaats- en geomorfologiese probleme met beperkte omvang, en die moontlike oplossings mondelings of skriftelik te kommunikeer.*

Method of delivery: Full Time
Metode van aflewering: *Voltyds*

Assessment Criteria:

- Write notes on, describe and discuss:
  - The nature, variability in space and time, and interaction of earth, atmospheric, hydrologic and biological processes of southern Africa;
  - The impact and interaction of human activities on earth, atmospheric, hydrologic and biological processes of southern Africa;
  - The ethical issues involved in the impact of human activities on earth, atmospheric, hydrologic and biological processes."
- Identify:
  - The important atmospheric circulation patterns of southern Africa;
  - The important geomorphological features of southern Africa;
  - The important ecological features of southern Africa
  - Important features of the global and regional water cycle
- Explain:
  - The drivers of earth, atmospheric, hydrologic and ecological processes of southern Africa;
- Evaluate how changes in atmospheric, hydrologic, geomorphological and ecological systems are likely to impact on the human environment.

- Demonstrate capacity to use the typical tools of physical geographers.
- Prepare written essays that show an understanding of the fundamental principles of physical geography in the southern African context.

Module code: GEOG212	**Semester 1**	**NQF Level: 6**

Title/ *Titel*: **Environmental Thermodynamics / *Omgewingstermodinamika***

Module Outcomes:

On completion of the module, the candidates should be able to demonstrate a thorough and advanced knowledge of, and skills in classical thermodynamics applied to the environment by using earth's atmosphere as a case study. Students should:

- Have in-depth knowledge and a critical understanding of the vertical variation of the thermodynamic variables in the atmosphere,
- Have in-depth knowledge and a critical understanding of the relevant processes that govern the thermodynamic state and change in state of air parcels,
- Demonstrate skills to interpret thermodynamic diagrams,
- Have understanding how thermodynamic processes relate to and create the weather phenomena,
- Further developing effective problem solving skills./

Module uitkomste:

Na afloop van die module behoort die kandidate 'n deeglike en gevorderde kennis van en vaardighede in klassieke termodinamika, toegepas op die omgewing, te demonstreer deur die atmosfeer van die aarde as gevallestudie te gebruik. Studente moet:

- *In-diepte kennis en kritiese begrip hê van die vertikale veranderlikheid van die termodinamiese veranderlikes in die atmosfeer,*
- *In-diepte kennis en kritiese begrip hê van die relevante prosesse wat die termodinamiese toestand beheer en verandering in die toestand van die atmosfeer kan interpreteer,*
- *Vaardighede demonstreer om termodinamiese diagramme te interpreteer,*
- *Verstaan hoe termodinamiese prosesse verband hou met weerverskynsels,*
- *Verdere ontwikkeling van effektiewe probleemoplossingsvaardighede.*

Method of delivery: Full Time
Metode van aflewering: *Voltyds*

Assessment Criteria:

Students have mastered the outcomes if they are able to:

- Use fundamental knowledge of principles of earth observation to solve problems in classical thermodynamics,
- Interpret and describe the impact of processes on the thermodynamic state of earth's atmosphere,
- Use thermodynamic diagrams to solve problems on the thermodynamic state of earth's atmosphere,
- Prepare and present oral and written reports and use appropriate platforms to communicate the principles of classical thermodynamics applied to the environment.

Module code: GEOG221	**Semester: 2**	**NQF-Level 6**

Title /*Titel* **: Human Geography / *Menslike Geografie***

Module Outcomes:

At the end of the module the student should be able to demonstrate:

- Detailed knowledge of the main areas of Human Geography, including an understanding of and an ability to apply the key terms, concepts, facts, principles, rules an theories of Human Geography; and demonstrate knowledge of an area or areas of specialisation and how that knowledge relates to other fields, disciplines or practices.
- An understanding of different forms of knowledge, schools of thought and forms of explanation typical within the field of Human Geography, and an awareness of knowledge production processes.

- An ability to evaluate, select and apply appropriate methods, procedures and techniques such as remote sensing techniques in processes of investigation or application within the context of Human Geography.
- An ability to identify, evaluate and solve problems in unfamiliar contexts, gathering evidence and applying solutions based on evidence and procedures appropriate to the field of Human Geography.
- An ability to evaluate different sources of information, to select information appropriate to the task, and to apply well-developed processes of analysis, synthesis and evaluation on that information.
- An ability to present and communicate complex information reliably and coherently, using appropriate academic and professional or occupational conventions, formats and technologies within the field of Human Geography.
- An ability to work effectively individually and in a team or group, and to take responsibility for his or her own decisions and actions with an understanding of the ethical implications of decisions and actions. /

Module uitkomste:

Na voltooiing van die module moet die studente die volgende kan demonstreer:

- *Gedetailleerde kennis van die hoofareas van Menslike Geografie, insluitende 'n begrip en toepassing van sleutelbegrippe, -konsepte, feite, beginsels, reëls en teorieë van Menslike Geografie; demonstreer ook gedetailleerde kennis van 'n spesialisarea of -areas en die wyse waarop dit verband hou met ander velde, dissiplines of praktyke.*
- *Begrip van verskillende vorme van kennis, denkskole en vorme van verduideliking wat kenmerkend is van die studieveld van Menslike Geografie, asook 'n bewustheid van kennisproduksie prosesse.*
- *Vermoë om gepaste metodes, prosedures of tegnieke soos afstandwaarnemingstegnieke in prosesse van ondersoek/navorsing te evalueer, te kies en toe te pas binne die konteks van Menslike Geografie.*
- *Die vermoë om probleme te identifiseer, te evalueer en op te los binne onbekende kontekste deur bewyse te versamel en oplossings toe te pas gegrond op bewyse en prosedures gepas vir die studieveld van Menslike Geografie.*
- *Die vermoë om verskillende inligtingsbronne te evalueer, geskikte inligting te kies en goed ontwikkelde prosesse van analise, sintese en evaluasie van daardie inligting toe te pas.*
- *Die vermoë om komplekse inligting betroubaar en samehangend aan te bied en te kommunikeer d.m.v. gepaste akademiese en professionele of beroepskonvensies, formate en tegnologieë binne die konteks van Menslike Geografie.*
- *Die vermoë om komplekse inligting betroubaar en samehangend aan te bied en te kommunikeer d.m.v. gepaste akademiese en professionele of beroepskonvensies, formate en tegnologieë binne die konteks van Menslike Geografie.*
- *Die vermoë om effektief individueel en in groepsverband te werk en verantwoordelikheid vir eie besluite en handelinge te neem met 'n begrip van die etiese implikasies van die genoemde besluite en aksies.*

Method of Delivery: Full Time
Metode van aflewering: *Voltyds*

Assessment Criteria:

The student will have mastered the outcomes of this module if the student is able to:

- Demonstrate detailed knowledge of the main areas of Human Geography, including an understanding of and an ability to apply the key terms, concepts, facts, principles, rules and theories of Human Geography; and demonstrate knowledge of an area or areas of specialisation and how that knowledge relates to other fields, disciplines or practices.
- Demonstrate an understanding of different forms of knowledge, schools of thought and forms of explanation typical within the field of Human Geography, and an awareness of knowledge production processes.

- Evaluate, select and apply appropriate methods, procedures and techniques such as remote sensing techniques in processes of investigation or application within the context of Human Geography.
- Identify, evaluate and solve problems in unfamiliar contexts, gathering evidence and applying solutions based on evidence and procedures appropriate to the field of Human Geography.
- Evaluate different sources of information, select information appropriate to the task, and apply well-developed processes of analysis, synthesis and evaluation on that information.
- Present and communicate complex information reliably and coherently, using appropriate academic and professional or occupational conventions, formats and technologies within the field of Human Geography.
- Work effectively individually and in a team or group, and take responsibility for his or her own decisions and actions with an understanding of the ethical implications of decisions and actions.

Module code: GEOG311	**Semester: 1**	**NQF-Level: 7**

Title /*Titel*: **GIS and Remote Sensing / *GIS en Afstandwaarneming***

Module outcomes:

At the end of the module the student should be able to demonstrate:

- An integrated knowledge of and engagement in Geographical Information Systems (GIS), Geographic Information Science (GISc) and Remote Sensing (RS) and a critical understanding and application of theories and techniques relevant to GIS, GISc and RS.
- Skills in collecting, managing and applying basic analyses to geographical data by making use of appropriate GIS and image processing software
- The ability to select, apply and critically review the effectiveness of spatial data for use in spatial analysis and mapmaking.
- Critical understanding of how spatial analysis aids in management decisions
- The ability to analyse, select and effectively apply scientific research methods to address spatial problems and communicate the research findings in an academically appropriate format.

***Module uitkomste*:**

Aan die einde van die module moet die student in staat wees om die volgende te demonstreer:

- *Geïntegreerde kennis van en betrokkenheid in Geografiese Inligting Stelsels (GIS), Geografiese Inligting Wetenskap (GISc) en Afstandwaarneming (RS) en 'n kritiese begrip en toepassing van teorieë en tegnieke relevant tot GIS, GISc en RS.*
- *Vaardighede om geografiese data te kan insamel, te kan bestuur en basiese analises kan toepas, deur gebruik te maak van toepaslike GIS en beeldverwerkingsprogrammatuur*
- *Die vermoë om toepaslike ruimtelike data te kan selekteer en die effektiwiteit daarvan krities te beoordeel vir die gebruik in ruimtelike analise en kaartproduksie.*
- Kritiese begrip toon van hoe ruimtelike analise bestuursbesluite kan ondersteun
- *Die vermoë om wetenskaplike navorsings metodes te analiseer, selekteer en effektief toe te pas op ruimtelike kwessies en die bevindinge op 'n akademiese aanvaarbare wyse te kommunikeer.*

Method of delivery: Full Time
Metode van aflewering: *Voltyds*

Assessment Criteria:

Students have mastered the outcomes if they are able to:

- Analyse the concepts, principles, techniques and applications that are fundamental to GIS, GISc and RS.
- Perform basic data collection, data management and spatial analysis processes.
- Manage complex spatial data and distinguish how they are different from non-spatial data
- Employ GIS software effectively to select, apply and implement a range of appropriate spatial data with a view to mapmaking

- Demonstrate how GIS aids in management decisions
- Analyse, select and effectively apply scientific research methods to reflect on and address spatial issues and communicate the research findings in an academically appropriate format.

Module code: GGFS321	**Semester 2**	**NQF Level: 7**

Title /*Titel*: **Applied Geography / *Toegepaste Geografie***

Module outcomes:

Students should be able to:

- Demonstrate integrated and systematic knowledge pertaining to the different components comprising the field of Geography, and insight into the manner and extent to which these different component parts interact with one another and impact on one another;
- Relate and contextualise theoretical concepts to real world scenarios and problems;
- Think spatially and holistically;
- As an individual and/or as a member of a group, to identify, describe and characterise problems in the field of Geography, to research relevant literature, collect and interpret data, analyse, evaluate and synthesise information and come to a meaningful conclusion, and communicate findings to peers orally and in written reports for a research project of appropriate scope;
- Reflect on the values, ethical conduct and justifiability of decisions appropriate to the practice of Geography. /

Module uitkomste:

Studente moet in staat wees om:

- *Geïntegreerde en sistematiese kennis met betrekking tot die verskillende komponente waaruit Geografie bestaan, en insig in die wyse en die mate waarin hierdie verskillende komponente interaksie met mekaar toon en mekaar impakteer, te demonstreer;*
- *Teoretiese konsepte met die werklikheid en regte wêreld probleme te trou;*
- *Ruimtelik en holisties te kan dink;*
- *As indiwidu of as lid van 'n groep, om Geografiese probleme te identifiseer, beskryf en karakteriseer; gepaste literatuursoektogte te onderneem, data te versamel, te interpreteer, inligting te analiseer, evalueer en te sintetiseer en tot 'n sinvolle gevolgtrekking te kom; en die resultate aan eweknieë te kommunikeer in verbale en/of geskrewe formaat, vir 'n navorsingsprojek van toepaslike omvang;*
- *Te besin oor die waardes, etiese gedrag en verdedigbaarheid van besluite wat toepaslik is vir die praktyk van Geografie.*

Method of delivery: Full Time
Metode van aflewering: *Voltyds*

Assessment Criteria:

Students have mastered the outcomes if they are able to:

- Critically discuss the concepts and principles relating to the different components comprising the field of Geography, with relevant focus on Africa.
- Relate theoretical knowledge to real world problems, particulary in Africa.
- Demonstrate an ability to think spatially and holistically.
- Conceptualise and successfully complete a research project.
- Reflect on the values, ethical conduct and justifiability of decisions appropriate to the practice of Geography

NAS.2.7.13 GEOLOGY / *GEOLOGIE*

Module code: GLGN112	**Semester 1**	**NQF Level: 5**

Title /*Titel*: **Geology and the Environment / *Geologie en die Omgewing***

Module outcomes:

Students should be able to:

- Demonstrate a fundamental knowledge base and informed understanding of the internal- and external geo-processes;
- Be aware of how scientific knowledge and theories are developed through the scientific method;
- Describe and identify the most common rock-forming minerals and rocks according to standard methods / description criteria;
- Display the skills required to identify and analyse geological problems or potential problems and to propose and apply solutions in the light of theory-driven arguments;
- Gather research and current information by undertaking literary searches (internet, books and magazines), select information appropriate to the task and communicate information accurately and coherently, demonstrating respect for intellectual property and an understanding of plagiarism;
- Operate as part of a group/pair and to make appropriate contributions to successfully complete a task related to the identification of minerals and rocks, taking co-responsibility for learning progress and outcome realization of the group/pair;
- Assess his or her performance within a structured learning process and to take appropriate action based on feedback from tests and assignments; and
- Be aware of the ethics associated with geology, such as the exploitation of mineral deposits at the expense of the preservation of geo- and biodiversity./

Module uitkomste:

Studente moet in staat wees om:

- *Te beskik oor 'n fundamentele kennisbasis en ingeligte begrip van die interne en eksterne geo-prosesse;*
- *Bewus te wees van hoe wetenskaplike kennis en teorieë ontwikkel deur toepassing van die wetenskaplike metode;*
- *Die mees algemene rotsvormende minerale en gesteentes volgens standaard metodes / beskrywingskriteria te kan beskryf en identifiseer;*
- *Geologiese probleme of potensiële probleme te identifiseer en te analiseer, asook om oplossings aan die hand van teorie-gedrewe argumente voor te stel en toe te pas;*
- *Navorsing en onlangse inligting in te samel deur die onderneming van literêre soektogte (internet, boeke en joernale), inligting geskik vir die taak te selekteer asook om díe inligting akkuraat en samehangend te kommunikeer, met inbegrip van plagiaat en respek vir intellektuele eiendom;*
- *As deel van 'n groep / paar te werk en om sinvolle bydraes te lewer tot 'n taak wat verband hou met die identifisering van minerale en gesteentes, suksesvol te voltooi, asook om mede-verantwoordelikheid vir vordering van leer en verwesenliking van uitkomste deur die groep/ paar te neem;*
- *Sy of haar prestasie binne 'n gestruktureerde leerproses te evalueer en om die nodige stappe wat gebaseer is op terugvoer van toetse en opdragte, te neem;*
- *Bewus te wees van die etiek verbonde aan geologie, soos die ontginning van mineraalafsettings ten koste van die behoud van geo- en biodiversiteit.*

Method of delivery: Full Time
Metode van aflewering: *Voltyds*

Assessment modes:
Assesseringsmetodes:

Module code: GLGN122	Semester 2	NQF Level: 5

Title / *Titel*: **South African Geology / *Suid-Afrikaanse Geologie***

Module outcomes:

Students should be able to:

- Demonstrate a fundamental knowledge base and informed understanding of the concept of geologic time, stratigraphic principles relevant to relative dating of rocks, theories relevant to the field of absolute dating of minerals and rocks, the development of the geologic time scale, and the application of the principles in the framework of South African stratigraphic units, as well as the fundamental concepts of crystallography and mineralogy;
- Describe and interpret geologic structures depicted on geologic maps, as well as the symmetry content of crystal models according to standard methods and description criteria;
- Display the skills required to identify and analyse geological problems or potential problems and to propose and apply solutions in the light of theory-driven arguments;
- Gather research and current information by undertaking literary searches (internet, textbooks and journals), select information appropriate to the task and communicate information accurately,and coherently, demonstrating respect for intellectual property and an understanding of plagiarism;
- Operate as part of a pair and make appropriate contributions to successfully complete a task related to practical work, taking co-responsibility for learning progress and outcome realization of the pair;
- Assess his or her performance within a structured learning process and to take appropriate action based on feedback from tests and assignments;
- Be aware of the ethics associated with geology, such as the exploitation of mineral and rock occurrences of value for geo-conservation purposes./

Module uitkomste:

Studente moet in staat wees om:

- *'n Fundamentele kennisbasis en ingeligte begrip van die konsep van geologiese tyd, stratigrafiese beginsels relevant ten opsigte van relatiewe datering van gesteente, teorieë relevant ten opsigte van die veld van absolute datering van minerale en gesteentes, die ontwikkeling van die geologiese tydskaal, en die toepassings van die beginsels in die raamwerk van die Suid-Afrikaanse stratigrafiese eenhede, asook die fundamentele konsepte van kristallografie en mineralogy, te demonstreer;*
- *Geologiese strukture voorgestel op geologiese kaarte te beskryf en interpreteer, asook die simmetrie-inhoud van kristalmodelle volgens standaard metodes en beskrywingskriteria;*
- *Om geologiese probleme of potensiële probleme te identifiseer en om oplossings in die lig van teorie-gedrewe argumente voor te stel en toe te pas;*
- *Navorsings- en byderwetse inligting te versamel deur middel van literatuursoektogte (internet, handboeke en joernale), inligting van toepassing op die taak te kies en inligting akkuraat en samehangend te kommunikeer terwyl respek vir intellektuele eiendom en 'n begrip van plagiaat deurgaans gedemonstreer word;*
- *As deel van 'n paar te kan werk en gepaste bydraes lewer om 'n taak wat verband hou met praktiese werk, suksesvol af te handel, deur mede-verantwoordelikheid te neem vir vordering in leer en realisering van uitkoms deur die paar;*
- *Sy of haar werkverrigting te assesseer binne 'n gestruktureerde leerproses en om gepaste aksie te neem gebaseer op terugvoer van toetse en opdragte;*
- *Bewus te wees van die etiek geassosieer met geologie, soos die uitbuiting van mineraal en gesteentevoorkomste van waarde vir 'n geo-bewaringsdoel.*

Method of delivery: Full Time
Metode van aflewering: *Voltyds*

Assessment modes:
Assesseringsmetodes:

Module code: GLGN211	Semester 1	NQF Level: 6

Titl / *Titel*: **Mineralogy en Igneous Petrology / *Mineralogie en Stollingspetrologie***

Module outcomes:

Students should be able to:

- Demonstrate detailed knowledge and understanding of: a variety of rock-forming and economic minerals, as well as a variety of igneous rock associations and associated rock-forming processes; the chemical, structural and optical aspects of various minerals and igneous rocks, accompanying analysis techniques, and the graphical representation thereof; the identification and systematic description of the major rock-forming minerals and most common igneous rocks;
- Display the skill required to analyse, synthesise and evaluate tendencies in changes with regard to the structure and composition of minerals and rocks; identification and systematic classification of rocks and minerals;
- Display the skill required to apply the investigation method of polarising petrographic microscopy, in order to identify and classify minerals and rocks in thin sections; analyse proposed models for the origin of particular igneous rock associations;
- Conduct accurate and reliable literary searches, to analyse, interpret and synthesise the information and to use it to make proposals to solve problems in both familiar and new contexts;
- Coherently communicate reporting, either individually or in group context, verbally, written or in digital format, to a group of peer learners with the help of it;
- Demonstrate ethical consciousness and accountability with regard to the collection of rock material for geological investigation, use of appropriate analytical techniques, presentation of geological data, the interpretation thereof, and reporting in written format according to scientific / academic standards with the understanding of intellectual property, copyright and rules on plagiarism./

Module uitkomste:

Studente moet in staat wees om:

- *Gedetailleerde kennis en begrip te demonstreer van: 'n verskeidenheid gesteentevormende en ekonomiese minerale, asook 'n verskeidenheid stollingsgesteente-assosiasies en gepaardgaande gesteentevormende prosesse; die chemiese, strukturele, en optiese aspekte van verskeie minerale en stollingsgesteentes, gepaardgaande ontledingstegnieke, en die grafiese voorstelling daarvan; die identifisering en sistematiese beskrywing van die hoof gesteentevormende minerale en algemeenste stollingsgesteentes;*
- *Neigings in veranderings ten opsigte van die struktuur en samestelling van minerale en stollingsgesteentes te kan analiseer, sintetiseer en evalueer; identifisering en sistematiese klassifisering van gesteentes en minerale;*
- *Polariserende petrografiese mikroskopie toe te pas om minerale en gesteentes in slypplaatjies te ondersoek, identifiseer en klassifiseer; om voorgestelde modelle vir die oorsprong van bepaalde stollinggesteente-assosiasies te kan analiseer;*
- *Akkurate en betroubare literatuursoektogte te onderneem, die inligting te analiseer / ontleed, interpreteer, sintetiseer en gebruik om voorstelle te maak en probleme op te los in bekende asook nuwe kontekste;*
- *'n Verslag samehangend te kommunikeer, individueel of in groepsverband, mondelings, geskrewe of in digitale formaat met behulp van it, aan 'n groep eweknie-leerders ;*
- *Etiese bewussyn en aanpreeklikheid te openbaar in verband met die versameling van gesteentemateriaal vir geologiese ondersoek, gebruik van gepaste ontledingstegnieke, aanbieding van geologiese data, interpretasie daarvan, en verslaggewing in geskrewe formaat met begrip vir intellektuele eiendom, kopiereg en plagiaatreëls volgens wetenskaplike / akademiese standaarde.*

Method of delivery: Full Time
Metode van aflewering: *Voltyds*

Assessment modes:
Assesseringsmetodes:

Module code: GLGN221	**Semester 2**	**NQF Level: 6**

Title / *Titel*: **Sedimentology, Structural Geology and Neotectonics / *Sedimentologie, Struktuurgeologie en Neo-tektoniek***

Module outcomes:
Students should be able to:

- Demonstrate detailed knowledge and understanding of
  - key terms, concepts, facts, principles, rules, theories, etc. within the fields of sedimentology, structural geology, and neotectonics;
  - how knowledge of sedimentology, structural geology, and neotectonics relates to applicable knowledge within the field of environmental geology;
  - the origin and development of knowledge within the fields of structural geology and sedimentology results in critical understanding of schools of thought, within the field of geology and environmental applications;
- Select, evaluate and effectively implement/apply, with discernment, those standard procedures/rules/methods/formulas/skills etc. To solve fundamental problems in a defined environment in die field of sedimetology and structural geology, with a view to conceptualize areas of interest;
- Distinguish and solve sedimentological and structural problems in unfamiliar contexts and to apply the solutions to support progress/development in the practice of environmental geology, in order to integrate the relationship between structural and sedimentological setting, resources and associated environmental impacts;
- Understand the ethical implications of decisions, actions and practices specifically relevant to field and practical sessions, in accordance with the rules of practice;
- Gather discipline-specific information, methods and techniques from credible and relevant discipline-related scientific sources; analyse, evaluate and synthesize the information and apply your conclusions/research to a given context in the fields of structural geology and sedimentology;
- Demonstrate accurate and coherent written and verbal communication of theoretical information/tasks/projects etc. With understanding of and respect for intellectual property conventions, copyright and rules on plagiarism;
- Act as group member and a group leader and contribute appropriate information/skills to successfully complete a task/project/profile etc., measuring the success of the task completion against given criteria, taking co-responsibility for learning progress and outcome realization of the group;
- Monitor own learning progress and apply relevant learning strategies and known and new resources to successfully realize all outcomes of this module./

Module uitkomste:
Studente moet in staat wees om:

- *'n Indiepte kennis en begrip te demonstreer van*
  - *kern terme, konsepte, feite, beginsels, reëls, teorieë, ens binne die velde van sedimentologie, struktuurgeologie, en neotektoniek;*
  - *hoe kennis van sedimentologie, struktuurgeologie, en neotektoniek verband hou met toegepasde kennis binne die veld van omgewingsgeologie;*
  - *die ontstaan en ontwikkeling van kennis binne die velde van struktuurgeologie en sedimentologie, bydrae tot kritieke begrip van denkrigtings binne die gebied van geologie en omgewingstoepassings;*
- *Die standaard prosedures/ reëls/metodes/formules/vaardighede ens, benodig om fundamentele probleme in 'n bepaalde omgewing in die gebied van sedimentologie en*

struktuurgeologie op te los, met onderskeiding te kies, te evalueer en effektief te implementeer/toe te pas met die oog op konseptualisering van gebiede van belang;

- *Sedimentologiese en strukturele probleme in onbekende kontekste te onderskei en op te los en om oplossings wat vordering/ontwikkeling in die praktyk van omgewingsgeologie ondersteun toe te pas ten einde integrasie van die verhouding tussen die strukturele en sedimentologiese omgewing, hulpbronne en gepaardgaande omgewingsimpakte te bewerkstellig;*
- *Begrip van die etiese implikasies van besluite, optrede en praktyke wat spesifiek op die veldwerk en praktiese sessies betrokke is, in ooreenstemming met die reëls van die praktyk te demonstreer;*
- *Dissipline-spesifieke inligting, metodes en tegnieke van geloofwaardige en relevante dissipline verwante wetenskaplike bronne in te samel; te analiseer, te evalueer en die inligting saam te vat om daarvolgens gevolgtrekkings/navorsing toe te pas in 'n gegewe konteks in die velde van struktuurgeologie en sedimentologie;*
- *Akkurate en samehangende geskrewe en verbale kommunikasie van teoretiese informasie/take/projekte ens. Met 'n begrip van en respek vir intellektuele eiendom konvensies, kopiereg en reëls oor plagiaat;*
- *Op te tree as lid van 'n groep en 'n groepleier en dra toepaslike inligting / vaardighede by om 'n taak / projek / profiel suksesvol te voltooi ens, die sukses van die taak voltooiing teen gegewe kriteria te kan meet, en mede-verantwoordelikheid vir die leer proses en uitkoms verwesenliking van die groep kan neem;*
- *Eie leervordering te monitor en relevante leerstrategieë, bekende en nuwe hulpbronne te kan aanwend om suksesvol al die uitkomste van hierdie module te bemeester.*

Method of delivery: Full Time
Metode van aflewering: *Voltyds*

Assessment modes:
Assesseringsmetodes:

Module code: GLGN311	**Semester 1**	**NQF Level: 7**

Title /*Titel*: **Metamorphic Petrology and Geochemistry / *Metamorfe Petrologie en Geochemie***

Module outcomes:
Students should be able to:

- Demonstrate integrated knowledge and understanding of, as well as ability to correctly evaluate and apply concepts and principles to different areas of specialization within the fields of metamorphic petrology and geochemistry and an understanding of how that knowledge relates to these fields;
- Demonstrate an understanding of contested knowledge within the field of metamorphic petrology and geochemistry, and a critical evaluation of the applicability of aforementioned concepts and principles to the field of metamorphic petrology and geochemistry;
- Select, evaluate and apply a range of different but appropriate theories and scientific methods of research;
- Reflect all values, and ethical conduct and justifiable decision making appropriate to the practice of research in the fields of metamorphism and geochemistry of rocks;
- Ability to identify, analyse, and critically reflect on and address complex metamorphic and geochemical problems and apply evidence-based solutions with theory-based arguments, and communicate in an accurate and coherent manner, written and verbal, with understanding of and respect to intellectual property conventions, copyright and rules on plagiarism;
- Manage a group in an unfamiliar context in order to solve a contextual problem (explain type), monitor the progress of the group and take responsibility for task outcomes and application of appropriate resources as necessary./

Module uitkomste:
Studente moet in staat wees om:

- *Geïntegreerde kennis en begrip van, asook vermoë om konsepte en beginsels korrekte te evalueer en toe te pas op verskillende spesialisgebiede in die velde van metamorfe petrologie en geochemie, en 'n begrip hoe daardie kennis verband hou met hierdie velde, te demonstreer;*
- *Begrip van betwiste kennis in die veld van metamorfe petrologie en geochemie, en 'n kritiese evaluering van die toepassing van voorheen genoemde konsepte en beginsels in die veld van metamorfe petrologie en geochemie te openbaar;*
- *'n Verskeidenheid, maar gepaste toerieë en wetenskaplike navorsings-metodes te kies, evalueer en toe te pas;*
- *Al die waardes en etiese gedrag, en regverdigbare besluitneming gepas in die navorsingspraktyk in die veld van geochemie te weerspieël;*
- *Komplekse metamorfe en geochemiese probleme te identifiseer, analiseer, en krities daaroor te besin en te hanteer, en om bewysgebaseerde oplossings met teoriegebaseerde argumente toe te pas, en op 'n akkurate en samehangende manier, geskrewe en verbaal, met begrip van en repsek vir gebruike in intellektuele eiendom, kopiereg en reëls ten opsigte van plagiaat;*
- *Saam te werk in 'n groep in 'n onbekende konteks om 'n kontekstuele probleem op te los, die vordering van die groep te monitor en verantwoordelikheid te neem vir taakuitkomste en toepassing van gepaste hulpmiddels soos nodig.*

Method of delivery: Full Time
Metode van aflewering: *Voltyds*

Assessment modes:
Assesseringsmetodes:

Module code: GLGN321	**Semester 2**	**NQF Level: 7**

Title / *Titel*: **Hydrogeology / *Hidrogeologie***

Module outcomes:
Students should be able to:

- Demonstrate integrated knowledge and understanding of, as well as an ability to correctly evaluate and apply principles of hydrogeology and engineering geology to different areas of specialization within the field of environmental geology, and an understanding of how that knowledge relates to other fields or practices within other disciplines with a view to access and solve environmental problems;
- Select, evaluate and apply a range of different but appropriate procedures/rules/methods/formulas/theories and scientific methods of enquiry to do focused research and resolve problems that will effect change within practice;
- Identify, analyse, critically reflect on and address complex groundwater and engineering geology problems and apply evidence-based/practice-driven/proven solutions with theoretically-driven arguments;
- Reflect all values, ethical conduct and justifiable decision making processes appropriate to the practice of hydrogeology, engineering geology, and geophysics;
- Demonstrate an understanding of the ethical implications of decisions, actions and practices specifically relevant to field and practical sessions, in accordance with the rules of practice;
- Display accurate and coherent written and verbal communication of projects with understanding of and respect for intellectual property conventions, copyright and rules on plagiarism;
- Manage a group in an unfamiliar context in order to solve a contextual problem (explain type), monitor the progress of the group and take responsibility for task outcomes and application of appropriate resources where appropriate;

- Take full responsibility for own learning needs, monitoring of own learning progress and application of relevant learning strategies and management of all resources to successfully realize all outcomes of this module./

Module uitkomste:
Studente moet in staat wees om:

- *Geïntegreerde kennis en begrip van, sowel as 'n vermoë om korrek te evalueer en beginsels van hidrogeologie en ingenieursgeologie, verskillende spesialiseringsrigtings binne die veld van omgewingsgeologie toe te pas, en 'n begrip toon van hoe daardie kennis verband hou met ander velde of praktyke binne ander dissiplines met die oog daarop om omgewingsprobleme te betree en op te los, te demonstreer;*
- *'n Verskeidenheid van verskillende maar toepaslike prosedures/reëls/ metodes/formules/teorieë en wetenskaplike metodes van ondersoek te kies, te evalueer en toe te pas om gefokusde navorsing te doen en probleme op te los wat verandering/vordering binne die praktyk sal bevorder;*
- *Om komplekse grondwater en ingenieursgeologie probleme te identifiseer, te analiseer, krities te besin en aan te spreek asook om bewysgebaseerde/praktykgerigte oplossings toe te pas gemotiveer deur teoreties-ondersteunde argumente;*
- *Te reflekteer oor alle waardes, etiese optrede en regverdigbare besluitnemingsprosesse wat geskik is vir die praktyk van hidrogeologie, ingenieursgeologie, en geofisika;*
- *Begrip te toon van die etiese implikasies van besluite, optrede en praktyke wat spesifiek op die veldwerk en praktiese sessies gerig is, soos in ooreenstemming met die reëls van die praktyk;*
- *Akkurate en samehangende geskrewe en verbale kommunikasie van projekte met 'n begrip van en respek vir intellektuele eiendom konvensies, kopiereg en reëls oor plagiaat openbaar;*
- *'n Groep in 'n onbekende konteks te bestuur ten einde 'n kontekstuele probleem op te los (verduidelik tipe), die vordering van die groep te monitor en verantwoordelikheid te neem vir taa uitkomste en toepassing van geskikte hulpbronne, waar gepas;*
- *Volle verantwoordelikheid vir eie leerbehoeftes te neem, eie leervordering te monitor, relevante leerstrategieë toe te pas en alle hulpbronne te bestuur om al die uitkomste van hierdie module suksesvol te bemeeste.r*

Method of delivery: Full Time
Metode van aflewering: *Voltyds*

Assessment modes:
Assesseringsmetodes:

NAS.2.7.14 SOIL SCIENCE / *GRONDKUNDE*

Module code: GDKN121	**Semester 2**	**NQF Level: 5**

Title / *Titel*: **Introduction to Soil Science / *Inleidende Grondkunde***

Module outcomes:
On completion of the module, the student should be able to demonstrate:

- An informed understanding of pedogenesis, soil forming factors and basic fundamental principles in soil science;
- The skill to differentiate, identify and classify soil horisons and soil forms within the contexts of south african soils and the standard south african classification procedures;
- The ability to demonstrate the relation between the various soil components and how the interaction between these components affects general soil health and performance;
- The ability to gather research and current information by undertaking literary searches (internet, books and magazines), select information appropriate to tasks and communicate

information accurately and coherently while demonstrating respect for intellectual property and an understanding of plagiarism;
- The ability to assess his or her performance within a structured learning program and to take appropriate action based on feedback from tests and assignments; and
- Be aware of his/her personal ethical framework. /

***Module uitkomste*:**
Na voltooiing van die module moet die student:
- *'n Ingeligte begrip van pedogenese, grondvormende faktore en basiese fundamentele beginsels in grondkunde toon;*
- *Beskik oor die vaardigheid om grondhorisonte en grondvorms binne die konteks van suid-afrikaanse grond te onderskei, te identifiseer en volgens die standaard suid-afrikaanse klassifikasie prosedures te klassifiseer;*
- *Die vermoë om die verhouding tussen die verskillende grondkomponente en hoe die interaksie tussen hierdie komponente beïnvloed algemene gesondheid en prestasie grond te demonstreer;*
- *Besik oor die vermoë om navorsing en relevante inligting in te samel deur die onderneming van literêre soektogte (internet, boeke en tydskrifte), inligting wat toepaslik is vir take te selekteer en hierdie inligting akkuraat en samehangend te kommunikeer met inbegrip van plagiaat en respek vir intellektuele eiendom;*
- *Beskik oor die vermoë om sy of haar prestasie binne 'n gestruktureerde leerprogram te evalueer en om die nodige stappe, gebaseer op terugvoer van toetse en opdragte, te neem; en bewus te wees van sy / haar persoonlike etiese raamwerk.*

Method of delivery: Full Time
Metode van aflewering: *Voltyds*

Assessment modes:
The participation mark is calculated using formal formative assessment activities that could include, but might not be limited to the following:
- Class tests, principle tests, assignments, e-assignments/quizzes (utilising the e-learning platform of NWU) and scheduled tests.

Module code: GDKN211	**Semester 1**	**NQF Level: 6**

Title / *Titel*: **Advanced Soil Science / *Gevorderde Grondkunde***

Module outcomes:
On completion of the module, the student should be able to:
- Demonstrate detailed knowledge of: soil chemistry, soil mineralogy and soil fertility.
- Demonstrate understanding of and the ability to apply key terms, concepts, facts, principles, rules and theories of soil science.
- Demonstrate understanding the behaviour of certain soils based on clay mineral content and why it is important for soils to be classified for specific uses and how this influence adsorption and exchange reactions in soil due to surface charge of the colloidal fraction.
- Demonstrate understanding of the principles of plant nutrition.
- Evaluate, select and apply appropriate soil chemical procedures to solve soil environmental problems.
- Evaluate soil analytical data and use that information to make fertiliser recommendations. Present and communicate the fertiliser recommendations made to the interested party in an academic and professional format.
- Make decisions and act appropriately in soil related matters with an understanding of the relationships between soil chemistry, soil mineralogy and soil fertility.
- Work effectively in a team or group, and to take responsibility for his or her decisions and actions and the decisions and actions of others within well-defined contexts, including the responsibility for the use of soil as an important resource./

***Module uitkomste*:**
Na voltooiing van die module behoort die student

- *In diepte kennis van grondmineralogie, grondchemie, plantvoeding te kan bewys.*
- *Grondkundige beginsels, terme, feite, beginsels reëls en teorie kan verstaan en toepas.*
- *'n Verstaan van die gedrag van sekere grondsoorte gebaseer op kleimineralogie demonstreer. Verder moet die student weet waarom dit belangrik is om gronde te klassifiseer vir spesifieke gebruike en hoe dit adsorpsie en uitruilingsreaksies in die grond beïnvloed.*
- *Die beginsels van plant voeding te verstaan*
- *Evaluering en toepassing van grondchemiese prosesse om grondomgewings probleme op te los.*
- *Grondontledingsdata te gebruik om bemestingaanbevelings te maak en dit in 'n professionele verslag weer te gee.*
- *Besluite te maak en op te tree in grond verwante sake met die nodige kennis van grondmineralogie, grondchemie en grondvrugbaarheid.*
- *Om effektief as 'n span te kan werk en verantwoordelikheid te vat vir besluite gemaak ten opsigte van grond as 'n belangrike hulpbron*
- *Probleme op te los van grond as 'n drie-fase sisteem.*

Method of delivery: Full Time
Metode van aflewering: *Voltyds*

Assessment modes:
The participation mark is calculated using formal formative assessment activities that could include, but might not be limited to the following:

- Class tests, principle tests, assignments, e-assignments/quizzes (utilising the e-learning platform of NWU) and scheduled tests.
- The weightings will be communicated to students in a module overview document.
- The practical examination of the soil science module is compulsory to be considered for admission to the examination
- A participation mark of 40% allows a student admission to the final examination (summative assessment). Additional proof of participation requirements may also be set out in the module study guide, which must also be satisfied before examination admission is allowed.

The final module mark is calculated using the following weightings:
Participation mark (50%); and

- Final examination mark (50%).
- The examination subminimum requirement is 40%.

Module code: GDKN221	**Semester 2**	**NQF Level: 6**

Title / *Titel*: **Soil Degradation and Rehabilitation / *Gronddegradasie en Rehabilitasie***

Module outcomes:
On completion of this module, you should be able to demonstrate the following:

- To distinguish between natural and anthropogenic soil degradation in terms of origins and factors that lead to soil degradation.
- Identify soil pollution on the basis of physical and chemical analysis and determine what types of analyses are applicable in the case of field investigations.
- Explain the impact of pollution and degradation on the chemical, physical and mechanical properties and general land uses of soils.
- Use remote sensing techniques to identify soil degradation.
- Remedial measures to avoid soil degradation, and to recover degraded soil.
- Identify and/or develop potential rehabilitation programs, describe the implications of soil degradation and pollution with reference to practical field observations.
- Development of sustainable land use management systems.
- Development of Environmental Risk analysis for different land uses.

- Do practical soil surveys in the field .with an emphasis on identifying soil degradation and pollution and risk management. /

***Module uitkomste*:**
Ná voltooiing van hierdie module moet die student die volgende te kan demonstreer:

- *Onderskeid te kan tref ten opsigte van natuurlike en anthropogenetiese gronddegradasie ten opsigte van oorsprong en faktore wat aanleiding gee tot gronddegradasie.*
- *Besoedeling van grond te kan identifiseer aan die hand van fisiese en chemiese analises en self te kan bepaal watter tipes analises is van toepassing in die geval van veld ondersoeke.*
- *Kan verduidelik wat die invloed van besoedeling en degradasie is op die chemiese, fisiese en meganiese eienskappe en algemene grondgebruike.*
- *Afstandswaarnemingstegnieke te kan gebruik om gronddegradasie te kan uitken en identifiseer.*
- *Remediërende maatreëls kan voorstel om degradasie teen te werk, te voorkom en te kan herstel.*
- *Implikasies van gronddegradsie en besoedeling in veldverband kan identifiseer en potensiële rehabilitasie programme kan identifiseer of ontwikkel*
- *Volhoubare grondgebruiksbestuur-stelsels kan ontwikkel.*
- *Omgewingsrisiko-analises kan ontwikkel vir verskillende grondgebruike.*
- *Praktiese grondopnames in die veld kan doen met die klem op identifisering van gronddegradsie en besoedeling en risikobestuur.*

Method of delivery: Full Time
Metode van aflewering: *Voltyds*

Assessment modes:
The participation mark is calculated using formal formative assessment activities that could include, but might not be limited to the following:

- Class tests, principle tests, assignments, e-assignments/quizzes (utilising the e-learning platform of NWU) and scheduled tests.
- The weightings will be communicated to students in a module overview document.
- The practical examination of the soil science module is compulsory to be considered for admission to the examination
- A participation mark of 40% allows a student admission to the final examination (summative assessment). Additional proof of participation requirements may also be set out in the module study guide, which must also be satisfied before examination admission is allowed.

The final module mark is calculated using the following weightings:

- Participation mark (50%); and
- Final examination mark (50%).
- The examination subminimum requirement is 40%.

Module code: GDKN311	**Semester 1**	**NQF Level: 7**

Title / *Titel*: **Soil Genesis and Classification / *Grond Genese en Klassifikasie***

Module outcomes:
This module is designed to equip students with fundamental knowledge regarding the principles, concepts of soil classification. GDKN311 also focus on soil genesis with special emphasis on physical and chemical weathering of parent material. All soil-forming factors and main pedogenic processes i.e. transformation and translocation are discussed in detail. The South Africa 2018 soil classification system will form the main focus of soil classification in this module.
After completion of this module the student should be able to:

- Demonstrate detailed knowledge, understanding and insight regarding soil classification and the ability to apply it practically.
- Know how soils are classified as natural bodies on the basis of their profile characteristics and not merely on the basis of their suitability for a particular use.

- Understand and describe basic principles of soil genesis soil-forming factors and processes related to agricultural and broader soil science applications.
- Understanding the interaction between the different factors and processes and the end land use.
- By understanding these processes and factors the students will be able to predict how soil will be affected by the addition of chemical fertilisers, cultivation and climate change within the South African context.
- Describe the physical breakdown and the chemical alteration and diagenesis of parent material i.e. primary minerals to secondary soil-forming minerals.
- Demonstrate detailed knowledge and practical application of the taxonomic system as applicable in South Africa.
- Identify and classify soil forms according to this classification system to better understand and make sense of the variability that occurs within the soils and how this apply to the use of the soil in South Africa./

***Module uitkomste*:**
Ná voltooiing van hierdie module moet die student die volgende te kan demonstreer:

- Gevorderde kennis, begrip en insig in grond klassifikasie wat prakties toegepas kan word.
- Weet hoe word gronde geklassifiseer as natuurlike liggame op die basis van hul profiel eienskappe, en nie slegs op grond van hulle gebruiksgeskiktheid nie.
- Die basiese beginsels van grond genese, die grondvormingsfaktore- en prosesse binne die raamwerk van die landbou en die breër grondkundige toepassings verstaan en beskryf.
- Die interaksie tussen grondvormingsfaktore en –prosesse en die landsgebruik te verstaan.
- Te voorspel hoe gronde beïnvloed sal word deur kunsmistoevoegings, bewerking en klimaatsverandering in die Suid Afrikaanse konteks.
- Die fisiese afbreek en chemiese verandering en diagenese van moedermateriaal (die afbreek van primêre kleiminerale na sekondêre kleiminerale) beskryf.
- Gevorderde kennis en die praktiese toepassing van die Suid-Afrikaanse grondklassifikasie sisteem kan demonstreer
- Grondsoorte volgens die Suid-Afrikaanse grondklassifikasie stelsel kan klassifiseer en die variasie binne grondsoorte verstaan, met toepassing op die gronde se gebruik in Suid-Afrika.

Method of delivery: Full Time
Metode van aflewering: *Voltyds*

Assessment modes:
The participation mark is calculated using formal formative assessment activities that could include, but might not be limited to the following:

- Class tests, principle tests, assignments, e-assignments/quizzes (utilising the e-learning platform of NWU) and scheduled tests.
- The weightings will be communicated to students in a module overview document.
- The practical examination of the soil science module is compulsory to be considered for admission to the examination
- A participation mark of 40% allows a student admission to the final examination (summative assessment). Additional proof of participation requirements may also be set out in the module study guide, which must also be satisfied before examination admission is allowed.

The final module mark is calculated using the following weightings:

- Participation mark (50%); and
- Final examination mark (50%).
- The examination subminimum requirement is 40%.

Module code: GDKN322	Semester 2	NQF Level: 7

Title / *Titel*: **Soil Physics / *Grondfisika***

Module outcomes:

After completion of this module the student should be able to:

- Identify and solve problems related to soil as a three-phase system.
- Demonstrate knowledge of soil water dynamics including the Law of Darcy concerning the flow of water in soil i.e. saturated and unsaturated water flow.
- Demonstrate a detailed understanding the movement of solutes through the soil profile.
- Demonstrate a detailed understanding regarding the gas content, composition, movement and exchange in the soil.
- Thorough knowledge and insight regarding the physical reaction of the solid fraction with water and air.
- Demonstrate a systematic overview of soil hydraulics including various aspects of soil water such as infiltration, run-off, base flow etc.
- Demonstrate an understanding and detail comprehension of what capillary and diffusion flow are.
- Demonstrate an understanding and describe water balances in term of ET, infiltration, precipitation etc.
- Identify processes and factors of plant available water with regards to soil as an entity.
- Demonstrate an in depth knowledge, understanding and insight regarding soil physics in agricultural systems, as well as the ability to apply it practically.

***Module uitkomste*:**

Ná voltooiing van hierdie module moet die student die volgende te kan doen:

- *Probleme in terme van die grond se drie-fase sisteem identifiseer en oplos*
- *Kennis van grondwater dinamiek, insluitende die reël van Darcy aangaande die vloei van water in 'n grond (versadigde en onversadigde vloei) demonstreer*
- *'n Gevorderde begrip van die beweging van die grondoplossing deur die grondprofiel demonstreer.*
- *'n Deeglike kennis en insig in die fisiese reaksies tussen die soliede fraksie met water en lug demonstreer*
- *'n Sistemiese kennis van grond hidrolika(insluitendverskeie aspekte van grond water soos infiltrasie, afloop basis vloei ens.) demonstreer.*
- *'n Gedetaileerde begrip van kapilêre en diffusie vloei demonstreer*
- *'n Begrip van die waterbalans, in terme van Evopotranspirasie, infiltrasie, presipitasie ens. demonstreer*
- *Prosesse en faktore van plantbeskikbare water aangaande die grond as 'n entiteit identifiseer.*
- *'n Gevorderde kennis, begrip en insig aangaande grond fisika in landbou sisteme demonstreer en prakties kan toepas.*

Method of delivery: Full Time
Metode van aflewering: *Voltyds*

Assessment modes:

The participation mark is calculated using formal formative assessment activities that could include, but might not be limited to the following:

- Class tests, principle tests, assignments, e-assignments/quizzes (utilising the e-learning platform of NWU) and scheduled tests.
- The weightings will be communicated to students in a module overview document.
- The practical examination of the soil science module is compulsory to be considered for admission to the examination
- A participation mark of 40% allows a student admission to the final examination (summative assessment). Additional proof of participation requirements may also be set out in the module study guide, which must also be satisfied before examination admission is allowed.

The final module mark is calculated using the following weightings:

- Participation mark (50%); and
- Final examination mark (50%).
- The examination subminimum requirement is 40%.

Module code: GDKN421	**Semester 2**	**NQF Level: 8**

Title / *Tite* **Precision Farming / *Presisieboerdery***

Module outcomes:

After completion of this module the student should be able to:

- Demonstrate knowledge of control and management aspects (basic principles of project management) and be able to apply it practically.
- Demonstrate a detailed understand of information technology (GIS, remote sensing, satellite images, geo-spatial technology, on-the-go info, etc.) and to explain and implement it practically.
- Identify, explain and implement farm machinery (hardware) and software for use in precision farming.
- Integrate fundamental knowledge and understanding of soil surveys and fertilizer recommendations.
- Demonstrate fundamental knowledge and applications of statistics in precision farming.
- Identify and explain sustainable soil and land management methods.
- Demonstrate detailed knowledge and understanding of the integration and modelling of environmental (climate, irrigation, cultivar choice fertilization, agronomy, yield potential, etc.) and management variables (sustainability of complex systems).
- Demonstrate complete knowledge, understanding and insight in regard to sustainable soil management and the means to apply it practically.
- Demonstrate practical application through integration of all the previous modules, survey data and all aspects of GDKN 421 (as discussed above, as well as with "real-time DSS", for Agronomy to complete a suitable project.

*FIELD MAPPING DURING THE DECEMBER HOLIDAY OF THE 3RD YEAR IS A PREREQUISITE FOR 4TH YEAR REGISTRATION.

The field mapping includes fieldwork and soil mapping with regards to the application of basic field techniques, sampling, soil mapping techniques, application of the South African taxonomic classification system, certain laboratory analysis of field samples, fertiliser applications, data interpretation and report writing.

- Demonstrate understanding and insight regarding various classification systems and their practical applications;
- Map soil information by means of geographical information systems (GIS) for application in precision farming planning and modelling in which different environmental and management attributes are integrated. /

***Module uitkomste*:**

Ná voltooiing van hierdie module moet die student die volgende te kan doen:

- *Kennis van beheer en bestuursaspekte (basiese beginsels van projek bestuur) demonstreer en prakties toepas*
- *'n Gevorderde kennis en begrip van Inligting tegnologie (GIS, afstandswaarneming, satellietbeelde, geo-ruimtelike tegnologie ens.) demonstreer en dit prakties kan verduidelik en implementeer.*
- *Plaasgereedskap en toepaslike sagteware vir gebruik in presisie boerdery kan identifiseer, verduidelik en implementeer.*
- *Fundamentele kennis van grond opnames en kunsmisaanbevelings kan integreer.*
- *Fundamentele kennis en toepassing van statistiek in presisie boerdery demonstreer.*
- *Geskikte volhoubare grond en land bestuursmetodes identifiseer en verduidelik.*

- *Gevorderde kennis en begrip van die integrasie en modellering van omgewings (bv. Klimaat, grond variasie, opbrengspotensiaal) en bestuurs (bv. besproeiing, kultivarkeuse, bemesting) veranderlikes demonstreer.*
- *Volkome kennis, begrip en insig ten opsigte van volhoubare grond bestuur demonstreer en prakties toepas.*
- *Die praktiese toepassing van alle vorige modules, opnames, en alle ander aspekte van GKD421 deur integrasie demonstreer (soos hierbo bespreek, sowel as met "intyd DSS" vir Agronomie om 'n geskikte projek te voltooi.*

VELDKARTERING GEDURENDE DIE DESEMBER VAKANSIE VAN DIE 3DE JAAR IS 'n VOORVEREISTE VIR 4DE JAAR REGISTRASIE.

Die veld kartering sluit die grondopname en kartering in, wat ook die volgende aspekte behels: basiese veld tegnieke, grondmonsterneming, grondkarteringstegnieke, toepassing van die Suid-Afrikaanse grondklassifikasie stelsel, sekere laboratorium analises van grondmonsters, kunsmisaanbevelings, data interpretasie en verslag skryf,

- *Begrip en insig in die gebruik van verskeie grondklassifikasie sisteme en hul praktiese toepassing demonstreer.*
- *Grond inligting kan karteer m.b.v. geografiese inligtingstelsels (GIS) vir toepassing in presisie boerdery beplanning en modellering waarin verskillende omgewings en bestuursveranderlikes geïntegreer word.*

Method of delivery: Full Time
Metode van aflewering: *Voltyds*

Assessment modes:

The participation mark is calculated using formal formative assessment activities that could include, but might not be limited to the following:

- Class tests, principle tests, assignments, e-assignments/quizzes (utilising the e-learning platform of NWU) and scheduled tests.
- The weightings will be communicated to students in a module overview document.
- The practical examination of the soil science module is compulsory to be considered for admission to the examination
- A participation mark of 40% allows a student admission to the final examination (summative assessment). Additional proof of participation requirements may also be set out in the module study guide, which must also be satisfied before examination admission is allowed.

The final module mark is calculated using the following weightings:

- Participation mark (50%); and
- Final examination mark (50%).
- The examination subminimum requirement is 40%.

NAS.2.7.15 INFORMATION TECHNOLOGY / *INLIGTINGSTEGNOLOGIE*

Module code: CMPG111 & 171	**Semester 1**	**NQF Level: 5**

Title / *Titel*: **Introduction to Computing and Programming / *Inleiding tot Rekenaarwese en Programmering***

Module outcomes:

Students should be able to:

- Knowledge scope: basic / fundamental / elementary knowledge / informed understanding
  - ➢ fundamental knowledge of the main areas of the computer science discipline including system areas and application areas.
- Methods and procedures: identify, select, organise and implement standard methods / procedures / rules / formulas

- the ability to identify, select and implement standard procedures and methods related to the manipulation of spreadsheets and database tables with a view to organise, process and present data and transfer data between different applications;
- the ability to identify, select and implement standard structured programming methods related to computer programming with a view to solve simple computational problems.

- Practical skill: demonstrate / implement / apply a basic practical skill
  - the ability to apply knowledge of tables, computations and functions in order to manipulate data on spreadsheets and database tables;
- Basic problem solving skill
  - the ability to identify, analyse and define basic problems specific to the field of computer programming.
  - the ability to select from a range of possible options the best solution to a discipline-specific problem and to apply the solution to support progress in the practice of designing and implementing structured programs.
- Identify ethical and professional behaviour
  - identify social and ethical issues in the field of IT./

Module uitkomste:

Studente moet in staat wees om:

- *Kennisbasis: basies / fundamenteel / elementêre kennis / ingeligte begrip*
  - *fundamentele kennis van die hoofareas van die rekenaarwetenskapdissipline insluitend stelsel- en toepassingsareas te demonstreer;*
- *Metodes en prosedures: identifiseer, selekteer, organiseer en implementeer standaard metodes / prosedures / reëls / formules:*
  - *die vermoë om standaardprosedures en -metodes in verband met die manipulasie van sigblaaie en databasisse te identifiseer, selekteer en te implementeer, om data sodoende te organiseer, verwerk, voor te stel en tussen verskillende toepassings oor te dra;*
  - *die vermoë om standaard gestruktureerde programmeringsmetodes te identifiseer, selekteer en te implementeer, om sodoende eenvoudige probleme met die rekenaar op te los.*
- *Praktiese vaardigheid: demonstreer / implementeer / pas 'n basiese praktiese vaardigheid toe:*
  - *die vermoë om kennis van tabelle, berekeninge en funksies toe te pas om sodoende data op sigblaaie en databasistabelle te manipuleer.*
- *Basiese probleemoplossingsvaardighede:*
  - *die vermoë om basiese probleme, spesifiek tot die veld van rekenaarprogrammering, te identifiseer, ontleed en te definieer;*
  - *die vermoë om die beste oplossing uit 'n versameling moontlikhede van 'n dissipline-spesifieke probleem te kies en om deur toepassing van die oplossing die praktyk van ontwerp en implementering van gestruktureerde programme te bevorder.*
- *Identifiseer etiese en professionele gedrag:*
  - *identifiseer sosiale en etiese kwessies in die veld van IT.*

Method of delivery: Contact & Distance (PC)/ Contact (VC & MC)
Metode van aflewering: *Kontak & Afstand (PC)/ Kontak (VC &MC)*

Assessment Modes:
Formal Formative

- Schedule tests and quizzes
- Computer Lab Practica
- Assessment Methods - Summative
- 3-hour examination including written and practical components.

Assessment Plan

- Participation mark: 50%
- Schedule tests
- Quizzes and exercises
- Computer Lab Practica
- Examination: 50%
- 3-hour examination including written and practical components.

Assesseringsplan

- *Deelnamepunt: 50%*
- *Geskeduleerde toetse*
- *Multikeuse toetse en oefening*
- *Rekenaar laboratorium praktika*
- *Eksamen 50%*
- *3-uur eksamen wat geskrewe en praktiese komponente insluit.*

Module code: CMPG112	**Semester 1**	**NQF Level: 5**

Title / *Titel*: **Introduction to End User Computing / *Inleiding tot Rekenaareindgebruik***

Module outcomes:

Students should be able to:

- Demonstrate fundamental knowledge of the different components of a computer and an information system, as well as programming languages and their uses;
- Demonstrate the manipulation of spreadsheets by applying knowledge of tables, computations, transfer of data between different applications, functions and graphic presentations;
- Demonstrate the ability to solve problems by designing and implementing structured programming, by using data manipulation and data presentations and applying 'gui' event-driven approaches in the development environment of a spreadsheet;
- Demonstrate insight into ethical issues related to the wider it business and an awareness of the risks and dangers that threaten the business;
- Demonstrate the ability to communicate in writing by compiling a report after having completed a project./

Module uitkomste:

Studente moet in staat wees om:

- *Fundamentele kennis te demonstreer van die verskillende komponente van 'n rekenaar en van 'n inligtingstelsel, asook programmeringstale en gebruik daarvan;*
- *Die manipulering van sigblaaie te kan demonstreer deur toepassing van kennis van tabelle, berekenings, oordrag van data tussen verskillende toepassings, funksies en grafiese voorstellinge;*
- *Die vermoë te demonstreer om probleme op te los deur ontwerp en implementering van gestruktureerde programmering, gebruik van datamanipulasie en datavoorstellings en toepassing van "gui" gebeurtenis gedrewe (event-driven) benadering in 'n sigblad se ontwikkelingsomgewing;*
- *Insig in etiese kwessies wat verwant is aan die breër it-bedryf te verstaan en bewus wees van die risiko en gevare wat die bedryf bedreig;*
- *Skriftelike kommunikasievermoë te demonstreer deur 'n verslag op te stel nadat 'n projek voltooi is.*

Method of delivery: Contact & Distance (PC)/ Contact (VC)
Metode van aflewering: *Kontak & Afstand (PC)/ Kontak (VC)*

Assessment Modes:
Formal Formative
Could include, but might not be limited to, class tests, assignments, and case studies.
Summative
Examination: A three-hour practical examination is written at the end of the semester.

Assessment Plan
Formative assessment (50%),
Summative assessment (50%) (1:1)
Assesseringsplan
Formatiewe assessering (50%,
Summatiewe assessering (50%) (1:1)

Module code: CMPG115	**Semester 1**	**NQF Level: 5**

Title / *Titel*: **Programming for Engineers I / *Programmering vir Ingenieurs I***

Module outcomes:
Students should be able to:

- Demonstrate a thorough knowledge of, and skill in the underlying principles, methods and the application of the following topics:
  - knowledge of and insight in the basic structure, data types, and functions, including structured problem solving and debugging, testing and execution of applications of a structured programming language;
  - the student will have to demonstrate that he/she can apply the acquired knowledge and insight to solve elementary problems, develop an algorithm to solve problems, codify the algorithm, and to debug, test and execute it on the computer.

Module uitkomste:
Studente moet in staat wees om:

- *'n Deeglike kennis van, en vaardigheid in die onderliggende beginsels, metodes en toepassing van die volgende onderwerpe te kan demonstreer:*
  - *basiese kennis en insig te hê oor 'n gestruktureerde programmeringstaal se basiese strukture, datatipes, funksies asook gestruktureerde probleemoplossing wat insluit: ontfouting, toetsing en uitvoering van toepassings.*
  - *die student sal kan bewys lewer dat hy/sy die kennis en insig wat verwerf is, kan toepas ten opsigte van eenvoudige probleemoplossing met programmering, 'n algoritme kan ontwikkel om die probleem op te los, die algoritme kan implementeer (kodeer), ontfout, toets en uitvoer met behulp van die rekenaar.*

Method of delivery: Contact
Metode van aflewering: *Kontak*

Assessment modes:
Assesseringsmetodes:

Module code: CMPG121 & 172	**Semester 2**	**NQF Level: 5**

Title / *Titel*: **Structured Programming / *Gestruktureerde Programmering***

Module outcomes:
Students should be able to:

- Knowledge scope: basic / fundamental / elementary knowledge / informed understanding:
  - fundamental knowledge of the main areas of structured programming including the basic structure, data types and functions;
  - knowledge of more advanced structured programming aspects such as arrays, records, file input and output, sorting and recursion;
- Methods And Procedures: Identify, Select, Organise And Implement Standard Methods / procedures / rules / formulas:

- the ability to use structured programming constructs in designing, coding, debugging, testing and execution of applications in a procedural programming language;
- the ability to understand basic representation of data in computer memory;

- Practical skill: demonstrate / implement / apply a basic practical skill:
  - the ability to apply knowledge of programming constructs to develop algorithms to solve programming problems;
- Basic problem solving skill:
  - the ability to apply the acquired knowledge and insight to solve elementary problems by developing algorithms, code the algorithms in a procedural language, and debug and test it on the computer;
- Identify ethical and professional behaviour:
  - the ability to identify social and ethical issues in the field of programming. /

Module uitkomste:

Studente moet in staat wees om:

- *Kennisbasis: basies / fundamenteel / elementêre kennis / ingeligte begrip:*
  - *fundamentele kennis van die hoofareas van gestruktureerde programmering insluitend die basiese struktuur, datatipes en funksies;*
  - *kennis van meer gevorderde gestruktureerde programmeringsaspekte soos skikkings, rekords, lêertoevoer en -afvoer, sortering en rekursie;*
- *Metodes en prosedures: identifiseer, selekteer, organiseer en implementeer standaard metodes / prosedures / reëls / formules:*
  - *die vermoë om gestruktureerde programmeringskonstrukte te gebruik tydens die ontwerp, kodering, ontfouting, toetsing en uitvoering van toepassings in 'n prosedurele programmeringstaal;*

  die vermoë om basiese voorstelling van data in die geheue van die rekenaar te verstaan.
- *Praktiese Vaardigheid: Demonstreer / Implementeer / Pas 'n Basiese Praktiese Vaardigheid Toe:*
  - *die vermoë om kennis van programmeringskonstrukte toe te pas om algoritmes te ontwikkel om programmeringsprobleme op te los;*
- *Basiese probleemoplossings vaardighede:*
  - *die vermoë om toepaslike kennis en insig te gebruik om elementêre probleme op te los deur algoritmes te ontwikkel, die algoritmes te kodeer in 'n prosedurele taal, dit te ontfout en op 'n rekenaar te toets;*
- *Identifiseer etiese en professionele gedrag:*
  - *die vermoë om sosiale en etiese kwessies in die veld van programmering te identifiseer.*

Method of delivery: Contact & Distance (PC)/ Contact (VC & MC)
Metode van aflewering: *Kontak & Afstand (PC)/ Kontak (VC & MC)*

Assessment Methods:

Formal Formative

Schedule tests and quizzes
Computer Lab Practica

Summative

A three-hour examination including written and practical components.

Assessment Plan

- Participation mark: 50%
- Schedule tests
- Quizzes and exercises
- Computer Lab Practica
- Examination: 50%
- 3-hour examination including written and practical components.

Assesseringsplan

- *Deelnamepunt: 50%*
- *Geskeduleerde toetse*
- *Multikeuse toetse en oefening*
- *Rekenaar laboratorium praktika*
- *Eksamen 50%*
- *3 uur eksamen wat geskrewe en praktiese komponente insluit.*

Module code: CMPG122	**Semester 2**	**NQF Level: 5**

Title / *Titel*: **User Interface Programming I / *Gebruikerskoppelvlak-Programmering***

Module outcomes:

Students should be able to:

- Write a computer program that demonstrates that the student mastered a thorough knowledge of, and skill in the underlying principles, methods and the application of computer programming;
- Identify problems, analyse and evaluate them and propose solutions through the design and development of applications with the emphasis on user-friendly interfaces;
- Demonstrate aspects such as graphical interface design using principles of human-computer interaction, event-driven programming and incorporating databases in the graphical interface;
- Demonstrate sufficient fundamental knowledge of and insight into the graphic interface environment to develop computerised systems in a visual object-based computer language;
- Demonstrate the ability to implement repetitive, conditional and sequential structures./

Module uitkomste:

Studente moet in staat wees om:

- *'n Rekenaarprogram te skryf wat demonstreer dat die student deeglike kennis en vaardigheid het van onderliggende beginsels, metodes en die toepassing van rekenaarprogrammering;*
- *Probleme te identifiseer, ontleed en te evalueer en oplossings voor te stel deur die ontwerp en ontwikkeling van toepassings met die klem op gebruikersvriendelike koppelvlakke;*
- *Aspekte soos grafiese koppelvlakontwerp met inagneming van beginsels vir mens-rekenaar-interaksie te demonstreer, asook gebeurlikheidsgedrewe programmering en die insluiting van databasisse in grafiese koppelvlakke;*
- *Genoegsame fundamentele kennis van en insig in die grafiese koppelvlakomgewing te demonstreer om gerekenariseerde stelsels te ontwikkel in 'n visuele objek-gebaseerde rekenaartaal;*
- *Die vermoë te demonstreer om herhalende, voorwaardelike en sekwensiële strukture te implementeer.*

Method of delivery: Contact & Distance (PC)/ Contact (VC)
Metode van aflewering: *Kontak & Afstand (PC)/ Kontak (VC)*

Assessment Methods:

Formal Formative

Weekly practical programming assignments and class tests.

Summative

Practical programming examination

Assessment Plan

Formative assessment (50%),
Summative assessment (50%) (1:1)

Assesseringsplan

Formatiewe assessering (50%),
Summatiewe assessering (50%) (1:1)

Module code: CMPG211	Semester 1	NQF Level: 6

Title / *Titel*: **Object Oriented Programming / *Objek-Georiënteerde Programmering***

Module outcomes:

Students should be able to:

- Demonstrate a thorough knowledge of, and skill in the underlying principles, methods and the application of the following topics:
  - analyse and solve a problem and write a structured object oriented program for the solution;
  - understand and apply search, sort and recursion methods in object oriented programming solutions;
  - discuss, use and do calculations in different numbering systems such as the binary numbering system;
  - solve problems that need file and exception handling in object oriented programming
  - apply advanced object oriented concepts including inheritance and polymorphism in program solutions;
  - be able to create an event driven programming (such as GUI) solution using object oriented programming;
  - apply version control in project development;
  - understand logical architecture which includes Karnaugh maps / gates;
  - basic understanding of UML diagrams as design tools./

Module uitkomste:

Studente moet in staat wees om:

- *Deeglike kennis van, en vaardigheid in die onderliggende beginsels, metodes en toepassings van die volgende onderwerpe te demonstreer:*
  - *ontleed en los 'n probleem op en skryf 'n gestruktureerde objek-georiënteerde program vir die oplossing;*
  - *verstaan en pas metodes van soek, sortering en rekursie in objek-georiënteerde programmeringsoplossings toe;*
  - *verduidelik, gebruik en berekenings kan doen in getallestelsels soos die binêre getallestelsel;*
  - *los probleme of wat lêer- en uitsonderingshantering in objek-georiënteerde programmering vereis;*
  - *pas gevorderde objek-georiënteerde konsepte toe, insluitend oorerwing en polimorfisme in program-oplossings;*
  - *in staat wees om gebeurlikheidsgedrewe programmeringsoplossings (soos 'n GGK) deur middel van objek-georiënteerde benaderings te skep;*
  - *weergawebeheer in projek-ontwikkeling te kan toepas;*
  - *verstaan logiese argitektuur wat Karnaugh-diagramme en hekke insluit;*
  - *'n basiese begrip te hê van UML-diagramme en ontwerphulpmiddels.*

Method of delivery: Contact & Distance (PC)/ Contact (VC & MC)
Metode van aflewering: *Kontak & Afstand (PC)/ Kontak (VC & MC)*

Assessment Methods:
Formal Formative
Schedule tests and quizzes
Computer Lab Practica
Summative
4-hour examination including written and practical components.

Assessment Plan
Participation mark: 50%
Examination: 50%
Assesseringsplan
Deelnamepunt: 50%
Eksamen 50%

Module code: CMPG212	**Semester 1**	**NQF Level: 6**

Title / *Titel*: **Apps and Advanced User Interface Programming / *Toepassings en Gevorderde Gebruikerkoppelvlakprogrammering***

Module outcomes:
Students should be able to:

- Demonstrate a thorough knowledge of, and skill in the underlying principles, methods and the application of the following topics: advanced graphical interface programming, file handling, web-based applications and mobile applications;
- Effectively apply programming skills with a view to develop web and mobile applications, determine the nature and scope of graphical user interface systems and select the best possible solution to solve interactive system problems;
- Design systems that are industry-directed and user-friendly and comply with professional and ethical codes of behaviour;
- Identify problems, analyse and evaluate them critically and propose solutions through the design and development of applications with the emphasis on user-friendly interfaces;
- Demonstrate the ability to communicate/demonstrate solutions/programs coherently and reliably, in a group or individually through making use of appropriate academic/professional oral and written argumentation (which includes source code commenting)./

Module uitkomste:
Studente moet in staat wees om deeglike kennis van, en vaardigheid van onderliggende beginsels, metodes en die toepassing van die volgende onderwerpe te demonstreer:

- *Gevorderde grafiese koppelvlak programmering, lêerhantering, web-gebaseerde toepassings en mobiele toepassings;*
- *Programmeringsvaardighede effektief toe te pas met die oog op die ontwikkeling van web- en mobiele toepassings, die aard en omvang van grafiese gebruikerskoppelvlak stelsels te bepaal en die beste oplossing vir interaktiewe stelselprobleme te selekteer;*
- *Stelsels te ontwerp wat industrie-gerig en gebruikersvriendelik is en voldoen aan professionele etiese gedragskodes;*
- *Probleme te identifiseer, analiseer en krities te evalueer en oplossings voor te stel vir die ontwerp en ontwikkeling van toepassing met die klem op gebruikersvriendelike koppelvlakke; en*
- *Die vermoë te demonstreer om oplossings/programme in 'n groep, of individueel, koherent en betroubaar te kommunikeer/demonstreer, deur gebruik te maak van toepaslike akademiese/professionele mondelinge of geskrewe argumentering (wat bronkode dokumentering insluit).*

Method of delivery: Contact & Distance (PC)/ Contact (VC)
Metode van aflewering: *Kontak & Afstand (PC)/ Kontak (VC)*

Assessment Methods:
Formal Formative
Class tests and small practical assignments
A practical project
Summative
There will be a 3-hour examination at the end of the semester.

Assessment Plan
Participation mark: 50%
Examination: 50%
Assesseringsplan
Deelnamepunt: 50%
Eksamen 50%

Module code: CMPG213	**Semester 1**	**NQF Level: 6**

Title / *Titel*: **Systems Analysis and Design I / *Stelselontleding en Ontwerp I***

Module outcomes:
Students should be able to:

- *Describe the phases of the system development life cycle and apply the tools and techniques used during the System Initiation, Analysis and Design phases to an IT project in a chosen scenario;*
- *Describe the activities involved in project management and apply these in group context cross the stated life-cycle activities while running the IT project;*
- *Present project reports orally on an ongoing basis and compile documents as an ongoing activity to record facts and specifications for the involved system;*
- *Act responsibly and professionally when designing and presenting IT projects and when working as part of a project group./*

Module uitkomste:
Studente moet in staat wees om

- *Die fases van die stelselontwikkelingslewenssiklus te beskryf en die hulpmiddels en tegnieke tydens inisiasie-, ontleding- en ontwerpfases van 'n IT projek in 'n gekose omgewing toe te pas;*
- *Die aktiwiteite betrokke by projekbestuur te bespreek en in groepsverband toe te pas tydens die verloop van die genoemde lewenssiklusfase aktiwiteite van die IT projek;*
- *Deurlopende mondelingse voordragte te gee van projekverslae en om dokumente by te werk as deurlopende aktiwiteit om feite en spesifikasies van die betrokke stelsel te weer te gee;*
- *Verantwoordelik en professioneel op te tree wanneer IT projekte ontwerp en voorgedra word en wanneer hy/sy deel is van 'n groep.*

Method of delivery: Contact & Distance (PC)/ Contact (VC & MC)
Metode van aflewering: *Kontak & Afstand (PC)/ Kontak (VC & MC)*

Assessment Methods:
Formal Formative
Class tests and small practical assignments
A practical project
Summative
There will be a 3-hour examination at the end of the semester. /
Assessment Plan
Participation mark: 50%
Examination: 50%
Assesseringsplan
Deelnamepunt: 50%
Eksamen 50%

Module code: CMPG214	Semester 1	NQF Level: 6

Title / *Titel*: **Communication Skills / *Kommunikasievaardighede***

Module outcomes:

Students should be able to:

- Scope of knowledge: integrated knowledge and coherent understanding
  Demonstrate integrated knowledge and clear / coherent / logical / critical understanding of, as well as an ability to correctly evaluate and apply the concept of a principle-based value system according to which he / she can set personal objectives to different areas of specialisation within the field of computer science and information systems;
- Demonstrate integrated knowledge and clear / coherent / logical / critical understanding of, as well as an ability to correctly evaluate and apply the concept of the basic communication skills of writing and presentation techniques to different areas of specialisation within the field of computer science and information systems;
- Demonstrate integrated knowledge and clear / coherent / logical / critical understanding of, as well as an ability to correctly evaluate and apply the concept of soft skills such as client management, conflict management, critical thinking, decision-making, emotional intelligence, flexibility, interpersonal relations, leadership, negotiation, professionalism, self-management, teamwork, willingness to learn, and work ethic to different areas of specialisation within the field of computer science and information systems;
- Practical skill: demonstrate practical skill
- Able to effectively implement communication skills;
- Able to function effectively in groups;
- Able to express themselves on the importance of soft skills, and to apply soft skills in everyday life.
- Act in accordance with ethical and professional behavioural requirements
- Able to reflect on the values, ethical conduct and justifiability of decisions./

Module uitkomste:

Studente moet in staat wees om:

- *Omvang van kennis: geïntegreerde kennis en kritiese verstaan*
- *Geïntegreerde kennis en duidelike / logiese / kritiese verstaan van die konsep van 'n beginselgebaseerde waardestelsel waarvolgens persoonlike doelwitte gestel word, sowel as die vermoë om dit te evalueer en toe te pas tot verskillende areas in die veld van rekenaarwetenskap en inligtingstelsels te demonstreer;*
- *Geïntegreerde kennis en duidelike / logiese / kritiese verstaan van die konsep van basiese kommunikasievaardighede en voorleggingstegnieke, sowel as die vermoë om dit te evalueer en toe te pas tot verskillende areas in die veld van rekenaarwetenskap en inligtingstelsels te demonstreer;*
- *Geïntegreerde kennis en duidelike / logiese / kritiese verstaan van die konsep van sagte vaardighede soos byvoorbeeld kliëntbestuur, konflikbestuur, besluitneming, emosionele intelligensie, aanpasbaarheid, interpersoonlike verhoudinge, leierskap, onderhandelinge, professionalisme, selfbestuur, spanwerk, bereidheid om te leer, en werksetiek, sowel as die vermoë om dit te evalueer en toe te pas tot verskillende areas in die veld van rekenaarwetenskap en inligtingstelsels te demonstreer;*
- *Praktiese vaardigheid: demonstreer praktiese vaardigheid*
- *Vaardigheid om kommunikasievaardighede effektief te implementeer;*
- *Vaardigheid om effektief te werk as lid van 'n groep;*
- *Vaardigheid om hulself uit te druk oor die belang van sagte vaardighede, en om sagte vaardighede toe te pas in die daaglikse lewe.*
- *Tree op in ooreenstemming met etiese en professionele gedragsvereistes*
- *Die vaardigheid om te reflekteer oor waardes, etiese gedrag en die regverdiging van besluite.*

Method of delivery: Contact & Distance (PC)/ Contact (VC)

Metode van aflewering: *Kontak & Afstand (PC)/ Kontak (VC)*

Assessment Methods:
Formal Formative
+- 4 tests and +- 3 practical assignments.
Summative
2 hour written examination

Assessment Plan

- Participation mark:
  50% Coursework
  50% Tests
- Final mark:
  50 % participation mark
  50% Exam.

Assesseringsplan

- *Deelnamepunt:*
  50% opdragte
  50% toetse
- *Finale punt:*
  50% deelnamepunt
  50% eksamen.

Module code: CMPG215	**Semester 1**	**NQF Level: 6**

Title / *Titel*: **Information Security / *Inligtingsekuriteit.***

Module outcomes:
Students should be able to:

- Knowledge:
  - on theoretical level the student should have insight and basic knowledge of main concepts of information and cyber security (these include concepts such as confidentiality, integrity, availability, authentication, privacy, secure software development, backup and recovery, legal and ethical issues);
  - the student is introduced to security threats in the world we live in and should be able to recognise appropriate controls to counteract these threats.
- Methods and procedures:
  - the students should have the ability to identify and have knowledge about security threats and vulnerabilities in a computerised environment such as hardware errors, software failures, human errors, malicious intent and natural causes;
  - the students should demonstrate that they have knowledge and can identify applicable controls and countermeasures on different levels such as technical controls, physical controls, and procedural controls as well as social controls in order to counteract the security threats and vulnerabilities in a computerised system.
- Ethics and professional practice:
  - the students should have the ability to act according to the code of conduct of the IT profession towards clients and to use computer resources ethically and responsibly./

Module uitkomste:
Studente moet in staat wees om

- *Kennis:*
  - *op teoretiese vlak moet die student insig en basiese kennis hê van die hoofaspekte van inligting- en kubersekuriteit (dit sluit konsepte in soos: vertroulikheid, integriteit, beskikbaarheid, identifisering, privaatheid, veilige programmatuurontwikkeling, rugsteun en herstel, regs- en etiese kwessies);*

- *die student word bewus gemaak van sekuriteitsbedreigings in die wêreld waarin ons leef en moet bewus wees van geskikte kontroles en teenmaatreëls om hierdie bedreigings af te weer.*

- *Metodes en prosedures:*
  - *die student moet oor die vermoë beskik om sekuriteitsbedreigings en kwesbaarhede in 'n gerekenariseerde omgewing te kan identifiseer en kennis te dra van apparatuurfoute, programmatuurfalings, menslike foute, kwaadwillige intensies en natuurlike oorsake;*
  - *die studente moet demonstreer dat hulle kennis het en toepaslike kontroles en teenmaatreëls kan identifiseer op verskillende vlakke, soos tegniese kontroles, fisiese kontroles, prosedurele kontroles sowel as kontroles op sosiale vlak, om sodoende sekuriteitsbedreigings en – kwesbaarhede in 'n gerekenariseerde stelsel teen te staan.*
- *Etiese en professionele optrede:*
  - *die studente moet oor die vermoë beskik om volgens die gedragskode van die IT professie op te tree teenoor kliënte en om rekenaarbronne eties en verantwoordelik te gebruik.*

Method of delivery: Contact & Distance (PC)/ Contact (VC)
Metode van aflewering: *Kontak & Afstand (PC)/ Kontak (VC)*

Assessment Methods:
Formal Formative
Class assignments
Tests
Summative
2 hour written examination

Assessment Plan
- Participation mark:
  50% Coursework
  50% Tests
- Final mark:
  50 % participation mark
  50% Exam.

Assesseringsplan
- *Deelnamepunt:*
  50% opdragte
  50% toetse
- *Finale punt:*
  50% deelnamepunt
  50% eksamen.

Module code: CMPG221	**Semester 2**	**NQF Level: 6**

Title / *Titel*: **Data Structures and Algorithms /** ***Datastrukture en Algoritmes***

Module outcomes:
Students should be able to:
- Demonstrate integrated knowledge and critical understanding of, as well as an ability to correctly evaluate running times and complexity of algorithms,
- Demonstrate integrated knowledge and clear understanding of, as well as an ability to correctly evaluate and apply manipulation algorithms for data structures such as linked lists, multidimensional arrays, queues, stacks and trees,
- Display advanced ability to effectively apply data manipulation algorithms with a view to solve familiar and unfamiliar problems including sorting and searching algorithms, using object-oriented programming techniques;
- Have basic knowledge of design patterns and its application./

Module uitkomste:
Studente moet in staat wees om

- *Kennis te integreer en kritiese begrip, tesame met die vermoë om die looptyd en kompleksiteit van algoritmes te bepaal, te openbaar;*
- *Kennis te integreer en 'n duidelike begrip tesame met die vermoë om algoritmes vir die manipulasie van datastrukture soos geskakelde lyste, multidimensionele vektore, toue, stapels en bome te evalueer en te implementeer, te openbaar;*
- *Gevorderde vermoë openbaar om data manipulasie algoritmes effektief toe te pas om bekende en onbekende probleme soos sorterings- en soek-algoritmes met behulp van objek-georiënteerde metodes op te los;*
- *Basiese kennis van ontwerppatrone en hulle toepassings kan demonstreer.*

Method of delivery: Contact & Distance (PC)/ Contact (VC & MC)
Metode van aflewering: *Kontak & Afstand (PC)/ Kontak (VC & MC)*

Assessment Methods:
Formal Formative
Class tests and small practical assignments
A practical project
Summative
There will be a 3-hour written examination at the end of the semester.

Assessment Plan
Participation mark: 50%
Examination: 50%
Assesseringsplan
Deelnamepunt: 50%
Eksamen 50%.

Module code: CMPG222	**Semester 2**	**NQF Level: 6**

Title / *Titel*: **Data Analytics / *Data Analise***

Module outcomes:
Students should be able to:
- Understand the importance of context of large data sets;
- Apply knowledge of concepts of design in data analysis;
- Demonstrate the ability to utilise modern data analysis tools to create effective reports and visualisations.

Module uitkomste:
Studente moet in staat wees om:
- *Die belangrikheid van die konteks van groot datastelle te verstaan;*
- *Kennis van konsepte rakende data-analise te kan toepas;*
- *Die vermoë te demonstreer om moderne hulpmiddels te gebruik om effektiewe verslae en visualiserings te skep.*

Method of delivery: Contact & Distance (PC)/ Contact (VC)
Metode van aflewering: *Kontak & Afstand (PC)/ Kontak (VC)*

Assessment Methods:
Formal Formative
Class assignments and tests
Summative
2 hour written examination

Assessment Plan
- Participation mark:
  50% Coursework
  50% Tests
- Final mark:
  50 % participation mark

50% Exam.

Assesseringsplan

- *Deelnamepunt:*
  50% opdragte
  50% toetse
- *Finale punt:*
  50% deelnamepunt
  50% eksamen.

Module code: CMPG223	**Semester 2**	**NQF Level: 6**

Title / *Titel*: **System Analysis and Design II / *Stelselontleding en –Ontwerp II***

Module outcomes:

Students should be able to:

- Demonstrate sufficient knowledge and insight into project management techniques and apply the phases and techniques of the system development life cycle (or alternative systems development methodologies) when a system is designed and developed including the later phases of physical design, construction, testing, installation and delivery of a system;
- Demonstrate that he/she can correctly apply and use the phases and techniques of a project as individual or in a group, manage a practical project by applying project management techniques, think and behave in an innovative and creative way when a computerized system is designed and developed;
- Successfully write reports of projects and present it orally;
- Apply a professional attitude towards clients and use computer resources ethically and responsibly when they create, complete and deliver it projects and work as part of a project team./

Module uitkomste:

Studente moet in staat wees om

- *Voldoende kennis en insig te demonstreer in projekbestuurstegnieke en die fases en tegnieke van die stelselontwikkelingslewensiklus (of alternatiewe stelselontwikkelingsmetodologieë) toe te pas wanneer 'n stelsel ontwerp en ontwikkel word, insluitende die latere fases van fisiese ontwerp, konstruksie, toetsing, installering en aflewering van 'n stelsel;*
- *Te demonstreer dat hy / sy die fases en tegnieke van 'n projek as individu of in 'n groep korrek kan toepas en gebruik, 'n praktiese projek kan bestuur deur projekbestuurstegnieke toe te pas, op innoverende en kreatiewe wyse te dink en op te tree wanneer 'n gerekenariseerde stelsel ontwerp en ontwikkel word;*
- *Verslae van projekte suksesvol te kan skryf en dit mondelings te kan aanbied;*
- *'n Professionele houding teenoor kliënte te toon en rekenaarhulpbronne eties en verantwoordelik gebruik wanneer hulle it-projekte skep, voltooi en aflewer en werk as deel van 'n projekspan*.

Method of delivery: Contact & Distance (PC)/ Contact (VC & MC)
Metode van aflewering: *Kontak & Afstand (PC)/ Kontak (VC & MC)*

Assessment Methods:

Formal Formative

Class tests
Assignments
A practical project

Summative

There will be a 3-hour examination at the end of the semester.

Assessment Plan

Participation mark: 50%
Examination: 50%
Assesseringsplan
Deelnamepunt: 50%
Eksamen 50%

Module code: CMPG224	**Semester 2**	**NQF Level: 6**

Title/ *Titel*: **Introduction to Software Engineering / *Inleiding tot Programmatuuringenieurswese***

Module outcomes:
Students should be able to:

- Describe software engineering and its process;
- Describe and appropriately apply different software development methodologies to implement quality software by:
  - describe different software processes and how to choose between them
  - elicit requirements from a client and specify them
  - create and analysing design models
- Develop a basic system using a DBMS using software requirements and specifications;
- Validate a basic system using a DBMS using software requirements and specifications;
- Write software engineering documentation such as reports, and user manuals;
- Develop technical skills, personal skills and social skill;
- Understand good coding practices, including documentation, contracts, regression tests and daily builds;
- Define software quality and describe various quality assurance techniques, including unit testing, functional testing, and automated analysis tools;
- Work in teams peacefully and create a project plan;
- Be aware of software engineering ethics and exhibit professional behaviour./

Module uitkomste:
Studente moet in staat wees om

- *Stelsingenieurswese en die prosesse daarvan te beskryf;*
- *Verskillende metodologieë programmatuurontwikkel te beskryf en toe te pas om in hoë kwaliteit programmatuur te implementeer deur:*
  - *beskryf verskillende programmatuurprosesse en die keuse daartussen;*
  - *bepaal spesifiseer behoefte van 'n kliënt.*
  - *skep en analiseer ontwerpmodelle.*
- *'n Stelsel met behulp van 'n DBBS en programmatuurvereistes en spesifikasies te ontwerp;*
- *'n Basiese stelsel met behulp van 'n DBBS en programmatuurvereistes en spesifikasies te valideer;*
- *Programmatuuringenieurswese-dokumentasie soos verslae en gebruikershandleidings te skryf;*
- *Tegniese vaardighede, persoonlike vaardighede en sosiale vaardighede te ontwikkel;*
- *Goeie koderingspraktyke soos dokumentasie, kontrakte, regressie toetsing, en daaglikse weergawe skepping te verstaan;*
- *Programmatuurkwaliteit en verskillende kwaliteitsversekeringstegnieke, soos eenheidstoetsing, funksionele toetsing, en geoutomatiseerde analise hulpmiddels te definieer.*
- *In vredeliewend in groepe en skep 'n projekplan te werk;*
- *Bewus te wees van etiek van programmatuuringenieurswese en vertoon professionele gedrag.*

Method of delivery: Contact
Metode van aflewering: *Kontak*

Assessment Methods:
Formal Formative
Class tests and small practical assignments
A practical project
Summative
2 hour written examination

Assessment Plan
Participation mark: 50%
Examination: 50%
Assesseringsplan
Deelnamepunt: 50%
Eksamen 50%

Module code: CMPG311	**Semester 1**	**NQF Level: 7**

Title/*Title:* ***Databases /Databasisse***

Module Outcomes:
After completion of the module, the student should demonstrate:
Scope of knowledge:
Integrated knowledge and coherent understanding:
- integrated knowledge and clear / coherent / logical / critical understanding of, as well as an ability to correctly evaluate and apply database concepts within the field of Computer Science and Information Systems.

Methods and procedures:
Implement an appropriate procedure / method / rule / formula and evaluate the effectiveness of the implementation:
- integrated knowledge and clear understanding of, as well as an ability to correctly evaluate and apply database systems and database design to different areas of concern within the field of Computer Science, Information Systems and business entities;
- the implementation of an appropriate procedure to develop entity relationship models as part of the database design process, do normalization of database tables and design databases.

Practical skill:
Demonstrate advanced practical skill:
- advanced ability to solve given problems in the database environment;
- advanced ability to effectively use SQL expressions and procedures with a view to create and change database objects, change data and retrieve information to respond to queries and resolve problems within a database environment.

Problem identification and problem solving:
- the ability to identify, analyse, critically reflect on and address complex problems/issues/challenges related to unstructured data stores and apply practice-driven solutions with theory-driven arguments. /

Module uitkomste:
Studente moet in staat wees om
Omvang van kennis:
Geïntegreerde kennis en samehangende verstaan:
- *geïntegreerde kennis en duidelike en kritiese verstaan van databasiskonsepte, asook die vermoë om databasiskonsepte krities te evalueer en toe te pas binne die veld van Rekenaarwetenskap en Inligtingstelsels.*

Metodes en prosedures:
Implementeer gepaste prosedures en evalueer die effektiwiteit van die implementering:
- *geïntegreerde kennis en duidelike en kritiese verstaan van databasisstelsels en databasisontwerp, asook die vermoë om databasisstelsels en databasisontwerp krities te evalueer en toe te pas binne die veld van Rekenaarwetenskap en Inligtingstelsels;*

- *die implementering van gepaste prosedures om entiteitverwantskapmodelle te ontwikkel as deel van die databasisontwerpproses, normalisering van databasistabelle te doen en databasisse te ontwerp.*

Praktiese vaardigheid: demonstreer gevorderde praktiese vaardigheid:

- *gevorderde vaardigheid om gegewe probleme in die databasisomgewing op te los;*
- *gevorderde vaardigheid om SQL uitdrukkings en prosedures effektief te gebruik vir die skep of verander van databasisobjekte, om data te verander of te onttrek, en om probleme in die databasisomgewing op te los.*

Probleemidentifisering en probleemoplossing:

- *die vaardigheid om te identifiseer, ontleed, krities te reflekteer en om komplekse probleme verwant aan ongestruktureerde data store aan te spreek en praktykgedrewe oplossings toe te pas met teorie-gedrewe argumente.*

Method of delivery: Contact & Distance (PC)/ Contact (VC & MC)
Metode van aflewering: *Kontak & Afstand (PC)/ Kontak (VC & MC)*

Assessment modes:
Formal Formative
There will typically be various practical and theoretical assignments, various contact tests, semester tests and a semester project to complete during the semester.
Summative
There will be a 3-4 hour examination at the end of the semester. Examination may include a practical session.

Assessment plan;
Formative assessments 50%.
Summative assessments 50% (1:1)

Module code: CMPG312	**Semester 1**	**NQF Level: 7**

Title / *Titel:* **Decision Support Systems I / *Besluitsteunstelsels I***

Module outcomes:
On completion of this module, the student should be able to:

- Apply the knowledge and insight that they have gained in problem-solution in the field of study and its fields of application;
- Discuss the definition of a decision-making support system;
- Formulate LP problems, solve them and apply sensitivity analysis to them;
- Formulate and solve transportation and allocation problems;
- Formulate and solve integer programming problems; and
- Formulate and solve network modelling problems.

Module uitkomste:
Studente het die uitkomste bereik as hulle in staat is om:

- *Kennis en insig wat verwerf is in probleem-oplossing in die veld van studie kan toepas;*
- *'n Besluitsteunstelsel se definisie te bespreek;*
- *LP probleme te formuleer, op te los en sensitiwiteitsontleding te doen;*
- *Transportasie en toekenningsprobleme te formuleer en op te los;*
- *Heeltallige programmeringsprobleme te formuleer en op te los; en*
- *Netwerk modelleringsprobleme te formuleer en op te los.*

Method of delivery: Contact & Distance (PC)/ Contact (VC)
Metode van aflewering: *Kontak & Afstand (PC)/ Kontak (VC)*

Assessment modes:
Formal formative
There will be 5 practical assignments (homework) and 4 class tests to complete the semester.
Summative

There will be a 3-hour examination at the end of the semester /

Assesseringsmetodes:
Formeel formatief
Daar sal 5 praktiese opdragte (tuiswerk) en 4 klastoetse wees om die semester te voltooi.
Summatief
Daar sal 'n 3-uur eksamen aan die einde van die semester wees.

Module code: CMPG313	**Semester 1**	**NQF Level: 7**

Title / *Titel:* **Artificial Intelligence / *Kunsmatige Intelligensie***

Module outcomes:
Students should be able to:

- Explain that Artificial Intelligence is a full branch of Computer Science, constructed on scientific principles;
- Define Artificial Intelligence and to comment on the definition;
- Describe the foundations and fields of application of the subject;
- Use Propositional Logic and Predicate Logic for the portrayal of problems in Artificial Intelligence;
- Set up condition spaces of problems for use by search processes;
- Use various uninformed and also informed search methods and to apply these to practical problems./

Module uitkomste:
Studente moet in staat wees om

- *Te verduidelik dat Kunsmatige Intelligensie 'n volwaardige onderafdeling van Rekenaarwetenskap is wat gebou is op wetenskaplike beginsels;*
- *Kunsmatige Intelligensie te definieer en kommentaar te lewer op die definisie;*
- *Die grondslag en toepassingsvelde van die vakgebied te kan beskryf;*
- *Proposisielogika en Predikaatlogika te gebruik om probleme in Kunsmatige Intelligensie voor te stel;*
- *Voorwaarderuimtes van probleme op te stel wat gebruik word deur soekprosesse;*
- *Verskeie oningeligte en ook ingeligte soekmetodes te gebruik en dit toe te pas op praktiese probleme.*

Method of delivery: Contact & Distance (PC)/ Contact (VC & MC)
Metode van aflewering: *Kontak & Afstand (PC)/ Kontak (VC & MC)*

Assessment modes:
Formal Formative
A project will be completed during the semester and there will be a number of reports and class discussions. There are typically 6 tests to complete during the semester.
Summative
There will be a 3-hour examination at the end of the semester.

Assessment Plan
There will be written tests and assignments.

Module code: CMPG315	**Semester 1**	**NQF Level: 7**

Title / *Titel:* **Computer Networks / *Rekenaarnetwerke***

Module outcomes:
To achieve the outcomes of the module, the students should be able to:

- Discuss the different types of networks as well as their function
- Describe and compare the OSI and TCP / IP reference models as well as the protocols used in these models.
- Discuss the physical layer of the OSI model in terms of the principles and protocols involved as well as the practical implementation.

- Discuss the data link layer of the OSI model in terms of the principles and protocols involved. Describe and compare different techniques used by protocols in this layer.
- Discuss the medium access control sub layer of the OSI model in terms of principles and protocols involved. Describe and compare different implementations used fo these protocols.
- Discuss the network layer of the OSI model in terms of the prinsiples and protocols involved. Compare different techniques used in the transport layer protocols.
- Discuss the session, presentation and application layer of the OSI models in term sof principles and protocols involved. Describe browser, DNS and email implementations and propose solutions for the given scenarios.
- Discuss security implications of networks in terms of the environment, vulnerabilities, attacks and possibole protection mechanisms.
- Analyse a given scenario and then design and implement a network solution to solve given problems./

Module uitkomste:
Studente sal die uitkomste van die module bereik indien hulle die volgende kan doen:

- *Bespreek die verskillende tipes netwerke en hul funksie.*
- *Beskryf en vergelyk die OSI en TCP /IP verwysingsmodelle asook die protokolle wat in die modelle gebruik word.*
- *Bespreek die fisiese-laag van die OSI model in terme van die beginsels en protokolle betrokke asook die praktiese implementering daarvan.*
- *Bespreek die dataverindingslaag van die OSI-model in terme van die beginsels en protokolle betrokke. Beskryf en vergelyk verskillende tegnieke wat deur protokolle in hierdie lag gebruik word.*
- *Bespreek die medium toegangsbeheersublaag van die OSI model in terme van die beginsels en protokolle betrokke. Beskryf en vergelyk verskillende implementerings wat vir hierdie protokolle gebruik word.*
- *Bespreek die netwerklaag van die OSI model in terme van die beginsels en protokolle betrokke. Vergelyk die verskillende tegnieke wat in netwerklaagprotokolle gebruik word.*
- *Bespreek die transportlaag van die OSI model in terme van die beginsles en protokolle betrokke. Vergelyk die verskillende tegnieke wat in die transportlaaprotokolle gebruik word.*
- *Bespreek die sessie-, voorstellings- en toepassingslaag van die OSI model in terme van die beginsels en protokolle betrokke. Beskryf weblaaier, DNS en epos implementerings en stel oplossings voor die gegewe scenario's.*
- *Bespreek sekuriteitsgevolge van netwerke in terme van die omgewing, kwesbaarheid en aanvalle asook moontlike beskermingsmeganismes.*
- *Analiseer 'n gegewe scenario en ontwerp en implementer 'n netwerkoplossing om die gegewe probleem op te los.*

Method of delivery: Contact & Distance (PC)/ Contact (VC & MC)
Metode van aflewering: *Kontak & Afstand (PC)/ Kontak (VC & MC)*

Assessment Methods:
Formal Formative
A project will be completed during the semester and there will be a number of reports and class discussions.
There are typically 6 tests to complete during the semester.
Summative
There will be a 3-hour examination at the end of the semester

Assessment Plan
There will be written tests and assignments.
Assesseringsplan
Daar sal geskrewe toetse en opdragte wees.

Module code: CMPG321	Semester 2	NQF Level: 7

Title / *Titel*: **Advanced Databases / *Gevorderde Databasisse***

Module outcomes:

After completion of the module, the student should demonstrate:

Scope of knowledge:

Integrated Knowledge And Coherent Understanding

- integrated knowledge and clear / coherent / logical / critical understanding of, as well as an ability to correctly evaluate and discuss the operation of transactions management, control of concurrent use, management of databases and performance, distributed database management systems, data-warehouses, Big Data analytics and NoSQL, database connectivity and web technologies as well as database administration within the field of Computer Science and Information Systems;
- the ability to reflect on the values, ethical conduct and justifiability of decisions appropriate to the practice of data handling and regulatory compliance.

Practical skill:

Demonstrate advanced practical skill

- advanced ability to effectively use SQL expressions and procedures with a view to apply database administration practically and resolve complex problems within a database environment;
- ability to use data visualization to present data;
- ability to effectively use SQL expressions and procedures to solve advanced problems in the database environment;

Problem identification and problem solving

- the ability to identify, analyse, critically reflect on and address complex problems/issues/challenges related to the database environment./

Module uitkomste:

Na voltooiing van die module, behoort die student die volgende te demonstreer:

Omvang van kennis:

Geïntegreerde kennis en samehangende verstaan

- *geïntegreerde kennis en duidelike en kritiese verstaan van transaksiebestuur, bestuur van gelyktydige gebruik, bestuur van databasisse en werkverrigting, verspreide databasisbestuur, datapakhuise, Groot Data ontledings en NoSQL, databasis konnektiwiteit en web tegnologieë asook databasisadministrasie binne die veld van Rekenaarwetenskap en Inligtingstelsels;*
- *die vermoë om te reflekteer oor waardes, etiese gedrag en die regverdigbaarheid van besluite, gepas tot die hantering van data en in nakoming van beleid en reëls.*

Praktiese vaardigheid:

Demonstreer gevorderde praktiese vaardigheid

- *gevorderde vermoë om effektief gebruik te maak van SQL uitdrukkings en prosedures, met die doel om databasisadministrasie prakties toe te pas en komplekse probleme binne 'n databasisomgewing op te los;*
- *vermoë om data visualisering te gebruik om data voor te stel;*
- *die vermoë om SQL-uitdrukkings en -prosedures effektief te gebruik om gevorderde probleme in die databasisomgewing op te los;*

Method of delivery: Contact & Distance (PC)/ Contact (VC & MC)
Metode van aflewering: *Kontak & Afstand (PC)/ Kontak (VC & MC)*

Assessment Methods:

Formal Formative

There will typically be various practical assignments and theoretical assignments, various contact tests, semester tests and a semester project to complete during the semester.

Summative
There will be a 3-4 hour examination at the end of the semester. Examination may include a practical session.

Assessment Plan
Formative assessments 50%, summative assessment 50% (1:1)
Assesseringsplan
Formatiewe assessering 50%, summatiewe assessering 50% (1:1)

Module code: CMPG322	**Semester 2**	**NQF Level: 7**

Title / *Titel*: **Decision Support Systems II / *Besluitsteunstelsels II***

Module outcomes:
Upon successful completion of the module the students will be able to:
- Identify the problem (or model type) based on a problem specification given;
- Solve given problems in each of the (sub)fields of study by hand and/or by utilizing available software;
- Interpret/explain the solution to the problem (as for management);
- Construc/develop a DSS based on a given Case Study (Project).

Indicative content/Areas of study/Subfields:
- Decision-making theory and
- Decision trees
- Forecasting models
- Inventory control problems
- Project management problems
- Waiting lines and queiuing theory models
- Simulation models
- Markov-analysis problems

Constructing a Decision Support System. /

Module uitkomste:
Na die suksesvolle voltooiing van die module sal die student in staat wees om:
- *Die probleem (of model tipe) te identifiseer volgens die probleem spesifikasie wat gegee is;*
- *Die gegewe probleem in elk van die subvelde van die studie met die hand of deur middle van beskikbare sagteware op te los;*
- *Die oplossing van die probleem te kan interreteer/verduidelik asof vir bestuur;*
- *'n BOS te ontwikkel volgens 'n gegewe gevallestudie (Projek).*

Aangeduide inhoud/Onderwerpe van studie/Subvelde:
- *Besluitnemingsteorie en*
- *Besluitnemingsbome*
- *Voorspellingsmodelle*
- *Voorraadbeheermodelle*
- *Projekbestuurprobleme*
- *Wagtoue en toustaanteoriemodelle*
- *Simulasiemodelle*
- *Markov-analise problem*

Ontwikkel van 'n Besluitsteunstelsel.

Method of delivery: Contact & Distance (PC)/ Contact (VC)
Metode van aflewering: *Kontak & Afstand (PC)/ Kontak (VC)*

Assessment modes:
Formal Formative: This module will be presented using lectures in class and practical sessions in the lab (with homework) and further be supported by applicable material. There will be 3x tests during the semester.
Summative: There will be a 3-hour examination at the end of the semester.

Assesseringsmetodes:

Formeel formatief: *Hierdie module word aangebied dmv lesings in klas en praktiese sessies in die laboratorium (met tuiswerk) en verder ondersteun deur toepaslike material.Daar sal 3 toetse gedurende die semester wees.*

Summatief: Daar sal 'n 3-uur eksamen aan die einde van die semester wees.

Module code: CMPG323	**Semester 2**	**NQF Level: 7**

Title / *Titel* : **IT Developments / *IT-Ontwikkelings***

Module outcomes:

After the successful completion of this module, the student must be able to demonstrate;

- Intergrated knowledge and clear understanding of, as well as an ability to correctly evaluate and apply new trending technologies to different areas of specialisation within the field of information technology,
- Coherent understanding of the different ways of implementing new and trending technologies in the field of information technology,
- The implementation of an appropriate software choice for a specific problem scope and to evaluate the effectiveness of the implementation,
- Advanced ability to effectively implement all practical skills acquired during the course of the degree with a view to prepare the student for industry,
- Access, analyse and evaluate current research on new and trending technologies and offer conclusions within a given context in the field of information technology,
- The ability to identify, analyse, critically reflect on and address complex problems related to project development with theory-driven arguments in the form of project documentation,
- The ability to reflect on the values, ethical conduct and justifiability of decisions appropriate to the practice of software development,
- Ability to communicate effectively in a variety of formats (oral, written, visual and electronic) to diverse audiences and for various purposes such as dedemonstratingrojects,
- Critical analysis of alternative approaches to software development and the ability to offer value-driven and logical arguments for considered decisions,
- Ability to be self-directed and lifelong learners, who are able to work independently, utilise resources effectively, and exercise initiative,
- Ability to interact and collaborate effectively with others, and to work as part of a team, in diverse social, cultural and linguistic contexts./

Module uitkomste:

Na die suksevolle afhandeling van hierdie module moet die student in staat wees om:

- *Geïntegreerde kennis en duidelike begrip van, sowel as die vermoë om nuwe neigingstegnologieë korrek te evalueer en toe te pas in verskillende spesialisrigtings binne die veld van inligtingstegnologie,*
- *Samehangende begrip van die verskillende manier om nuwe en toekomstige tegnologieë op die gebied van inligtingstegnologie te implementer,*
- *Die implementering van 'n toepaslike sagteware keuse vir 'n spesifieke probleem omvang en die doeltreffendheid van die implementering te evalueer,*
- *Gevorderde vermoë om alle praktiese vaardighede wat tydens die verloop van die grad verwerf is effektief te implementer met die oog daarop om die student voor te berei vir die industrie,*
- *Huidige navorsing oor nuwe en niegingstegnologieë te verkry, te analiseer en evalueer en gevolgtrekkings binne 'n gegewe konteks op die gebied van inligtngstegnologie te maak,*
- *Die vermoë om komplekse problem rakende projekontwikkeling te identifiseer, te analiseer, krities daaroor te reflekteer en te bespreek met teoriegedrewe argumente in die vorm van projekdokumentasie,*
- *Om te besin oor die waardes, etiese optrede en regverdigheid van besluite wat toepaslik is vir die praktyk van sagteware-ontwikkeling,*

- *Effektief te kommunikeer in verskillende formate (mondeling, skriftelik, visueel en elektronies) vir uiteenlopende gehore en vir verskeie doeleindes soos projekte,*
- *Kritiese analise van alternatiewe benaderings tot sagteware-ontwikkeling te identifiseer met die vermoë om waardegedrewe en logiese argumente vir oorweegde besluite aan te bied,*
- *Selfgerigte en lewenslange leerders te wees, wat onafhanklik kan werk, hulpbronne doeltreffend kan gebruik en inisiatief kan uitoefen,*
- *Effektief met ander saam te werk en om as deel van 'n span te werk, in diverse sosiale, kulturele en taalkundige kontekste.*

Method of delivery: Contact & Distance (PC)/ Contact (VC)
Metode van aflewering: *Kontak & Afstand (PC)/ Kontak (VC)*

Assessment Methods:
Formal Formative
No tests are written.
Four to six projects have to be completed, including reports.
Summative
There is no exam for this module.
The first projects will count towards the participation mark and the last project will be the exam mark.

Assessment Plan
Four to six projects are completed.
Each project covers all learning outcomes.
Practical assessment 50%; Summative assessment 50% (1:1)
Assesseringsplan
Vier tot ses projekte moet voltooi word.
Elke projek dek al die leeruitkomste.
Praktiese assessering 50%; Summatiewe assessering 50% (1: 1)

Module code: CMPG324	Semester 1	NQF Level: 7

Title / *Titel*: **Operating Systems / *Bedryfstelsels***

Module outcomes:

Students have achieved the outcomes if they are able to:

- Describe the functions, layout and core concepts of operating systems;
- Discuss the history of computers and operating systems;
- Describe and compare concepts in operating systems regarding processes and apply different scheduling algorithms;
- Discuss and compare different methods of memory management;
- Describe the concepts and compare various implementations of file systems;
- Describe and compare Input/Output concepts as well as storage media
- Describe deadlock concepts including detection, handling, avoidance and prevention;
- Discuss IT security environment, vulnerabilities and attacks as well as possible protection mechanisms;
- Install and configure an operating system as well as use utility functions.Module uitkomste:/

Module uitkomste:

Studente het die uitkomste bereik as hulle in staat is om:

- *Studente het die uitkomste bereik indien hulle in staat is om:*
- *Die funksies, uitleg en kernkonsepte van bedryfstelsels kan beskryf;*
- *Die geskiedenis van rekenaars en bedryfstelsels kan bespreek;*
- *Die konsepte in bedryfstelsels rakende prosesse kan beskryf en vergelyk en verskillende skeduleringsalgoritmes kan toepas;*
- *Verskillende metodes van geheuebestuur kan bespreek en vergelyk;*
- *Die konsepte betrokke by lêerstelsels kan beskryf en implementerings daarvan kan vergelyk;*
- *Invoer/Afvoer konsepte kan beskryf en vergelyk, asook verskillende stoormedia;*
- *Dooiepuntkonsepte kan beskryf, insluitend opsporing, hantering, vermyding en voorkoming;*
- *IT-sekuriteitomgewing, -kwesbaarhede, en –aanvalle kan bespreek, asook moontlike beskermingsmeganismes;*
- *Installering en opstel van 'n bedryfstelsel kan doen, asook nutsfunksies kan gebruik*

Method of delivery: Contact & Distance (PC)/ Contact (VC & MC)
***Metode van aflewering:** Kontak & Afstand (PC)/ Kontak (VC & MC)*

Assessment modes:

Formal formative: There are typically 6 tests and 6 assignments to complete during the semester.
Summative: There will be a 3-hour examination at the end of the semester.

Assesseringsmetodes:

***Formeel formatief:** Daar sal tipies 6 toetse en 6 opdragte wees om te voltooi gedurende die semester.*
***Summatief:** Daar sal 'n 3-uur eksamen wees aan die einde van die semester.*

Module code: CMPG325	Semester 2	NQF Level: 7

Title / *Titel*: **Computer Networks / *Rekenaarnetwerke***

Module outcomes:

To achieve the outcomes of the module, the students should be able to:

- Discuss the different types of networks as well as their function
- Describe and compare the OSI and TCI/IP reference models as well as the protocols used in these models.
- Discuss the physical layer of the OSI model in terms of the principles and protocols involved as well as the practical implementation.
- Discuss the data link layer of the OSI model in terms of the principles and protocols involved. Describe and compare different techniques used by protocols in this layer.
- Discuss the medium access control sub layer of the OSI model in terms of principles and protocols involved. Describe and compare different implementations used fo these protocols.
- Discuss the network layer of the OSI model in terms of the prinsiples and protocols involved. Compare different techniques used in the transport layer protocols.
- Discuss the session, presentation and application layer of the OSI models in term sof principles and protocols involved. Describe browser, DNS and email implementations and propose solutions for the given scenarios.
- Discuss security implications of networks in terms of the environment, vulnerabilities, attacks and possibole protection mechanisms.
- Analyse a given scenario and then design and implement a network solution to solve given problems./

Module uitkomste:

Studente sal die uitkomste van die module bereik indien hulle die volgende kan doen:

- *Bespreek die verskillende tipes netwerke en hul funksie.*
- *Beskryf en vergelyk die OSI en TCP/IP verwysingsmodelle asook die protokolle wat in die modelle gebruik word.*
- *Bespreek die fisiese-laag van die OSI model in terme van die beginsels en protokolle betrokke asook die praktiese implementering daarvan.*
- *Bespreek die dataverindingslaag van die OSI-model in terme van die beginsels en protokolle betrokke. Beskryf en vergelyk verskillende tegnieke wat deur protokolle in hierdie lag gebruik word.*
- *Bespreek die medium toegangsbeheersublaag van die OSI model in terme van die beginsels en protokolle betrokke. Beskryf en vergelyk verskillende implementerings wat vir hierdie protokolle gebruik word.*
- *Bespreek die netwerklaag van die OSI model in terme van die beginsels en protokolle betrokke. Vergelyk die verskillende tegnieke wat in netwerklaagprotokolle gebruik word.*
- *Bespreek die transportlaag van die OSI model in terme van die beginsles en protokolle betrokke. Vergelyk die verskillende tegnieke wat in die transportlaaprotokolle gebruik word.*
- *Bespreek die sessie-, voorstellings- en toepassingslaag van die OSI model in terme van die beginsels en protokolle betrokke. Beskryf weblaaier, DNS en epos implementerings en stel oplossings voor die gegewe scenario's.*
- *Bespreek sekuriteitsgevolge van netwerke in terme van die omgewing, kwesbaarheid en aanvalle asook moontlike beskermingsmeganismes.*
- *Analiseer 'n gegewe scenario en ontwerp en implementer 'n netwerkoplossing om die gegewe probleem op te los.*

Method of delivery: Contact (VC & MC)
Metode van aflewering: *Kontak (VC & MC)*

Assessment modes:
Formal formative: A project will be completed during the semester and there will be a number of reports and class discussions. There are typically 6 tests to complete during the semester.

Summative: There will be a 3-hour examination at the end of the semester./

Assesseringsmetodes:
Formeel formatief: *'n projek sal voltooi word gedurende die semester en daar sal 'n aantal verlsae en klasdiskoerse wees. Daar is tipies 6 toetse om te voltooi gedurende die semester.*
Summatief: *Daar sal 'n 3-uur eksamen aan die einde van die semester wees.*

NAS.2.7.16 INDIGENOUS KNOWLEDGE

Module code: IKSM111	**Semester 1**	**NQF level:5**
Title: **The Nature and Patterns of Indigenous Knowledge Systems (IKS) and Innovations**		
Module outcomes: Students should be able to: • Demonstrate an understanding of the nature and patterns of African indigenous knowledge systems (IKS) and innovations.		
Method of delivery: Contact and Practical Modes of Teaching: Lectures, audio visuals, Excursions		
Assessment modes: 1 Test (10%) 2 Assignments (20%) 1 Project (20%) 3 Hour exam (50%).		
Module code: IKSM112	**Semester 1**	**NQF level:5**
Title: **African Indigenous Languages and Communication Systems**		
Module outcomes: Students should be able to: • Analyse the impact of indigenous languages and communication systems in addressing the psycho - social and cultural needs of the African society.		
Method of delivery: Contact and Practical Modes of Teaching: Lectures, Audio Visuals, Community Excursions.		
Assessment modes: 1 Test (10%) 2 Assignments (20%) 1 Project (20%) 3 Hour exam (50%).		
Module code: IKSM113	**Semester 1**	**NQF level:5**
Title: **Introduction to Health Care Systems in relation to Indigenous Knowledge Systems (IKS)**		
Module outcomes: Students should be able to: • Define health care system; describe current trends in health care systems; • Explain indigenous health care modalities; • Identify challenges and opportunities of integrating indigenous and modern health care systems; • Analyse health care systems in relation to IKS.		
Method of delivery: Contact and Practical Modes of Teaching: Lectures, Audio Visuals, Community Excursions		
Assessment modes: 1 Test (10%) 2 Assignments (20%) 1 Project (20%) 3 Hour exam (50%).		
Module code: IKSM114	**Semester 1**	**NQF level:5**
Title: **The Role of Indigenous Knowledge Systems in Climate Change**		
Module outcomes: Students should be able to: • Define climate change and explain its causes; • Identify the effects of climate change in various sectors and on sustainable community livelihoods; explain the role of iks in mitigating the effects of climate change..		
Method of delivery: Contact and Practical Modes of Teaching: Lectures, Audio Visuals, Excursions.		
Assessment modes: 1 Test (10%) 2 Assignments (20%) 1 Project (20%) 3 Hour exam (50%).		

Module code: IKSM115	Semester 1	NQF level:5
Title: **Introduction to African Indigenous Life Skills Education**		
Module outcomes: Students should be able to: • To demonstrate knowledge and critical understanding of the concepts and approaches to life skills and counselling from an African indigenous socio - cultural perspective.		
Method of delivery: Contact and Practical Modes of Teaching: Lectures, Audio Visuals, Excursions.		
Assessment modes: 1 Test (10%) 2 Assignments (20%) 1 Project (20%) 3 Hour exam (50%).		
Module code: IKSM121	**Semester 2**	**NQF level:5**
Title: **A Historiography of African Indigenous Science and Technology**		
Module outcomes: Students should be able to: • Demonstrate an understanding of the development of African indigenous science and technology		
Method of delivery: Contact and Practical Modes of Teaching: Lectures, Audio Visuals, Excursions.		
Assessment modes: 1 Test (10%) 2 Assignments (20%) 1 Project (20%) 3 Hour exam (50%).		
Module code: : **IKSM122**	**Semester 2**	**NQF level:5**
Title: **Introduction to Tools of Indigenous Knowledge Management**		
Module outcomes: Students should be able to: • Generate, populate and manage IKS data using ICT tools.		
Method of delivery: Contact and Practical Modes of Teaching: Lectures, Audio Visuals, Excursions.		
Assessment modes: 1 Test (10%) 2 Assignments (20%) 1 Project (20%) 3 Hour exam (50%).		
Module code: : **IKSM123**	**Semester 2**	**NQF level:5**
Title: **The Use and Roles of Signs and Symbols in African Communities**		
Module outcomes: Students should be able to: • Analyze the **u**se and roles of signs and symbols in Indigenous languages and communication systems as they link up with the needs of the different African cultures and societies		
Method of delivery: Contact and Practical Modes of Teaching: Lectures, Audio Visuals, Excursions.		
Assessment modes: 1 Test (10%) 2 Assignments (20%) 1 Project (20%) 3 Hour exam (50%).		
Module code: IKSM124	**Semester 2**	**NQF level:5**
Title: **The Nature and Roles of African Indigenous Health Care Providers**		
Module outcomes: Students should be able to: • Demonstrate an understanding of the nature, roles and the impact of health care providers in African indigenous health care systems; • Explain the impact of African Indigenous Health Care Providers on primary health; • Identify the different African Indigenous Health Care Providers; • Explain the theories of indigenous wellness		
Method of delivery: Contact and Practical Modes of Teaching: Lectures, Audio Visuals, Excursions		
Assessment modes: 1 Test (10%) 2 Assignments (20%) 1 Project (20%) 3 Hour exam (50%).		

Module code: IKSM125	Semester 2	NQF level:5
Title: **African Indigenous Food Security Systems**		
Module outcomes: Students should be able to: • Define food security; • Explain the nature and characteristics of african indigenous food security systems; • Identify the elements and components of the african indigenous food security systems; • Critically analyse case studies of african indigenous food security systems		
Method of delivery: Contact and Practical Modes of Teaching: Lectures, Audio Visuals, Excursions.		
Assessment modes: 1 Test (10%) 2 Assignments (20%) 1 Project (20%) 3 Hour exam (50%).		
Module code: : **IKSM211**	**Semester 1**	**NQF level:6**
Title: **The Rights of Indigenous Peoples**		
Module outcomes: Students should be able to: • Understand the rights and major concerns of indigenous peoples and the national, regional and international legal mechanisms to address them.		
Method of delivery: Contact and Practical Modes of Teaching: Lectures and Audio Visuals.		
Assessment modes: 1 Test (10%) 2 Assignments (20%) 1 Project (20%) 3 Hour exam (50%).		
Module code: IKSM212	**Semester 1**	**NQF level:6**
Title: **African Cultural Astronomy**		
Module outcomes: Students should be able to: • Understand the rights and major concerns of indigenous peoples and the national, regional and international legal mechanisms to address them.		
Method of delivery: Contact and Practical Modes of Teaching: Lectures and Audio Visuals.		
Assessment modes: 1 Test (10%) 2 Assignments (20%) 1 Project (20%) 3 Hour exam (50%).		
Module code: : **IKSM213**	**Semester 1**	**NQF level:6**
Title: **The Nature and Characteristics of African Indigenous Health Care Systems**		
Module outcomes: Students should be able to: • Explain the nature and characteristics of African indigenous health care systems; • Describe the theories behind African indigenous health care systems; • Identify the challenges and prospects of African indigenous health care systems		
Method of delivery: Contact and Practical Modes of Teaching: Lectures and Audio Visuals.		
Assessment modes: 1 Test (10%) 2 Assignments (20%) 1 Project (20%) 3 Hour exam (50%).		
Module code: IKSM214	**Semester 1**	**NQF level:6**
Title: **African Indigenous Knowledge Development and Management**		
Module outcomes: Students should be able to: • Demonstrate an understanding of the nature and characteristics of African indigenous knowledge development and management systems.		
Method of delivery: Contact and Practical Modes of Teaching: Lectures and Audio Visuals.		
Assessment modes: 1 Test (10%) 2 Assignments (20%) 1 Project (20%) 3 Hour exam (50%).		

Module code: IKSM215	Semester 1	NQF level:6
Title: **Implications of Intellectual Property Rights (IPR) on Indigenous Knowledge Systems (IKS) / Traditional Knowledge (TK)**		
Module outcomes: Students should be able to: • Demonstrate an understanding of the nature, characteristics, importance and implications of IPR for IKS / Traditional Knowledge (TK).		
Method of delivery: Contact and Practical Modes of Teaching: Lectures and Audio Visuals.		
Assessment modes: 1 Test (10%) 2 Assignments (20%) 1 Project (20%) 3 Hour exam (50%).		
Module code: IKSM221	**Semester 2**	**NQF level:6**
Title: **African Indigenous Architecture and Design**		
Module outcomes: Students should be able to: • critically interrogate theories and principles on African architectural designs and its contribution to contemporary designs and housing needs.		
Method of delivery: Contact and Practical Modes of Teaching: Lectures and Audio Visuals.		
Assessment modes: 1 Test (10%) 2 Assignments (20%) 1 Project (20%) 3 Hour exam (50%).		
Module code: IKSM222	**Semester 2**	**NQF level:6**
Title: **African Indigenous Approaches to Peace and Conflict Resolution**		
Module outcomes: Students should be able to: • Demonstrate an understanding of the efficacy of African indigenous approaches and institutions for conflict transformation and peace - building for sustainable community livelihood.		
Method of delivery: Contact and Practical Modes of Teaching: Lectures and Audio Visuals.		
Assessment modes: 1 Test (10%) 2 Assignments (20%) 1 Project (20%) 3 Hour exam (50%).		
Module code: IKSM223	**Semester 2**	**NQF level:6**
Title: **Socio - Cultural Protocols associated with African Traditional Medicine and Health Care Systems**		
Module outcomes: Students should be able to: • Demonstrate an understanding of the socio - cultural protocols in African traditional medicine and health care systems; • Explain the international and national legal instruments supporting bio-cultural community protocols		
Method of delivery: Contact and Practical Modes of Teaching: Lectures and Audio Visuals.		
Assessment modes: 1 Test (10%) 2 Assignments (20%) 1 Project (20%) 3 Hour exam (50%).		
Module code: IKSM224	**Semester 2**	**NQF level:6**
Title: **African Indigenous Cultural, Bio - Diversity and Heritage**		
Module outcomes: Students should be able to: • Define African Indigenous Cultural, Bio - Diversity and Heritage; • Explain the concepts and theories associated with African indigenous cultural, bio - diversity and heritage; • Apply concepts and theories associated with African indigenous cultural, bio - diversity and heritage to climate change and globalization issues; • Explain the significance of African indigenous cultural, bio - diversity and heritage for sustainable community livelihood and development with examples.		
Method of delivery: Contact and Practical Modes of Teaching: Lectures and Audio Visuals.		
Assessment modes: 1 Test (10%) 2 Assignments (20%) 1 Project (20%) 3 Hour exam (50%).		

Module code: IKSM225	Semester 2	NQF level:6
Title: **Foundations of African Indigenous Education**		
Module outcomes: Students should be able to: • Demonstrate an understanding of the nature, structure and content of African indigenous education; the impact of colonialism and other forms of imperialism on pre - colonial education and the interfacing of African indigenous and modern forms of education.		
Method of delivery: Contact and Practical Modes of Teaching: Lectures and Audio Visuals.		
Assessment modes: 1 Test (10%) 2 Assignments (20%) 1 Project (20%) 3 Hour exam (50%).		
Module code: IKSM313	**Semester 1**	**NQF level:7**
Title: **Theories of Indigenous Community Innovation Systems and Technologies for Sustainable Livelihood**		
Module outcomes: Students should be able to: • Demonstrate detailed knowledge of the theories, concepts and applications associated with community innovation and technologies.compare and contrast between African community innovation and technologies for sustainable livelihood; • Make a critical evaluation of the role African community innovation and technologies on sustainable livelihood; • Make an analysis of African community innovation and technologies on sustainable livelihood.		
Method of delivery: Contact and Practical Modes of Teaching: Lectures and Audio Visuals.		
Assessment modes: 1 Test (10%) 2 Assignments (20%) 1 Project (20%) 3 Hour exam (50%).		
Module code: IKSM411	**Semester 1**	**NQF level:8**
Title: **Principles of Research**		
Module outcomes: Students should be able to: Demonstrate an understanding and skills of recording and using IKS for promoting sustainable community livelihood in local communities.		
Method of delivery: Contact and Practical Modes of Teaching: Lectures and Audio Visuals.		
Assessment modes: 1 Test (10%) 2 Assignments (20%) 1 Project (20%) 3 Hour exam (50%).		
Module code: IKSM412	**Semester 1**	**NQF level:8**
Title: **Research Methodologies in Indigenous Knowledge Systems (IKS)**		
Module outcomes: Students should be able to: • Explain the differences between Qualitative and Quantitative Research Methods; • Describe the components of Qualitative and Quantitative Research Methods; • Select the appropriate research methods to use in IKS research; • Demonstrate skills of applying the principles of qualitative and quantitative research methods in IKS research; • Select and apply appropriate research method to an IKS research project		
Method of delivery: Contact and Practical Modes of Teaching: Lectures and Audio Visuals.		
Assessment modes: 1 Test (10%) 2 Assignments (20%) 1 Project (20%) 3 Hour exam (50%).		
Module code: IKSM421	**Semester 2**	**NQF level:8**
Title: **Internship and Research Project**		
Module outcomes: Students should be able to: Gain practical experience and skills in their field of IKS specialization; and will be able to write an independent research paper based on the field experience (internship) in their area of specialization.		
Method of delivery: Contact and Practical Modes of Teaching: Lectures and Audio Visuals.		

Assessment modes: 1 Test (10%) 2 Assignments (20%) 1 Project (20%) 3 Hour exam (50%).		
Module code: IKSS311	**Semester 1**	**NQF level:7**
Title: **Introduction to African Ethno - mathematics**		
Module outcomes: Students should be able to: • Demonstrate knowledge and understanding of the African Ethno - mathematics		
Method of delivery: Contact and Practical Modes of Teaching: Lectures and Audio Visuals.		
Assessment modes: 1 Test (10%) 2 Assignments (20%) 1 Project (20%) 3 Hour exam (50%).		
Module code: IKSS312	**Semester 1**	**NQF level:7**
Title: **Comparative African Indigenous and Western Science and Technology Systems**		
Module outcomes: Students should be able to: • Demonstrate a critical and comparative analysis of the development of African indigenous and western science and technology.		
Method of delivery: Contact and Practical Modes of Teaching: Lectures and Audio Visuals.		
Assessment modes: 1 Test (10%) 2 Assignments (20%) 1 Project (20%) 3 Hour exam (50%).		
Module code: IKSS321	**Semester 2**	**NQF level:7**
Title: **African Indigenous Metallurgy 1**		
Module outcomes: Students should be able to: • analyse and apply the scientific and technological processes involved in African indigenous metallurgy for sustainable community livelihood.		
Method of delivery: Contact and Practical Modes of Teaching: Lectures and Audio Visuals.		
Assessment modes: 1 Test (10%) 2 Assignments (20%) 1 Project (20%) 3 Hour exam (50%).		
Module code: IKSS322	**Semester 2**	**NQF level:7**
Title: **African Indigenous Ethno mathematics 11**		
Module outcomes: Students should be able to: • demonstrate critical knowledge and skills of African indigenous Ethno mathematics		
Method of delivery: Contact and Practical Modes of Teaching: Lectures and Audio Visuals.		
Assessment modes: 1 Test (10%) 2 Assignments (20%) 1 Project (20%) 3 Hour exam (50%).		
Module code: IKSS323	**Semester 2**	**NQF level:7**
Title: **Comparative African Indigenous Textile Technologies**		
Module outcomes: Students should be able to: • Acquire critical knowledge and skills of the scientific and technological processes involved in African indigenous textile technologies		
Method of delivery: Contact and Practical Modes of Teaching: Lectures and Audio Visuals.		
Assessment modes: 1 Test (10%) 2 Assignments (20%) 1 Project (20%) 3 Hour exam (50%).		
Module code: IKSS324	**Semester 2**	**NQF level:7**
Title: **Indigenous Knowledge and Renewable Energy Sources for Sustainable Livelihood**		
Module outcomes: Students should be able to: • Demonstrate a critical knowledge and understanding of the relationship between indigenous knowledge systems (IKS), community - based renewable energy sources and sustainable development and livelihood in African local communities.		
Method of delivery: Contact and Practical Modes of Teaching: Lectures and Audio Visuals.		
Assessment modes: 1 Test (10%) 2 Assignments (20%) 1 Project (20%) 3 Hour exam (50%).		

Module code: IKSS413	Semester 1	NQF level:8
Title: **African Indigenous Metallurgy II**		
Module outcomes: Students should be able to: Analyse and apply the scientific and technological processes involved in African Indigenous metallurgy for sustainable community livelihood.		
Method of delivery: Contact and Practical Modes of Teaching: Lectures and Audio Visuals.		
Assessment modes: 1 Test (10%) 2 Assignments (20%) 1 Project (20%) 3 Hour exam (50%).		
Module code: IKSA311	**Semester 1**	**NQF level:7**
Title: **Impact of Climate Change on African Indigenous Food Security Systems**		
Module outcomes: Students should be able to: • Demonstrate knowledge and understanding of the theories and applications on the causes (natural and human) of climate change within the context of indigenous agriculture; • Demonstrate an understanding of the effects of climate change on sustainable indigenous community livelihoods; • Make a critical evaluation of the impact of climate change on african indigenous food security systems; • Make an evaluation the role of indigenous knowledge and systems in mitigating against the effects of climate change.		
Method of delivery: Contact and Practical Modes of Teaching: Lectures and Audio Visuals.		
Assessment modes: 1 Test (10%) 2 Assignments (20%) 1 Project (20%) 3 Hour exam (50%).		
Module code: IKSA321	**Semester 2**	**NQF level:7**
Title: **African Indigenous Agriculture and Sustainable Community Livelihood and Development in Southern Africa**		
Module outcomes: Students should be able to: • Demonstrate an understanding of the role of African indigenous agriculture for sustainable community livelihoods in Southern Africa; • Display detailed knowledge on the types and elements of African indigenous agriculture and their contribution to sustainability; • Comprehend the role of African indigenous agriculture in community development in Southern Africa; • Demonstrate a critical understanding of the challenges and prospects of indigenous agriculture for community livelihoods and development in the Southern African region.		
Method of delivery: Contact and Practical Modes of Teaching: Lectures and Audio Visuals.		
Assessment modes: 1 Test (10%) 2 Assignments (20%) 1 Project (20%) 3 Hour exam (50%).		
Module code: IKSA322	**Semester 2**	**NQF level:7**
Title: **Comparative African Indigenous Cultural, Bio - diversity and Heritage**		
Module outcomes: Students should be able to: • Compare and contrast African indigenous and Western cultural, biodiversity and heritage; • Demonstrate detailed knowledge and understanding of the concepts and theories associated with African indigenous cultural, biodiversity and heritage; • Make a critical evaluation of African indigenous cultural, bio-diversity and heritage; • Understand the relationships between African indigenous cultural, biodiversity and heritage.		
Method of delivery: Contact and Practical Modes of Teaching: Lectures and Audio Visuals.		
Assessment modes: 1 Test (10%) 2 Assignments (20%) 1 Project (20%) 3 Hour exam (50%).		

Module code: IKSA323	Semester 2	NQF level:7
Title: **Comparative African Indigenous and Western Food Security Systems**		
Module outcomes: Students should be able to: • Compare and contrast African indigenous and western food security systems; • Demonstrate detailed knowledge of the components of African indigenous and western food security systems and their role in sustainable community livelihoods. • Evaluate the challenges and prospects of African indigenous and western food security systems.		
Method of delivery: Contact and Practical Modes of Teaching: Lectures and Audio Visuals.		
Assessment modes: 1 Test (10%) 2 Assignments (20%) 1 Project (20%) 3 Hour exam (50%).		
Module code: IKSC311	**Semester 1**	**NQF level:7**
Title: **Comparative Western and African Indigenous Life Skills Education**		
Module outcomes: Students should be able to: • Demonstrate detailed knowledge of the theories and application of western and African indigenous life skills education; • Make a critical evaluation of the socio - cultural context of western and African indigenous life skills education; • Compare and contrast western and African life skills education.		
Method of delivery: Contact and Practical Modes of teaching: Lectures and Audio Visuals.		
Assessment modes: 1 Test (10%) 2 Assignments (20%) 1 Project (20%) 3 Hour exam (50%).		
Module code: IKSC312	**Semester 1**	**NQF level:7**
Title: **Comparative African Indigenous and Western Peace and Conflict Resolution Approaches**		
Module outcomes: Students should be able to: • Demonstrate detailed knowledge of indigenous and western peace and conflict resolution approaches; • Make an application of theories of indigenous and western peace and conflict resolution approaches; • Compare and contrast between indigenous and western peace and conflict resolution approaches; • Display a critical knowledge of indigenous and western peace and conflict resolution approaches.		
Method of delivery: Contact and Practical Modes of Teaching: Lectures and Audio Visuals.		
Assessment modes: 1 Test (10%) 2 Assignments (20%) 1 Project (20%) 3 Hour exam (50%).		
Module code: IKSC321	**Semester 2**	**NQF level:7**
Title: **African Traditional Governance and Democracy**		
Module outcomes: Students should be able to: • Demonstrate detailed knowledge and understanding of the nature and characteristics of African traditional authority; • Make an application of the theories and practices of African traditional authorities in the promotion of democracy and socio – economic development in local communities; • Demonstrate detailed understanding of the role of African traditional authorities in the promotion of democracy and socio – economic development in local communities; Compare and contrast African traditional governance and western governance.		
Method of delivery: Contact and Practical Modes of Teaching: Lectures and Audio Visuals.		
Assessment modes: 1 Test (10%) 2 Assignments (20%) 1 Project (20%) 3 Hour exam (50%).		

Module code: IKSC322	Semester 2	NQF level:7
Title: **African Indigenous Music and Dance**		
Module outcomes: Students should be able to: • Demonstrate an in-depth understanding and knowledge of the nature, characteristics, principles and practices of different African indigenous music and dances; • Make an application of the theories and concepts of different African indigenous music and dances; Compare and contrast African indigenous music and dances from different African cultures		
Method of delivery: Contact and Practical Modes of Teaching: Lectures and Audio Visuals.		
Assessment modes: 1 Test (10%) 2 Assignments (20%) 1 Project (20%) 3 Hour exam (50%).		
Module code: IKSC323	**Semester 2**	**NQF level:7**
Title: **Gender in African Indigenous Arts and Culture**		
Module outcomes: Students should be able to: • Demonstrate detailed knowledge of African indigenous arts and culture; • Make an application of the theories and concepts of gender in African indigenous arts and cultural issues; Understand the role of gender in African indigenous arts and cultural issues.		
Method of delivery: Contact and Practical Modes of Teaching: Lectures and Audio Visuals.		
Assessment modes: 1 Test (10%) 2 Assignments (20%) 1 Project (20%) 3 Hour exam (50%).		
Module code: IKSH311	**Semester 1**	**NQF level:7**
Title: **Comparative Health Care Systems**		
Module outcomes: Students should be able to: • Demonstrate an understanding of the theories of different health care systems of the world; • Make an application of theories of health care systems to the southern african region; • Compare and contrast different health care systems in the world; • Make an evaluation of the nature, characteristics and limitations of the different health care systems of the world		
Method of delivery: Contact and Practical Modes of Teaching: Lectures and Audio Visuals.		
Assessment modes: 1 Test (10%) 2 Assignments (20%) 1 Project (20%) 3 Hour exam (50%).		
Module code: IKSH312	**Semester 1**	**NQF level:7**
Title: **African Indigenous Medicinal and Nutritional Significance of Living Organisms**		
Module outcomes: Students should be able to: • Demonstrate and understanding of the significance of living organisms as medicine and food; • Make an evaluation of the extent of interdependence between human beings and other living organisms from an indigenous knowledge systems health care perspective; • Make a critical analysis of the medicinal and nutritional significance of african indigenous living organisms.		
Method of delivery: Contact and Practical Modes of Teaching: Lectures and Audio Visuals.		
Assessment modes: 1 Test (10%) 2 Assignments (20%) 1 Project (20%) 3 Hour exam (50%).		

Module code: IKSH314	Semester 1	NQF level:7
Title: **Gender in African Indigenous Health Care Systems**		
Module outcomes: Students should be able to: • Demonstrate an understanding of the role of gender in African Indigenous Health Care Systems; • Make a critical analysis of the role of gender in African indigenous health care systems; • Make an evaluation on the relationship between gender, culture and science and technology with regards to African Indigenous Health Care Systems.		
Method of delivery: Contact and Practical Modes of teaching: Lectures and Audio Visuals.		
Assessment modes: 1 Test (10%) 2 Assignments (20%) 1 Project (20%) 3 Hour exam (50%).		
Module code: IKSH321	**Semester 2**	**NQF level:7**
Title: **The Nature and Role of African Indigenous Health Care Providers**		
Module outcomes: Students should be able to: • Demonstrate an understanding of the categories and roles of African indigenous health care providers; • Demonstrate detailed knowledge of the theories, challenges and prospects of African indigenous health care providers in the primary health realm; • Make an analysis of the practices of African indigenous health care providers; • Make an evaluation of the application of standard protocols by African indigenous health care providers.		
Method of delivery: Contact and Practical Modes of Teaching: Lectures and Audio Visuals.		
Assessment modes: 1 Test (10%) 2 Assignments (20%) 1 Project (20%) 3 Hour exam (50%).		
Module code: IKSH322	**Semester 2**	**NQF level:7**
Title:**African Indigenous Knowledge (IK) and Innovation Systems in Public Health Care I**		
Module outcomes: Students should be able to: • Display detailed knowledge of the research, innovation and technologies in African public health; demonstrate understanding of the benefits of IK innovations in public health; • Make a critical analysis of the role of policy and institutions in promoting African indigenous knowledge (IK) and innovation systems in public health care; • Make an evaluation of the challenges and opportunities of African Indigenous Knowledge (IK) and Innovation Systems in Public Health Care.		
Method of delivery: Contact and Practical Modes of Teaching: Lectures and Audio Visuals.		
Assessment modes: 1 Test (10%) 2 Assignments (20%) 1 Project (20%) 3 Hour exam (50%).		
Module code: IKSH323	**Semester 2**	**NQF level:7**
Title: **African Traditional Medicine and Health Care Systems I**		
Module outcomes: Students should be able to: • Demonstrate understanding of the history of African Traditional Medicine and Health Care Systems; • Compare and contrast between African Traditional and western health care systems; • Make a critical analysis on the challenges experienced by African Traditional Medicine Practitioners		
Method of delivery: Contact and Practical Modes of Teaching: Lectures and Audio Visuals.		
Assessment modes: 1 Test (10%) 2 Assignments (20%) 1 Project (20%) 3 Hour exam (50%).		

Module code: IKSH411	Semester 1	NQF level:8
Title: **African Traditional Medicine and Health Care Systems II**		
Module outcomes: Students should be able to: • Demonstrate detailed knowledge of African traditional medical systems for sustainable community livelihood; • Display detailed knowledge of theories, concepts and practices of African traditional medical systems; • Make an evaluation of the role of African traditional medical systems on sustainable livelihood.		
Method of delivery: Contact and Practical Modes of Teaching: Lectures and Audio Visuals.		
Assessment modes: 1 Test (10%) 2 Assignments (20%) 1 Project (20%) 3 Hour exam (50%).		
Module code: WVCS221	**Semester 2**	**NQF level:6**
Title: **Understanding the Cultural World**		
Module outcomes: (Not received)		
Method of delivery: Contact and Practical Modes of Teaching: Lectures and Audio Visuals.		
Assessment modes: 1 Test (10%) 2 Assignments (20%) 1 Project (20%) 3 Hour exam (50%).		
Module code: WVCS315	**Semester 1**	**NQF level:7**
Title: **Man and Society**		
Module outcomes: Students should be able to: • Have a solid and systematic knowledge of the most important foundational issues in the field of IKS and demonstrate a critical understanding of the meta-theoretical assumptions underscoring foundational issues; • Demonstrate knowledge and a critical understanding of specific forms of ethics that apply to the field of IKS , such as a personalized code of conduct or the general human rights charter, and be able to apply such forms of ethics discriminately to analyse, evaluate and pose possible solutions to some current themes or issues salient to the field of IKS; • Demonstrate the ability to analyse, synthesize and critique the assumptions on which a chosen theme or issue are based, formulate a personal opinion about the theme or issue that gives evidence of an own coherent world view, and communicate the findings in a presentation making use of applicable technology, as well as in a proof-based report written in a typically academic format		
Method of delivery: Contact and Practical Modes of Teaching: Lectures and Audio Visuals.		
Assessment modes: 1 Test (10%) 2 Assignments (20%) 1 Project (20%) 3 Hour exam (50%).		

NAS.2.7.17 Microbiology / *Mikrobiologie*

Module code: MKBN121	Semester 2	NQF Level: 5
Title / *Titel*: **Introductory Microbiology for Nursing / *Mikrobiologie vir Verpleegkunde***		
Module outcomes: After completion of the module, the student should be able to: • Demonstrate knowledge of microbiology and its relation to health sciences; • Apply knowledge of infectious diseases, infection control and related procedures within the health sciences context; • Demonstrate and apply specific microbiology laboratory techniques; • Exhibit skills in elementary research techniques, group work, report writing and problem solving through case studies; • Uphold strict ethical principles in all situations and show respect for life without exception.		

***Module uitkomste*:**
Na voltooiing van die module moet die student in staat wees om:

- *Kennis van mikrobiologie en die verwantskap daarvan met gesondheidswetenskappe te kan demonstreer.*
- *Kennis van infektiewe siektetoestande, beheer van infeksies en verwante prosedures binne die konteks van gesondheidsorg toe te kan pas.*
- *Spesifieke mikrobiologiese laboratoriumtegnieke wat relevant is tot gesondheidswetenskappe te demonstreer en toe te pas.*
- *Vaardighede wat betref elementêre navorsingstegnieke, groepwerk, skryf van verslae en probleemoplossing deur middel van gevallestudies te kan toon.Streng etiese beginsels in alle omstandighede te kan handhaaf en deurgaans respek vir lewe te kan toon.*

Method of delivery: Full Time
Metode van aflewering: *Voltyds*

Assessment plan:
Formative Assessment:
2 x Assignments:
Students will be given relevant assignments both during contact sessions and on eFundi.
1 x Semester test:
This is a comprehensive evaluation opportunity that occurs in April. The test forms an integral part of the participation mark. It contributes 25% to the module mark.
Practical tests:
Practical sessions may include tests to prepare students, as well as reports regarding every practical session
Preparatory tests will be written during the initial 15 minutes of each practical session. Evaluation thereof will be aimed at evaluation of your mastery and understanding of the practical session.
Practical assignments must be submitted weekly prior to the start of the next practical session.
Summative assessment:
1 x Examination paper of 3 hours
Informal assessment:
Continual assessment consisting of questions as well as short class tests during contact sessions

***Assesseringsplan*:**
Formatiewe assessering:
3 x Klastoetse / 3x class tests
Vind plaas tydens die eerste 20 minute van vasgestelde kontaksessies. Hierdie evaluasie-geleentheid is om te toets of die terme/konsepte/begrippe wat die pas afgelope leergedeelte bespreek is deur die leerder verstaan word. Dit bied ook geleentheid om, indien nodig, remediëring te doen.
2x Werksopdragte
Relevante opdragte sal tydens kontaksessies gegee word, asook op eFundi geplaas word.
1x Semestertoets
Dit is 'n omvattende evalueringsgeleentheid wat tydens April plaasvind. Hierdie is 'n integrale deel van die deelnamepunt en dra 25% by tot die modulepunt.
Praktiese toetse:
Praktiese sessies insluitend voorbereidingstoetse en verslae vir elke prakties
Voorbereidingstoetse sal plaasvind tydens die eerste 15 minute van die praktikumperiode. Die evaluasie sal daarop gerig wees om jou bemeestering en begrip van die praktikum te evalueer.
Praktiese werkstukke word weekliks voor die aanvang van die volgende praktikum ingehandig.
Summatiewe assessering:
1 x Eksamenvraestel van 3 ure
Informele assessering:
Deurlopende assessering met vrae en kort klastoetsies tydens kontaksessies

Assessment criteria:

Students have achieved the outcomes when they:

- Have at their disposal adequate knowledge regarding microbiology to successfully answer questions during the assessment while displaying the required insight as well;
- Have managed to complete the theoretic assignments successfully;
- Can execute laboratory techniques and report back in this regard;
- Can complete practical assignments successfully in group or individual context; and
- Can argue responsibly while responding to questions during assessment sessions./

Assesseringskriteria:

Die student bewys dat die uitkomste bereik is indien hy/sy:

- *oor voldoende kennis van mikrobiologie beskik om vrae tydens die assessering suksesvol en met die nodige insig te beantwoord.*
- *teoretiese opdragte suksesvol voltooi het.*
- *basiese mikrobiologiese laboratorium-tegnieke kan uitvoer en verslag daaroor kan doen.*
- *praktiese opdragte suksesvol in groepsverband of individueel voltooi.*
- *eties verantwoordbaar redeneer en vrae tydens assesserings-geleenthede dienooreenkomstig beantwoord.*

Module code: MKBN211	**Semester 1**	**NQF Level: 6**

Title / *Titel*: **Introductory Microbiology / *Inleidende Mikrobiologie***

Module outcomes:

Students should be able to:

- Demonstrate detailed knowledge of development, scope and contribution of Microbiology as a discipline; basic concepts in Microbiology and characteristics of different types of microorganisms;
- Demonstrate an understanding of and ability to apply and demonstrate basic practical skills in the laboratory that are associated with Microbiology;
- Identify, evaluate and solve problems in unfamiliar contexts by gathering evidence and applying solutions based on evidence and procedures appropriate to Microbiology;
- Communicate complex information reliably and coherently using appropriate academic formats relevant to the field of Microbiology;
- Demonstrate an ability to evaluate performance against given criteria and identify and address own task-specific learning needs;
- Work effectively in a group and to take responsibility for own decisions and actions as well as those of group members in a defined context, including the ethical use of resources./

Module uitkomste:

Studente moet in staat wees om

- *Gedetailleerde kennis te demonstreer van die ontwikkeling, omvang en bydrae van Mikrobiologie as 'n dissipline; basiese konsepte in Mikrobiologie en eienskappe van verskillende tipes mikroörganismes;*
- *Basiese praktiese vaardighede wat geassosieer word met Mikrobiologie te kan uitvoer en demonstreer in die laboratorium en 'n begrip daarvan te toon;*
- *Probleme in onbekende kontekste te kan identifiseer, evalueer en oplos deur bewyse te versamel en oplossings toe te pas gebaseer op bewyse en prosedures wat toepaslik is in Mikrobiologie;*
- *Komplekse inligting betroubaar en samehangend te kan oordra deur gebruik te maak van gepaste akademiese formate wat relevant is tot die veld van Mikrobiologie;*
- *Die vermoë te demonstreer om prestasie teen gegewe kriteria te evalueer en eie taak-spesifieke leerbehoeftes te identifiseer en aan te spreek;*
- *Effektief te werk in 'n groep en om verantwoordelikheid te neem vir eie besluite en aksies sowel as die van groeplede in 'n gedefinieerde konteks, insluitend die etiese gebruik van bronne.*

Method of delivery: Full Time
Metode van aflewering: *Voltyds*

Assessment modes:
Assesseringsmetodes:

Module code: MKBS221	**Semester 2**	**NQF Level: 6**

Title / *Titel*: **Introductory Microbial Genetics, Virology and Immunology / *Inleidende Mikrobiese Genetika, Virologie en Immunologie***

Module outcomes:
Students should be able to:

- Demonstrate knowledge and informed understanding of key concepts relevant to microbial genetics, virology and immunology;
- Select and effectively apply the basic standard procedures and laboratory techniques relevant to the field of molecular biology and genetics.
- Identify, analyse and solve problems in the field of microbial genetics, virology and immunology in unfamiliar contexts.
- Communicate complex information reliably and coherently using appropriate academic formats relevant to the field of microbiology.
- Demonstrate an ability to evaluate performance against given criteria and identify and address own task-specific learning needs.
- Work effectively in a group and to take responsibility for own decisions and actions as well as those of group members in a defined context, including the ethical use of resources./

Module uitkomste:
Studente moet in staat wees om

- Kennis en duidelike begrip te toon van die sleutelkonsepte relevant tot mikrobiese genetika, virologie en immunologie;
- Die basiese standaardprosedures en laboratoriumtegnieke wat relevant is tot die veld van molekulêre biologie en genetika kan selekteer en effektief toepas;
- Probleme in die veld van mikrobiese genetika, virologie en immunologie in onbekende kontekste te identifiseer, analiseer en oplos;
- Komplekse inligting betroubaar en sinvol te kan kommunikeer deur gebruik te maak van gepaste akademiese formaat in die veld van mikrobiologie;
- Die vermoë te demonstreer om eie vordering en prestasie te kan meet teen gegewe kriteria en om self taak-spesifieke leerbehoeftes aan te spreek;
- Effektief te kan werk in 'n groep en verantwoordelikheid neem vir eie besluite en aksies sowel as die van groeplede in 'n gedefiniëerde konteks, insluitend die etiese gebruik van bronne.

Method of delivery: Full Time
Metode van aflewering: *Voltyds*

Assessment modes:
Class tests, practical tests, assignments in groups or individually.
Semster tests.
Exam at the end of the semester.
Assesseringsmetodes:
Klastoetse, praktiese toetse, opdragte in groepe of individueel.
Semestertoets.
Eksamen aan die einde van die semester.

Module code: MKBS313	**Semester 1**	**NQF Level: 7**

Title / *Titel*: **Microbial Physiology / *Mikrobiese Fisiologie***

Module outcomes:
At the end of the module the student should be able to:

- Demonstrate an integrated knowledge and clear understanding of the diversity of microbial physiology (metabolism) and the impacts and applications thereof.

- Be able to implement appropriate methods and procedures to apply principles from microbial physiology (metabolism) to characterise, identify and study microorganisms.
- Demonstrate an advanced ability to effectively identify and analyse complex problems, use practical skills mastered in the module and apply principles of microbial physiology (metabolism) to support evidence-based solutions and theory-driven arguments.
- Obtain, manage and process information gathered from literature or through experimentation. This includes being able to independently validate the reliability of information or data. Students should also be able to communicate information and research findings in well-formulated arguments in written and oral reports.
- Interpret and manage tasks related to microbial physiology (metabolism). This include monitoring the progress of teams and taking responsibility for task outcomes.
- Effectively identify, evaluate and address his/her learning needs in a self-directed manner, and to facilitate collaborative learning processes.
- Demonstrate the ability to take full responsibility for his or her work, including acting professionally and ethically when working with microorganisms, always maintaining an awareness of public and/or environmental safety./

***Module uitkomste*:**

Aan die einde van die module moet die student in staat wees om:

- *'n Geïntegreerde kennis en duidelike begrip van die diversiteit van mikrobiese fisiologie (metabolisme) asook die impakte en toepassings daarvan kan demonstreer.*
- *In staat wees om gepaste metodes en prosedures te implementeer om beginsels vanuit mikrobiese fisiologie (metabolisme) toe te pas om mikroörganismes te karakteriseer, identifiseer en bestudeer.*
- *Gevorderde vaardighede te demonstreer om effektief komplekse probleme te identifiseer en te analiseer; deur praktiese vaardighede wat bemeester is in hierdie module en toepassing van die beginsels van mikrobiese fisiologie (metabolisme), bewys-gebaseerde en teorie-gedrewe argumente te ondersteun.*
- *Inligting te verkry, hanteer en te verwerk vanaf literatuur of eksperimentele werk. Dit sluit in die vermoë om die inligting en bevindinge te kan kommunikeer as goed geformuleerde stelling in geskrewe of mondelinge verslae.*
- *Take met betrekking tot mikrobiese fisiologie (metabolisme) te kan interpreteer en te bestuur. Dit sluit in die monitering van die vordering van groepe en om verantwoordelikheid te neem vir die taak se uitkomstes.*
- *Effektief sy/haar leerbehoeftes kan identifiseer, evalueer en aanspreek op 'n self-gedrewe wyse om gesamentlike leerprosesse te fasiliteer.*
- *Die vermoë demonsteer om volle verantwoordelikheid te neem vir sy of haar werk, insluitend professionele en etiese gedrag wanneer daar met mikroörganismes gewerk word, terselfdertyd ook bewustheid handhaaf vir publieke- en/of omgewingsveiligheid.*

Method of delivery: Full Time
Metode van aflewering: *Voltyds*

Assessment modes:
Class tests, practical tests, assignments in groups or individually.
Semster tests.
Exam at the end of the semester.
Assesseringsmetodes:
Klastoetse, praktiese toetse, opdragte in groepe of individueel.
Semestertoets.
Eksamen aan die einde van die semester.

Module code: MKBS314	**Semester 1**	**NQF Level: 7**

Title / *Titel:* **Recombinant DNA Technology and Industrial Microbiology / *Rekombinante DNA Tegnologie en Industriële Mikrobiologie***

Module outcomes:
Students should be able to:

- Demonstrate an integrated knowledge and clear understanding of recombinant DNA technology and industrial microbiology as well as the impacts and applications thereof in society;
- Be able to implement appropriate methods and procedures to (i) apply principles from recombinant DNA technology and industrial microbiology to identify, characterise and study microorganisms used in laboratory and industrial settings; (ii) use methods and national standards to critically describe and evaluate the application of microbiology in water and waste-water treatment processes;
- Demonstrate an advanced ability to effectively identify and analyse complex problems, use practical skills mastered in the module and apply principles of recombinant DNA technology and industrial microbiology to support evidence-based solutions and theory-driven arguments;
- Demonstrate the ability to obtain, manage and process information gathered form literature or through experimentation (this includes being able to independently validate the reliability of information or data and to communicate information and research findings in well-formulated arguments in written and oral reports);
- Interpret and manage tasks related to recombinant DNA technology and industrial microbiology in unfamiliar environments (this includes monitoring the progress of teams and taking responsibility for task outcomes);
- Effectively identify, evaluate and address his/her learning needs in a self-directed manner, and to facilitate collaborative learning processes;
- Demonstrate the ability to take full responsibility for his or her work, including acting professionally and ethically when working with microorganisms, always maintaining an awareness of public and/or environmental safety./

Module uitkomste:
Studente moet in staat wees om

- *'n Geïntegreerde kennis en duidelike begrip van rekombinante DNA tegnologie en industriële mikrobiologie te kan demonstreer asook die impakte en toepassings daarvan in die samelewing;*
- *In staat wees om gepaste metodes en prosedures te implementeer om (i) beginsels vanuit rekombinante DNA tegnologie en industriële mikrobiologie toe te kan pas om mikroörganismes te karakteriseer, identifiseer en bestudeer in die laboratorium en industriële omgewings; (ii) metodes en nasionale standaarde te gebruik om krities die toepassing van mikrobiologie in water en afvalwater prosesse te evalueer;*
- *'n Gevorderde vaardigheid demonstreer om effektief komplekse probleme te identifiseer en te analiseer en dan deur praktiese vaardighede bemeester in hierdie module en deur die beginsels van rekombinante DNA tegnologie en industriële mikrobiologie toe te pas, bewys-gebaseerde en teorie-gedrewe argumente te ondersteun;*

- *Die vermoë demonstreer om inligting te verkry, hanteer en te verwerk vanaf literatuur of eksperimentele werk (dit sluit in die vermoë om die betroubaarheid van die inligting of data te kan beoordeel asook om navorsingsbevindinge te kan kommunikeer as goed geformuleerde stellings in geskrewe of mondelinge verslae);*
- *Take met betrekking tot rekombinante DNA tegnologie en industriële mikrobiologie te kan interpreteer en te kan bestuur (dit sluit in die monitering van die vordering van groepe en om verantwoordelikheid te neem vir die taak se uitkomstes);*
- *Effektief sy/haar leerbehoeftes kan identifiseer, evalueer en aanspreek op 'n self-gedrewe wyse om gesamentlike leerprosesse te fasiliteer;*
- *Die vermoë demonsteer om volle verantwoordelikheid te neem vir sy of haar werk, insluitend professionele en etiese gedrag wanneer daar met mikroörganismes gewerk word, terselfdertyd ook bewustheid handhaaf vir publieke- en/of omgewingsveiligheid.*

Method of delivery: Full Time
Metode van aflewering: *Voltyds*

Assessment modes:
Class tests, practical tests, assignments in groups or individually.
Semster tests.
Exam at the end of the semester.
Assesseringsmetodes:
Klastoetse, praktiese toetse, opdragte in groepe of individueel.
Semestertoets.
Eksamen aan die einde van die semester.

Module code: MKBS316	**Semester 1**	**NQF Level: 7**

Title: **Microbial Ecology**

Module outcomes:
After completion of the module, the student should:

- Demonstrate an integrated knowledge and clear understanding of the key concepts and theories of microbial ecology and the impacts and applications thereof.
- Be able to use appropriate methods and procedures to apply principles from microbial ecology to characterise and study microorganisms in their various environments.
- Demonstrate an advanced ability to effectively identify and analyse complex problems, use practical skills mastered in the module and apply principles of microbial ecology to support evidence-based solutions and theory-driven arguments.
- Obtain, manage and process information gathered from literature or through experimentation. This includes being able to independently validate the reliability of information or data.
  Students should also be able to communicate information and research findings in well-formulated arguments in written and oral reports.
- Interpret and manage tasks related to microbial ecology. This include monitoring the progress of teams and taking responsibility for task outcomes.
- Effectively identify, evaluate and address his/her learning needs in a self-directed manner, and to facilitate collaborative learning processes.
- Demonstrate the ability to take full responsibility for his or her work, including acting professionally and ethically when working with microorganisms, always maintaining an awareness of public and/or environmental safety.

Method of delivery: Full Time

Assessment modes:
Class tests, practical tests, assignments in groups or individually.
Semster tests.
Exam at the end of the semester.

Module code: MKBS317	Semester 1	NQF Level: 7

Title: **Environmental Microbiology and Public Health**

Module outcomes:

After completion of the module, the student should:

- Demonstrate an integrated knowledge and clear understanding of the key concepts and theories of environmental microbes and their impacts on public health.
- Demonstrate an understanding of the major microorganisms responsible for biodeterioration, biodegradation and bioremediation.
- Be able to implement appropriate methods and procedures to apply principles from environmental microbiology to wastewater treatment, purification and sanitary analysis as well as the health impact of improperly treated water.
- Demonstrate an advanced ability to effectively identify and analyse complex problems, use practical skills mastered in the module and apply principles of environmental microbiology and public health to support evidence-based solutions and theory-driven arguments.
- Obtain, manage and process information gathered from literature or through experimentation. This includes being able to independently validate the reliability of information or data. Students should also be able to communicate information and research findings in well-formulated arguments in written and oral reports.
- Interpret and manage tasks related to practical projects in the module. This include monitoring the progress of teams and taking responsibility for task outcomes.
- Effectively identify, evaluate and address his/her learning needs in a self-directed manner, and to facilitate collaborative learning processes.
- Demonstrate the ability to take full responsibility for his or her work, including acting professionally and ethically when working with microorganisms, always maintaining an awareness of public and/or environmental safety.

Method of delivery: Full Time

Assessment modes:

Class tests, practical tests, assignments in groups or individually.
Semster tests.
Exam at the end of the semester.

Module code: MKBS325	Semester 2	NQF Level: 7

Title / *Titel*: **Diversity and Ecology of Microorganisms / *Diversiteit en Ekologie van Mikroörganismes***

Module outcomes:

Students should be able to:

- Demonstrate an integrated knowledge and clear understanding of diversity in the microbial kingdom and explain how this relates to humans and the environment;
- Implement standard methods and procedures to evaluate microbial diversity and to study microbial ecology; use practical skills mastered in the module to determine microbial diversity using taxonomic procedures and to study the effect of the environment on microorganisms;
- Effectively identify and analyse complex problems and apply evidence-based solutions and theory-driven arguments;
- Demonstrate the ability to obtain, manage and process information gathered from literature or through experimentation (this includes being able to independently validate the reliability of information or data;
- Be able to interpret and manage tasks related to microbial diversity and ecology in unfamiliar environments, including monitoring the progress of teams and taking responsibility for task outcomes;
- Effectively identify, evaluate and address his/her learning needs in a self-directed manner, and to facilitate collaborative learning processes;

- Demonstrate the ability to take full responsibility for his or her work, including acting professionally and ethically when working with microorganisms, always maintaining an awareness of public and/or environmental safety./

Module uitkomste:
Studente moet in staat wees om

- *'n Geïntegreerde kennis van mikrobiese diversiteit te kan demonstreer en te kan verduidelik hoe dit op die mens en die omgewing impakteer;*
- *Standaard metodes en prosedures te implementeer om mikrobiese diversiteit te evalueer en om die impak op die omgewing te meet; gebruik te maak van praktiese vaardighede wat in die module bemeester is om mikrobiese diversiteit te bepaal met behulp van taksonomiese prosedures;*
- *Komplekse probleme effektief te identifiseer en te analiseer en bewysgebaseerde oplossings en teoriegedrewe argumente toe te pas;*
- *Die vermoë demonstreer om inligting te versamel uit literatuur en ander bronne, of deur eksperimentering, en om hierdie inligting te analiseer en te verwerk (dit sluit ook in die vermoë om onafhanklik te bevestig of die inligting en data betroubaar is of nie);*
- *In staat wees om take wat verband hou met mikrobiese diversiteit en ekologie in onbekende omgewings te interpreteer en te bestuur, insluitend die monitering van groepwerk en om verantwoordelikheid te aanvaar vir die uitkomste van 'n span se take;*
- *Effektief sy/haar leerbehoeftes kan identifiseer, evalueer en aanspreek op 'n self-gedrewe wyse om gesamentlike leerprosesse te fasiliteer;*
- *Die vermoë demonsteer om volle verantwoordelikheid te neem vir sy of haar werk, insluitend professionele en etiese gedrag wanneer daar met mikroörganismes gewerk word, terselfdertyd ook bewustheid handhaaf vir publieke- en/of omgewingsveiligheid.*

Method of delivery: Full Time
Metode van aflewering: *Voltyds*

Assessment modes:
Class tests, practical tests, assignments in groups or individually.
Semster tests.
Exam at the end of the semester.
Assesseringsmetodes:
Klastoetse, praktiese toetse, opdragte in groepe of individueel.
Semestertoets.
Eksamen aan die einde van die semester.

Module code: MKBS326	**Semester 2**	**NQF Level: 7**

Title: **Industrial Microbiology and Biotechnology**

Module outcomes:
After completion of the module, the student should:

- Demonstrate an integrated knowledge and clear understanding of the key concepts of food preservation and microbial growth.
- Be able to use appropriate methods and procedures to sample and assess microbial contaminants and toxicants in food.
- Demonstrate an advanced ability to effectively identify and analyse complex problems, use practical skills mastered in the module and apply principles of biotechnology to support evidence-based solutions and theory-driven arguments.
- Obtain, manage and process information gathered from literature or through experimentation. This includes being able to independently validate the reliability of information or data. Students should also be able to communicate information and research findings in well-formulated arguments in written and oral reports.
- Interpret and manage tasks related to biotechnology projects in the module. This include monitoring the progress of teams and taking responsibility for task outcomes.

- Effectively identify, evaluate and address his/her learning needs in a self-directed manner, and to facilitate collaborative learning processes.
- Demonstrate the ability to take full responsibility for his or her work, including acting professionally and ethically when working with microorganisms, always maintaining an awareness of public and/or environmental safety.

Method of delivery: Full Time

Assessment modes:
Class tests, practical tests, assignments in groups or individually.
Semster tests.
Exam at the end of the semester.

Module code: MKBS327	**Semester 2**	**NQF Level: 7**

Title: **Virology and Immunology**

Module outcomes:
After completion of the module, the student should:

- Demonstrate an integrated knowledge and clear understanding of the key concepts and theories of virology and immunology and the impacts and applications thereof.
- Be able to use appropriate methods and procedures to apply principles from virology and immunology to characterise and study microorganisms in their various environments.
- Demonstrate an advanced ability to effectively identify and analyse complex problems, use practical skills mastered in the module and apply principles of virology and immunology to support evidence-based solutions and theory-driven arguments.
- Obtain, manage and process information gathered from literature or through experimentation. This includes being able to independently validate the reliability of information or data.
- Students should also be able to communicate information and research findings in well-formulated arguments in written and oral reports.
- Interpret and manage tasks related to projects in the module. This include monitoring the progress of teams and taking responsibility for task outcomes.
- Effectively identify, evaluate and address his/her learning needs in a self-directed manner, and to facilitate collaborative learning processes.
- Demonstrate the ability to take full responsibility for his or her work, including acting professionally and ethically when working with microorganisms, always maintaining an awareness of public and/or environmental safety.

Method of delivery: Full Time

Assessment modes:
Class tests, practical tests, assignments in groups or individually.
Semster tests.
Exam at the end of the semester.

Module code: MKBX213	**Semester 1**	**NQF Level: 6**

Title / *Titel*: **Microbiology for Food and Nutrition / *Mikrobiologie vir Voedsel en Voeding***

Module outcomes:
Students should be able to:

- Demonstrate knowledge concerning microbiological aspects of laboratory techniques, preparation and storage of food and microbiological food safety in a selective way;
- Apply basic laboratory techniques used in microbiological laboratories;
- Demonstrate competency with regard to elementary research techniques, group work, writing of reports and problem solving by means of case studies;
- Maintain strict ethical principles in all circumstances and show respect for life throughout./

Module uitkomste:
Studente moet in staat wees om

- *Kennis met betrekking tot die Mikrobiologiese aspekte van laboratoriumtegnieke, voedselvoorbereiding en -berging, asook die mikrobiologiese veiligheid van voedsel op 'n geselekteerde wyse te demonstreer;*
- *Basiese laboratoriumtegnieke wat in 'n Mikrobiologiese laboratorium gebruik word, toe te pas;*
- *Vaardighede met betrekking tot elementêre navorsings-tegnieke, groepwerk, die skryf van verslae en probleem-oplossing deur middel van gevallestudies te toon;*
- *Streng etiese beginsels in alle omstandighede te handhaaf en deurgaans respek vir lewe te toon.*

Method of delivery: Full Time
Metode van aflewering: *Voltyds*

Assessment modes:
Assesseringsmetodes:

Module code: MKPN111	**Semester 1**	**NQF-level: 5**

Title / *Titel*: **Microbiology for Pharmacy / *Mikrobiologie vir Farmasie***

Module outcomes:
Students should be able to:

- Demonstrate knowledge of microbiology and its relation to pharmaceutical and occupational health sciences;
- Apply knowledge of infectious diseases, infection control and related procedures within the health care context;
- Demonstrate and apply specific microbiology laboratory techniques;
- Exhibit skills in elementary research techniques, group work, report writing and problem solving through case studies;
- Uphold strict ethical principles in all situations and show respect for life without exception./

Module uitkomste:
Studente moet in staat wees om

- Kennis van mikrobiologie en die verband met farmaseutiese en beroepsgesondheid wetenskappe te demonstreer;
- Kennis toe te pas van infektiewe siektes, beheer van infeksie en verwante prosedures binne die gesondheidsorg konteks;
- Spesifieke mikrobiologiese laboratoriumtegnieke te kan demonstreer en toepas;
- Vaardighede te toon in basiese navorsingstegnieke, groepwerk, skryf van verslae en probleemoplossing deur gevallestudies;
- Streng etiese beginsels in alle situasies toe te pas en sonder uitsondering respek te toon vir lewe.

Method of delivery: Full Time
Metode van aflewering: *Voltyds*

Assessment modes:
Assesseringsmetodes:

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Module code: PLKS111 / PLKS171	**Semester 1**	**NQF Level: 5**

Title / *Titel*: **Plant Structure and Function / *Plantstruktuur en –funksie***

Module outcomes:

Students should be able to:

- Demonstrate fundamental knowledge of the relevance of plants to life on earth and how plants are structurally and functionally adapted;
- Select, distinguish and organize standard methods and procedures to identify basic plant structures and their respective functions;
- Access and process information from different sources with a view to compare and summarise scientific information on plant uses;
- Demonstrate coherent understanding of the ethical implications of decisions, actions and practices pertaining to the use of plants;
- Identify and apply acceptable and independent self-study methods and exhibit adherence to rules on plagiarism and copyright principles./

Module uitkomste:

Studente moet in staat wees om

- *Fundamentele kennis van die belang van plante vir lewe of aarde en hoe plante struktureel en funksioneel aangepas is, te demonstreer;*
- *Standaardmetodes en prosedures te selekteer, onderskei en organiseer om basiese plantstrukture en hul onderskeie funksies te kan identifiseer;*
- *Inligting vanuit verskeie bronne te bekom en te prosesseer met die oogmerk om wetenskaplike kennis oor plantgebruike te vergelyk en op te som;*
- *Samehangende begrip van die etiese implikasies van besluite, aksies en praktyke met betrekking tot die gebruike van plante te demonstreer;*
- *Aanvaarbare- en onafhanklike selfstudiemetodes te identifiseer en toe te pas en gehoorsaamheid aan reëls oor plagiaat en kopiereg beginsels te demonstreer.*

Method of delivery: Full Time (Lectures & practicals)
Metode van aflewering: *Voltyds (Lesings en prakties)*

Assessment modes:

Class tests, practical tests, assignments in groups or individually.
Semestertest.
Exam at the end of the semester.

Assesseringsmetodes:

Klastoetse, praktiese toetse, opdragte in groepe of individueel.
Semestertoets.
ksamen aan die einde van semester.

Module code: PLKS122 / PLKS172	Semester 2	NQF Level: 5

Title/ *Titel*: **Biodiversity** / ***Biodiversiteit***

Module outcomes:

After completion of the PLKS122/172 module, the student should demonstrate:

- Knowledge and informed understanding of key terms, principles, concepts, facts, rules and theories used in the field of Biodiversity.
- Basic knowledge and informed understanding of taxonomic principals, including evolution and classification, in order to distinguish and compare different prokaryotic organisms, algae, fungi and plants.
- The ability to apply standard methods, procedures and techniques commonly used in botanical studies to study characteristics of living organisms in order to identify, name, illustrate and classify them.
- The ability to communicate verbally and in writing and gather information reliably and accurately from a range of sources in order to do elemental research in a scientific way by using conventional methods and basic technologies.
- An ability to monitor his/her own learning progress individually and in groups, and implement relevant learning strategies in Biodiversity.
- Ethical and professional behaviour within the academic environment, inclusive of adherence to rules on plagiarism and copyright principles. /

***Module uitkomste*:**

Na voltooiing van die PLKS122/172 module, moet die student die volgende kan demonstreer:

- *Kennis en ingeligte begrip van sleutelterme, beginsels, konsepte, feite, reëls en teorieë wat gebruik word in die veld van Biodiversiteit.*
- *Basiese kennis en ingeligte begrip van taksonomiese beginsels, insluitende evolusie en klassifikasie, om sodoende verskillende prokariotiese organismes, alge, fungi en plante te kan onderskei en met mekaar te kan vergelyk.*
- *Die vermoë om standaard metodes, prosedure en tegnieke wat algemeen in plantkundige studies gebruik word, toe te pas om die eienskappe van lewende organismes te bestudeer ten einde hulle te identifiseer, benaam, illustreer en klassifiseer.*
- *Die vermoë om te kommunikeer, beide verbaal en in geskrewe vorm, asook die vermoë om inligting in te samel op 'n betroubare en akkurate wyse deur gebruik te maak van 'n verskeidenheid bronne om sodoende elementêre navorsing te doen op 'n wetenskaplike manier deur die gebruik van konvensionele metodes en basiese tegnologie.*
- *Die vermoë om sy/haar eie studievordering te monitor, individueel en in groepe, en om relevante leerstrategieë te implementeer in sy /haar studies van Biodiversiteit.*
- *Etiese en professionele gedrag binne die akademiese omgewing, insluitend om hom/haar te onderwerp aan reëls oor plagiaat en kopiereg beginsels.*

Method of delivery: Full Time (Lectures & practicals|)
Metode van aflewering: *Voltyds (Lesings en prakties)*

Assessment modes:
Assessment modes:
Class tests, practical tests, assignments in groups or individually.
Semestertest.
Exam at the end of the semester.

Assesseringsmetodes:
Klastoetse, praktiese toetse, opdragte in groepe of individueel.
Semestertoets.
ksamen aan die einde van semester..

Module code: PLKS211	Semester 2	NQF Level: 6

Title / *Titel* : **Environmental Botany / *Omgewingsplantkunde***

***Module uitkomste*:**

Na voltooiing van die PLKS211 module, moet die student die volgende kan demonstreer:

- *Gedetailleerde kennis van die ekologie van die biosfeer en 'n duidelike begrip van ekosisteemdinamika.*
- *Die vermoë om die mees geskikte metodes en prosedures te evalueer en te selekteer vir die verkryging van bewyse om omgewingsprobleme te kan identifiseer.*
- *Basiese kennis en samehangende begrip van die etiese implikasies van besluite, aksies en praktyke wat die omgewing kan beïnvloed.*
- *Die vermoë om inligting oor 'n dissipline verwante onderwerp rakende omgewingswetgewing en globale verdrae te verkry, te verwerk, aan te bied en te kommunikeer.*
- *Die vermoë om hoofbedreigings van die suider-Afrikaanse flora te herken en moontlike oplossings voor te stel om sulke bedreigings aan te spreek en te versag.*
- *Verantwoordelikheid om leerstrategieë te ontwikkel om professionele ontwikkeling as omgewingsbewuste te onderhou.*
- *Waardering vir die ryk floristiese diversiteit en ekosisteme van Suider-Afrika en 'n verantwoordelikheid om 'n begrip daarvan te ontwikkel.*

Method of delivery: Full Time (Lectures & practicals|)
Metode van aflewering: *Voltyds (Lesings en prakties)*

Assessment modes:

Class tests, practical tests, assignments in groups or individually.
Semestertest.
Exam at the end of the semester.

Assesseringsmetodes:

Klastoetse, praktiese toetse, opdragte in groepe of individueel.
Semestertoets.
ksamen aan die einde van semester.

Module code: PLKS223	Semester 1	NQF Level: 6

Title / *Titel* : **Plant Genomics / *Plantgenomika***

Module outcomes

After completion of the PLKS223 module, the student should demonstrate:

- Have at his or her disposal detailed knowledge of the genomic structure of plant cells, plant gene expression and the regulation thereof.
- Have an understanding of certain recombinant DNA technologies.
- Be able to evaluate and select appropriate molecular methods for conducting investigations in plant physiology, plant systematics or plant ecology.
- Be able to demonstrate limited practical molecular skills, including an understanding of the generation, presentation and interpretation of data, as well as the formulation of theories about data.
- Be able to exhibit sensitivity for the role that values play in biotechnology.
- Be able to evaluate relevant ethical issues in terms of a world view./

***Module uitkomste*:**
Na voltooiing van die PLKS223 module, moet die student die volgende kan demonstreer:

- *Oor breedvoerige kennis van die genomiese struktuur van plantselle, die uitdrukking van plantgene en die regulering daarvan hê.*
- *Begrip van sekere rekombinante DNS-tegnologieë hê.*
- *In staat wees om toepaslike molekulêre metodes vir ondersoek in plantfisiologie of plantsistematiek of plant-ekologie te evalueer en te selekteer.*
- *In staat wees om beperkte praktiese molekulêre vaardighede, met inbegrip van die generering, aanbieding en vertolking van data, asook die vorming van teorieë rondom die data te demonstreer.*
- *In staat wees om sensitiwiteit te toon vir die rol van waardes in biotegnologie.*

In staat wees om tersaaklike aangeleenthede uit die oogpunt van 'n wêreldbeskouing te evalueer

Method of delivery: Full Time (Lectures & practicals|)
Metode van aflewering: *Voltyds (Lesings en prakties)*

Assessment modes:
Class tests, practical tests, assignments in groups or individually.
Semestertest.
Exam at the end of the semester.

Assesseringsmetodes:
Klastoetse, praktiese toetse, opdragte in groepe of individueel.
Semestertoets.
ksamen aan die einde van semester.

Module code: PLKS314	**Semester 1**	**NQF Level: 7**

Title / *Titel*: **Plant Physiology / *Plantfisiologie***

Module outcomes:
After completion of the PLKS314 module, the student should demonstrate:

- Integrate knowledge related to responses of plants to environmental stress and the essential physiological processes of photosynthesis and respiration.
- Evaluate and interpret energy conservation in the processes of photosynthesis and respiration.
- Show a critical understanding and the ability to interrogate multiple sources of environmental stress and their impacts on plants.
- Demonstrate the ability to identify, analyse and reflect on the environmental influences in relation to photosynthesis and respiration.
- Access and evaluate the scientific evidence supporting hypotheses and assumptions related to environmental stress, photosynthesis and respiration.
- Identify, analyse and critically reflect on addressing complex challenges relating to environmental stress, photosynthesis and respiration through an application of evidence based solutions and theory-driven arguments.
- Demonstrate the ability to identify, evaluate and address his or her own learning needs in a self-directed manner and/or facilitated collaborative learning processes./

***Module uitkomste*:**
Na voltooiing van die PLKS314 module, moet die student die volgende kan demonstreer:

- *Integrasie van kennis wat verband hou met die reaksie van plante tot omgewingstres en die belangrike fisiologiese prosesse van fotosintese en respirasie.*
- *Die bewaring van energie in fotosintese en respirasie te evalueer en interpreteer.*
- *Kritiese begrip en die vermoë om verskeie bronne van omgewingsstres en die impak daarvan op plante te beoordeel.*
- *Vermoë om die omgewingsinvloede wat betrekking het met fotosintese en respirasie te identifiseer, ontleed en te besin.*

- *Bekom en evalueer die wetenskaplike bewyse wat hipoteses en aannames ondersteun wat verband hou met omgewingsstres, fotosintese en respirasie.*
- *Identifiseer, ontleed en besin krities oor hoe om komplekse uitdagings met betrekking tot omgewingsstres, fotosintese en respirasie aan te spreek deur middel van 'n toepassing van bewysgebaseerde oplossings en teorie-gedrewe argumente.*
- *Vermoë om sy of haar eie leerbehoeftes op selfgerigte wyse en/of gefasiliteerde samewerkende leerprosesse te identifiseer, evalueer en aan te spreek.*

Method of delivery: Full Time (Lectures & practicals)
Metode van aflewering: *Voltyds (Lesings en prakties)*

Assessment modes:
Class tests, practical tests, assignments in groups or individually.
Semestertest.
Exam at the end of the semester.

Assesseringsmetodes:
Klastoetse, praktiese toetse, opdragte in groepe of individueel.
Semestertoets.
ksamen aan die einde van semester.

Module code: PLKS324	**Semester 2**	**NQF Level: 7**

Title / *Titel*: **Plant Ecology / *Plantekologie***

Module outcomes:
Third year Botany students registered for PLKS324 must attend a compulsory field trip during the first or second semester (that can include weekends and recess time). The report generated from results obtained during the field trip will contribute to the participation mark. No excuses for absence from the field trip will be accepted, except in the event of illness in which case a medical certificate must be presented.

After completion of the PLKS324 module, the student should demonstrate:

- Integrated knowledge and clear understanding of, as well as have the ability to evaluate and apply key terminology, concepts, facts, rules and theories used in the field of basic and applied aquatic and terrestrial ecology.
- The ability to select, evaluate and apply appropriate quantitative and qualitative survey, monitoring and data analysis techniques commonly used in aquatic and terrestrial ecology.
- The ability to analyse and critically reflect on the ecosystem functioning with particular emphasis on interactions between physical, chemical and biological variables.
- The ability to access, analyse and evaluate current scientific methods to be able to conduct focused research and resolve problems within the fields of aquatic and terrestrial ecology.
- The ability to reflect on the values, ethical conduct and justifiability of decisions appropriate to the practice of plant ecology in aquatic and terrestrial ecosystems.
- Full responsibility for his/her own learning needs, monitoring of own learning progress and application of relevant learning strategies and management of all resources to successfully realise all outcomes of this module.
- Accurate and coherent written and verbal communication with understanding of and respect for intellectual property conventions, copyright and rules on plagiarism./

***Module uitkomste*:**
Derdejaar Plantkunde studente wat vir PLKS324 registreer moet 'n verpligte velduitstappie gedurende die eerste of tweede semester (dit kan die naweke asook die reses insluit) bywoon. Die resultate wat verkry word, moet in verslagvorm ingehandig word en dit sal bydra tot die deelnamepunt. Geen verskonings sal aanvaar word nie, behalwe in die geval van siekte in welke geval 'n mediese sertifikaat voorgelê moet word.

Na voltooiing van die PLKS324 module, moet die student die volgende kan demonstreer:

- *Geïntegreerde kennis en duidelike begrip asook die vermoë om sleutelterminologie, -konsepte, -feite, reëls en teorieë in die veld van basiese, asook toegepaste akwatiese en terrestriële ekologie te evalueer en toe te pas.*
- *Die vermoë om geskikte kwantitatiewe en kwalitatiewe opnames, monitering en data analise tegnieke wat algemeen in akwatiese en terrestriële ekologie gebruik word, te selekteer, evalueer en toe te pas.*
- *Die vermoë om die ekologiese werking van ekosisteme, met klem op die interaksies tussen fisiese, chemiese en biologiese veranderlikes, te analiseer en krities daarop te reflekteer.*
- *Die vermoë om toegang te verkry tot hedendaagse wetenskaplike metodes en dit te analiseer en te evalueer om sodoende in staat te wees tot gefokusde navorsing en die oplossing van probleme binne die velde van akwatiese en terrestriële ekologie.*
- *Die vermoë om te reflekteer oor waardes, etiese gedrag en verantwoordbaarheid van besluite wat van toepassing is op Plantekologie in akwatiese en terrestriële ekosisteme.*
- *Volle verantwoordelikheid vir sy/haar eie leerprosesse, die monitering van sy/haar studievordering en die toepassing van relevante leerstrategieë asook die bestuur van alle hulpbronne om sodoende sukses te behaal met die bereiking van alle uitkomste van hierdie module.*
- *Akkurate en samehangende geskrewe en verbale kommunikasie met die begrip van en respek vir intellektuele eiendomswaardes, kopiereg en reëls met betrekking tot plagiaat.*

Method of delivery: Full Time (Lectures & practicals|)
Metode van aflewering: *Voltyds (Lesings en prakties)*

Assessment modes:
Class tests, practical tests, assignments in groups or individually.
Semestertest.
Exam at the end of the semester.

Assesseringsmetodes:
Klastoetse, praktiese toetse, opdragte in groepe of individueel.
Semestertoets.
ksamen aan die einde van semester.

NAS.2.7.19 URBAN AND REGIONAL PLANNING / *STADS- EN STREEKBEPLANNING*

Module code / ***Modulekode:*** **SBES212**	**Semester 1**	**NQF level /** ***NKR vlak:*** **6** **Credits /** ***Krediete*****: 16**

Title/ *Titel*: **Layout Planning /** ***Uitlegbeplanning***

Module outcomes:
Students should be able to:

- Comprise detailed knowledge relating to the different types of layouts, the concepts, approaches and principles applicable thereto and the manner in which it relates to other disciplines;
- Demonstrate a comprehension of what the different sources of cadastral, legal and physical aspects entail and be mindful of the possible impact thereof on the design and planning of a site;
- Acquire and collect the different sources of cadastral, legal and physical data and correctly evaluate, research and select which aspects thereof will affect the planning and design of a terrain;
- Identify, evaluate and solve possible problems relating to the planning of a site within the context of current norms, standards and design principles that are applicable and being presented in professional practice;

- Illustrate the planning and design of a terrain in an ethical and accountable manner through appropriate drawing techniques and display awareness of what the impact of the decisions and actions by the planner could be on the future development of a site;
- Illustrate the planning and design of a site, by applying prevailing norms, standards and design principles in relation and in context to the impact that cadastral, legal and physical constraints have on a site./

Module uitkomste:
Studente moet in staat wees om

- *Oor gedetailleerde kennis te beskik aangaande verskillende tipes uitlegte, die konsepte, benaderings en beginsels van toepassing hierop en die wyse waarop dit verband hou met ander dissiplines;*
- *Kennis te demonstreer wat die verskillende bronne van kadastrale-, wetlike- en fisiese, aspekte behels en bewus wees van wat die moontlike impak hiervan op die ontwerp en beplanning van 'n terrein sal wees;*
- *Die verkryging en insameling van die verskillende bronne van kadastrale-, wetlike- en fisiese data korrek te kan evalueer, na te vors en te selekteer watter aspekte hiervan wel 'n impak op die beplanning en ontwerp van 'n terrein sal hê;*
- *Moontlike probleme tydens die beplanning en ontwerp van 'n terrein te kan identifiseer, te evalueer en op te los binne die konteks van heersende norme, standaarde en ontwerpbeginsels wat van toepassing is en voorgehou word in die professionele praktyk;*
- *Die beplanning en ontwerp van 'n terrein op eties verantwoordbare wyse, deur toepaslike tekentegnieke te kan illustreer, en bewustheid te toon van wat die besluite en aksies van die beplanner op die toekomstige ontwikkeling van 'n terrein sal wees;*
- *Die beplanning en ontwerp van 'n terrein, deur die toepassing van heersende norme, standaarde en ontwerpbeginsels in verhouding en konteks tot die impak wat kadastrale-, wetlike- en fisiese beperkings op 'n terrein het, te kan illustreer.*

Method of delivery: Full Time
Metode van aflewering: *Voltyds*

Assessment modes:
The final module mark is the non-weighted average of the formal formative and the summative assessment marks.
The average module mark has to be above 50% for the student to pass the module.
Students need at least 40% in order to qualify for the summative assessment opportunities./

Assesseringsmetodes:
Die finale modulepunt is die ongeweegde gemiddeld van die formele formatiewe assesseringspunt en die summatiewe assesseringspunt.
'n Student benodig ten minste 50% vir die gemiddelde punt om die module te slaag.
'n Minimumpunt van 40% word benodig om te kwalifiseer vir die summatiewe assesseringsgeleenthede.

Module code / ***Modulekode:*** **SBES313**	**Semester 1**	**NQF level /** ***NKR vlak:*** **7** **Credits /** ***Krediete*****: 16**

Title/ *Titel*: **Infrastructure Planning /** ***Infrastruktuurbeplanning***

Module outcomes:
Students should be able to:

- Comprise knowledge of the integrated work environment in which the planner operates and how it relates to current legislation, rules, theories, design concepts and the disciplines involved in the design and installation of engineering services and the application of other engineering aspects;
- Explain what engineering services and aspects involve in practice and evaluate what the possible impact thereof will be on the planning and design of a site and also on the long-term development of a region;

- Undertake the collection of prevailing norms, standards and design principles involved in engineering services and aspects and to validate and evaluate it in order to determine the impact thereof on the planning and design of a site in order to ensure the effective installation of engineering services and the application of other engineering aspects;
- Identify, analyse and critically reflect on potentially complex problems applicable to the design and installation of engineering services and aspects, when planning and designing a site, and be able to solve it within the context of prevailing norms, standards and design principles applicable and offered in legislation and professional practice;
- Illustrate the planning and design of a site in an ethical and accountable manner through appropriate drawing techniques and display awareness of what the decisions and ethical approach of the planner could be on the design and installation of engineering services and aspects on the future development of a site and of a region; and
- Illustrate the planning and design of a site, by applying prevailing norms, standards and design principles, in relation and context to the potential impact it may have on installation of engineering services and systems. /

Module uitkomste:

Studente moet in staat wees om

- *Oor kennis te beskik rakende die geïntegreerde werksomgewing waarin die beplanner werksaam is en die wyse hoe dit verband hou met heersende wetgewing, reëls, teorieë, ontwerp konsepte en die dissiplines betrokke by die ontwerp en installering van ingenieursdienste en toepassing van ander ingenieursaspekte;*
- *Verduidelik wat ingenieursdienste en –aspekte in die praktyk behels en te evalueer wat die moontlike impak daarvan op die beplanning en ontwerp van 'n terrein en ook op die langtermyn ontwikkeling van 'n streek sal wees;*
- *Die versameling van heersende norme, standaarde en ontwerpbeginsels betrokke by ingenieursdienste en –aspekte te onderneem, dit te valideer en te evalueer ten einde te bepaal wat die impak hiervan op die beplanning en ontwerp van 'n terrein sal wees ten einde die effektiewe installering van ingenieursdienste en toepassing van ander ingenieursaspekte, te verseker;*
- *Moontlike komplekse probleme rakende die ontwerp en installering van ingenieursdienste en –aspekte, tydens die beplanning en ontwerp van 'n terrein, te identifiseer, analiseer, krities daaroor te reflekteer en dit op te los binne die konteks van heersende norme, standaarde en ontwerpbeginsels wat van toepassing is en voorgehou word in wetgewing en die professionele praktyk;*
- *Die beplanning en ontwerp van 'n terrein op eties en professionele wyse, deur toepaslike tekentegnieke te kan illustreer, en bewustheid te toon van wat die besluite en etiese benadering van die beplanner op die ontwerp en installering van ingenieursdienste en –aspekte, op die toekomstige ontwikkeling van 'n terrein en 'n streek sal wees;*
- *Die beplanning en ontwerp van 'n terrein, deur die toepassing van heersende norme, standaarde en ontwerpbeginsels, in verhouding en konteks tot die impak wat dit moontlik kan hê op die installering van ingenieursdienste en sisteme, te illustreer.*

Method of delivery: Full Time
Metode van aflewering: *Voltyds*

Assessment modes:

The final module mark is the non-weighted average of the formal formative and the summative assessment marks.

The average module mark has to be above 50% for the student to pass the module.

Students need at least 40% in order to qualify for the summative assessment opportunities./

Assesseringsmetodes:

Die finale modulepunt is die ongeweegde gemiddeld van die formele formatiewe assesseringspunt en die summatiewe assesseringspunt.

'n Student benodig ten minste 50% vir die gemiddelde punt om die module te slaag.

'n Minimumpunt van 40% word benodig om te kwalifiseer vir die summatiewe assesseringsgeleenthede.

Module code / ***Modulekode:*** **SBRS221**	**Semester 2**	**NQF level /** ***NKR vlak:*** **5** **Credits /** ***Krediete*****: 16**

Title/ *Titel*: **Regional Plans /** ***Streekplanne***

Module outcomes:

Students should be able to:

- Demonstrate detailed knowledge and understanding of the principles and theories of regional planning, as well as the application thereof in regional plans;
- Demonstrate insight into the origin and development of policy approaches and applications of regional plans in africa and south africa;
- Demonstrate the ability to identify and analyse regional planning approaches, as well as evaluate metropolitan and regional plans in developed countries;
- Demonstrate the ability to identify, analyse and solve complex problems with regard to regional plans, regional policy and regional planning instruments;
- Demonstrate an understanding of the relationship between urban systems and regional plans in order to formulate a well-founded written and verbal opinion; and
- Demonstrate coherent understanding of the ethical implications of decisions, actions and practices specifically relevant to proposals for regional plans.

Module uitkomste:

Studente moet in staat wees om

- *Detail kennis en begrip te demonstreer van die beginsels en teorieë van streekbeplanning, asook die toepassing daarvan in streekplanne;*
- *Insig te demonstreer in die ontstaan en ontwikkeling van beleidsbenaderings en toepassings van streekplanne in afrika en suid-afrika;*
- *Die vaardigheid te demonstreer vir die evaluering en toepassing van streekbeplannings-benaderings, metropolitaanse- en streekplanne in ontwikkelde lande; die vermoë te demonstreer om streekbeplanningbenaderings te identifiseer en te ontleed, asook om metropolitaanse en streekplanne in ontwikkelde lande te evalueer;*
- *Die vermoë demonstreer ten einde komplekse probleme te identifiseer, analiseer en op te los met betrekking tot streekplanne, beplanningsbeleide en -instrumente;*
- *Die verhouding tussen stedelike sisteme en streekplanne te verstaan ten einde 'n eie begronde mening skriftelik en mondelings te kan weergee; en*

Samehangende begrip te demonstreer van die etiese implikasies van besluite, aksies en praktyke wat spesifiek relevant is vir voorstelle vir streekplanne.

Method of delivery: Full Time
Metode van aflewering: *Voltyds*

Assessment modes:

The final module mark is the non-weighted average of the formal formative and the summative assessment marks.
The average module mark has to be above 50% for the student to pass the module.
Students need at least 40% in order to qualify for the summative assessment opportunities./

Assesseringsmetodes:

Die finale modulepunt is die ongeweegde gemiddeld van die formele formatiewe assesseringspunt en die summatiewe assesseringspunt.
'n Student benodig ten minste 50% vir die gemiddelde punt om die module te slaag.
'n Minimumpunt van 40% word benodig om te kwalifiseer vir die summatiewe assesseringsgeleenthede.

Module code / *Modulekode:* **SBRS313**	**Semester 1**	**NQF level /** ***NKR vlak:*** **7** **Credits /** ***Krediete*****: 16**

Title/ *Titel*: **Regional Development Theory /** ***Streekontwikkelingsteorie***

Module outcomes:

Students should be able to:

- Demonstrate integrated knowledge of various forms of economic development, including an understanding of regional economics and its application to local economic development;
- Demonstrate an understanding of various regional analysis techniques as well as the ability to demarcate and analyse regions using different scientific methods;
- Identify, analyse and critically reflect on complex regional development problems and address these problems by applying evidence-based solutions and theory-driven arguments;
- Identify alternative regional analysis techniques and to select and execute logical solutions and calculations;
- Develop appropriate processes of information gathering within the context of regional development and analysis as well as the ability to independently validate the source of information, evaluate and manage the information;
- Develop and communicate ideas and opinions on regional development and analysis in well-formed arguments, using appropriate academic, professional, or occupational discourse. /

Module uitkomste:

Studente moet in staat wees om

- *Geïntegreerde kennis te demonstreer van verskeie vorme van ekonomiese ontwikkeling, insluitend 'n begrip van streeksekonomie en die toepassing daarvan op plaaslike ekonomiese ontwikkeling;*
- *'n begrip van verskeie streekontledingstegnieke te demonstreer asook die vermoë om deur middel van verskillende wetenskaplike metodes streke af te baken en te analiseer;*
- *Komplekse streekontwikkelingsprobleme te identifiseer, analiseer, krities daaroor te reflekteer en hierdie probleme aan te spreek, met toepassing van bewese oplossings en teorie-gedrewe argumente;*
- *Alternatiewe streekontledingstegnieke te kan identifiseer en logiese oplossings en berekeninge te kan kies en uitvoer; gepaste inligtingversamelingstegnieke binne die konteks van streekontwikkeling en -ontleding toe te pas, asook die vermoë om onafhanklik die inligtingsbronne te valideer, evalueer en te bestuur;*
- *Idees en opinies oor streekontwikkeling en –ontleding deur middel van goed gestruktureerde argumente te ontwikkel en te kommunikeer deur gebruik te maak van gepaste akademiese, professionele, of beroepsgerigte diskoerse.*

Method of delivery: Full Time
Metode van aflewering: *Voltyds*

Assessment modes:

The final module mark is the non-weighted average of the formal formative and the summative assessment marks.
The average module mark has to be above 50% for the student to pass the module.
Students need at least 40% in order to qualify for the summative assessment opportunities./

Assesseringsmetodes:

Die finale modulepunt is die ongeweegde gemiddeld van die formele formatiewe assesseringspunt en die summatiewe assesseringspunt.
'n Student benodig ten minste 50% vir die gemiddelde punt om die module te slaag.
'n Minimumpunt van 40% word benodig om te kwalifiseer vir die summatiewe assesseringsgeleenthede.

Module code / *Modulekode:* **SBRS411**	**Semester 1**	**NQF level /** ***NKR vlak:*** **8** **Credits /** ***Krediete*****: 16**

Title/ *Titel*: **Regional Analysis and Application /** ***Streekanalise en Toepassing***

Module outcomes:

Students should be able to:

- Demonstrate coherent understanding and integrated knowledge of the principles and ideas of national policy and legislation of regional planning and development;
- Demonstrate an ability to critically interrogate the complexities in analysing and evaluating planning policy and planning instruments in the realisation of regional planning initiatives in south africa;
- Demonstrate the ability to critically review the contents of spatial development plans for all the spheres of authorities in order evaluate contexts, based on theoretical and practical foundations;
- Demonstrate an advanced ability to interrogate and critically reflect on and effectively address complex issues related to (i) the role of different aspects of globalisation in contemporary urban environments, (ii) different forms of urban development patterns based on different development pulses on migration; (iii) factors that have impacts on migration patterns in developed and developing worlds;
- Demonstrate an ability to develop and communicate own ideas and opinions in well-formed arguments, using appropriate academic, professional, or occupational discourse;
- Demonstrate the ability to reflect on the values, ethical conduct and justifiability of decisions appropriate to regional plans and policy./

Module uitkomste:

Studente moet in staat wees om

- *Samehangende begrip en geïntegreerde kennis van die beginsels en idees van nasionale beleid en wetgewing van streekbeplanning en ontwikkeling te demonstreer;*
- *Die vermoë te demonstreer om die kompleksiteite met betrekking tot die ontleding en evaluering van beplanningsbeleid en beplanningsinstrumente krities te ondersoek, in die verwesenliking van streeksbeplanning inisiatiewe in suid-afrika;*
- *Die vermoë te demonstreer om die inhoud van ruimtelike ontwikkelingsplanne krities te hersien vir alle sfere van owerhede ten einde kontekste te evalueer, gebaseer op teoretiese en praktiese grondslae;*
- *Gevorderde vermoë te demonstreer en krities te reflekteer op effektief komplekse vraagstukke rakende (i) die rol van verskillende aspekte van globalisering in kontemporêre stedelike omgewings te bespreek; (ii) verskillende vorme van stedelike ontwikkelingspatrone gebaseer op verskillende ontwikkelingspulse oor migrasie; (iii) faktore wat 'n impak het op migrasiepatrone in ontwikkelde en ontwikkelende wêrelde;*
- *Die vermoë te demonstreer om eie ideë en menings in goed gevormde argumente te ontwikkel en te kommunikeer, deur toepaslike akademiese, professionele of beroepskommunikasie te gebruik;*
- *Die vermoë te demonstreer om te besin oor die waardes, etiese optrede en regverdigbaarheid van besluite wat geskik is vir streekplanne en -beleid.*

Method of delivery: Full Time
Metode van aflewering: *Voltyds*

Assessment modes:

The final module mark is the non-weighted average of the formal formative and the summative assessment marks.

The average module mark has to be above 50% for the student to pass the module.

Students need at least 40% in order to qualify for the summative assessment opportunities./

Assesseringsmetodes:

Die finale modulepunt is die ongeweegde gemiddeld van die formele formatiewe assesseringspunt en die summatiewe assesseringspunt.

'n Student benodig ten minste 50% vir die gemiddelde punt om die module te slaag.
'n Minimumpunt van 40% word benodig om te kwalifiseer vir die summatiewe assesseringsgeleenthede.

Module code / ***Modulekode:*** **SBSS111**	**Semester 1**	**NQF level /** ***NKR vlak:*** **5** **Credits /** ***Krediete*****: 12**

Title/ *Titel*: **Planning and Settlement History** / ***Beplannings- en Nedersettingsgeskiedenis***

Module outcomes:
Students should be able to:

- Demonstrate integrated knowledge of the establishment, origin and development of cities of different historical civilisations including an understanding of the relevance of a historical study of settlements and cities for urban and regional planning;
- Demonstrate an awareness of how settlements and cities have developed historically and to evaluate their value and impact on urban and regional planning;
- Identify and evaluate problems within the historical establishment, origin and development of cities and to apply solutions based on relevant urban and regional planning principles;
- Communicate information on planning and settlement history reliably, accurately and coherently in written form, or verbally, or by means of practical demonstration./

Module uitkomste:
Studente moet in staat wees om

- *Geïntegreerde kennis te demonstreer van die vestiging, ontstaan en ontwikkeling van stede van verskillende geskiedkundige beskawings en om 'n begrip te toon van die relevansie van 'n geskiedkundige studie van nedersettings en stede vir stads- en streekbeplanning;*
- *'n Bewustheid te demonstreer van die wyse waarop nedersettings en stede geskiedkundig ontwikkel het en om die waarde en impak daarvan op stads-en streekbeplanning te kan evalueer;*
- *Probleme binne die geskiedkundige vestiging, ontstaan en ontwikkeling van stede te identifiseer, evalueer en om oplossings toe te pas gebaseer op relevante stads-en streekbeplannningsbeginsels;*
- *Inligting rakende beplannings- en nedersettingsgeskiedenis betroubaar, akkuraat en samehangend te kommunikeer in geskrewe vorm, of verbaal, of d.m.v. Praktiese demonstrasie.*

Method of delivery: Full Time
Metode van aflewering*: Voltyds*

Assessment modes:
The final module mark is the non-weighted average of the formal formative and the summative assessment marks.
The average module mark has to be above 50% for the student to pass the module.
Students need at least 35% in order to qualify for the summative assessment opportunities.

Assesseringsmetodes:
Die finale modulepunt is die ongeweegde gemiddeld van die formele formatiewe assesseringspunt en die summatiewe assesseringspunt.
'n Student benodig ten minste 50% vir die gemiddelde punt om die module te slaag. 'n Minimumpunt van 35% word benodig om te kwalifiseer vir die summatiewe assesseringsgeleenthede.

Module code / ***Modulekode:*** **SBSS121**	**Semester 2**	**NQF level /** ***NKR vlak:*** **5** **Credits /** ***Krediete*****: 12**

Title/ *Titel*: **Introduction to Planning /** ***Inleiding tot Beplanning***

Module outcomes:
Students should be able to:

- Demonstrate basic knowledge and informed understanding of fundamental Urban and Regional planning theories, concepts, principles, and approaches;

- Demonstrate fundamental knowledge and understanding of the different modern and post-modern planning models, including those that apply to South Africa;
- Display basic research skills in collecting, reading, summarising, interpreting and communicating information reliably, accurately and coherently, using conventions appropriate to the context, either in writing, verbally or in practical demonstration;
- Act ethically in presenting knowledge relating to the planning of cities and regions./

Module uitkomste:
Studente moet in staat wees om
- *Basiese kennis en ingeligte begrip te demonstreer van fundamentele stedelike en streekbeplanningsteorieë, konsepte, beginsels en benaderings;*
- *Fundamentele kennis en begrip van die verskillende moderne en post-moderne beplanningsmodelle, insluitend dié wat van toepassing is op suid-afrika te demonstreer;*
- *Basiese navorsingsvaardighede te openbaar om inligting betroubaar, akkuraat en samehangend te versamel, te lees, op te som, te interpreteer en te kommunikeer deur gebruik te maak van konvensies wat toepaslik is vir die konteks, hetsy skriftelik, mondeling of practise;*
- *Eties te handel in die aanbieding van kennis met betrekking tot die beplanning van stede en streke.*

Method of delivery: Full Time
Metode van aflewering: *Voltyds*

Assessment modes:
The final module mark is the non-weighted average of the formal formative and the summative assessment marks.
The average module mark has to be above 50% for the student to pass the module.
Students need at least 40% in order to qualify for the summative assessment opportunities.

Assesseringmetodes:
Die finale modulepunt is die ongeweegde gemiddeld van die formele formatiewe assesseringspunt en die summatiewe assesseringspunt.
'n Student benodig ten minste 50% vir die gemiddelde punt om die module te slaag.
'n Minimumpunt van 40% word benodig om te kwalifiseer vir die summatiewe assesseringsgeleenthede.

Module code / ***Modulekode:*** **SBSS223**	**Semester 2**	**NQF level /** ***NKR vlak:*** **6** **Credits /** ***Krediete*****: 16**

Title/ *Titel*: **Urban Design /** ***Stedelike Ontwerp***

Module outcomes:
Students should be able to:
- Demonstrate insight and understanding of theoretical concepts space, place, place-making, design and urban design;
- Display analytical skills in selecting and applying various urban design methods and procedures;
- Demonstrate critical thinking by evaluating existing areas in the environment as well as urban design proposals for various areas;
- Display practical skills in terms of developing creative urban design solutions for urban and/or rural areas and presenting the designs in written, visual and oral format whether individually or in a group; and
- Display ethical and professional behaviour in terms of urban design applications./

Module uitkomste:
Studente moet in staat wees om
- *Insig en begrip van teoretiese konsepte ruimte, plek, plekskepping, ontwerp en stedelike ontwerp te demonstreer;*
- *Analitiese vaardighede in die keuse en toepassing van verskeie stedelike ontwerpmetodes en prosedures te openbaar;*

- *Kritiese denke deur die evaluering van bestaande areas in die omgewing sowel as stedelike ontwerp voorstelle vir verskeie areas te demonstreer;*
- *Praktiese vaardighede in terme van die ontwikkeling van kreatiewe stedelike ontwerp oplossings vir stedelike en/of landelike area sowel as die voorlegging van die ontwerpe in geskrewe, visuele en mondelinge formaat hetsy individueel of in groepsverband, te opnbaar;*
- *Etiese en professionele optrede in terme van die toepassing van stedelike ontwerp te openbaar.*

Method of delivery: Full Time
Metode van aflewering: *Voltyds*

Assessment modes:
The final module mark is the non-weighted average of the formal formative and the summative assessment marks.
The average module mark has to be above 50% for the student to pass the module.
Students need at least 40% in order to qualify for the summative assessment opportunities./

Assesseringsmetodes:
Die finale modulepunt is die ongeweegde gemiddeld van die formele formatiewe assesseringspunt en die summatiewe assesseringspunt.
'n Student benodig ten minste 50% vir die gemiddelde punt om die module te slaag.
'n Minimumpunt van 40% word benodig om te kwalifiseer vir die summatiewe assesseringsgeleenthede.

Module code / ***Modulekode:*** **SBSS313**	**Semester 1**	**NQF level /** ***NKR vlak:*** **7** **Credits /** ***Krediete*****: 16**

Title/ *Titel*: **Planning for Sustainable Cities /** ***Beplanning vir Volhoubare Stede***

Module outcomes:
Students should be able to:
- Demonstrate integrated knowledge and logical understanding of theories, planning principles and approaches to plan sustainable cities;
- Demonstrate coherent understanding of the different perspectives and complex problems relating to the interpretation of sustainable cities;
- Demonstrate an advanced ability to analyse, evaluate and consider complex problems relating to the planning of sustainable cities, with sufficient evidence from theory and practice;
- Demonstrate the ability to reflect on the values, ethical conduct and justifiability of decisions appropriate to the practice of city planning and broader sustainability thinking; and
- Demonstrate an ability to develop and communicate own ideas and opinions in well-formed arguments, using appropriate academic, professional, or occupational discourse./

Module uitkomste:
Studente moet in staat wees om
- *Geïntegreerde kennis en logiese begrip te demonstreer van teorieë, beplanningsbeginsels en benaderings vir die beplanning van volhoubare stede;*
- *Samehangende begrip te demonstreer van die verskillende perspektiewe en komplekse probleme met betrekking tot die interpretasie van volhoubare stede;*
- *'N gevorderde vermoë te demonstreer om komplekse probleme met betrekking tot die beplanning van volhoubare stede te analiseer, evalueer en te oorweeg, met voldoende bewyse uit teorie en praktyk;*
- *Die vermoë te demonstreer om te besin oor die waardes, etiese optrede en regverdigbaarheid van besluite wat toepaslik is vir die praktyk van Stadsbeplanning en breër volhoubaarheidsdenke; en*
- *Die vermoë te demonstreer om eie idees en menings in goed gevormde argumente te ontwikkel en te kommunikeer, deur gebruik te maak van toepaslike akademiese, professionele of professionele diskoers.*

Method of delivery: Full Time

Metode van aflewering: *Voltyds*

Assessment modes:
The final module mark is the non-weighted average of the formal formative and the summative assessment marks.
The average module mark has to be above 50% for the student to pass the module.
Students need at least 40% in order to qualify for the summative assessment opportunities./

Assesseringsmetodes:
Die finale modulepunt is die ongeweegde gemiddeld van die formele formatiewe assesseringspunt en die summatiewe assesseringspunt.
'n Student benodig ten minste 50% vir die gemiddelde punt om die module te slaag.
'n Minimumpunt van 40% word benodig om te kwalifiseer vir die summatiewe assesseringsgeleenthede.

Module code / ***Modulekode:*** **SBSS321**	**Semester 2**	**NQF level /** ***NKR vlak:*** **7** **Credits /** ***Krediete*****: 16**

Title/ *Titel:* **Transport Planning and Systems /** ***Vervoerbeplanning en Stelsels***

Module outcomes:
Students should be able to:

- Comprise integrated knowledge and be able to demonstrate an understanding of policy and legislation on regional, national and municipal contexts regarding transportation planning and the ability to correctly evaluated the relation it has with settlement and regional planning;
- Explain knowledge and understanding of sustainable transport and the relation it has with the development of settlements in order to achieve optimal transportation planning in south africa;
- Identify, analyse and critically reflect on potentially complex transport problems arising from the interaction between settlement and transportation planning and solve it within the context of prevailing norms, standards and design principles applicable and proposed in relevant legislation and professional practice;
- Undertake the collection of prevailing norms, standards and design principles involved in restructuring settlements and to validate and evaluate it in order to determine the impact thereof on the planning and design of transport supportive settlements; and
- Illustrate the planning and design of settlements in an ethical and accountable manner through appropriate drawing techniques and display awareness of what the decisions and ethical approach of the planner could be on sustainable and public transport, land use and integration on the future development of settlements./

Module uitkomste:
Studente moet in staat wees om

- *Oor geïntegreerde kennis te beskik en begrip te demonstreer aangaande beleid en wetgewing op streek, nasionale en munisipale konteks rakende vervoerbeplanning en oor die vermoë beskik om die verband wat dit met nedersetting- en streek beplanning hou, korrek te evalueer;*
- *Kennis en die begrip rakende volhoubare vervoer, en die verband wat dit op die ontwikkeling van nedersettings het, te verduidelik ten einde optimale vervoerbeplanning in suid-afrika te bereik;*
- *Moontlike komplekse vervoerprobleme voortspruitend uit die interaksie tussen nedersetting- en vervoerbeplanning te identifiseer, analiseer, krities daaroor te reflekteer en dit op te los binne die konteks van heersende norme, standaarde en ontwerpbeginsels wat van toepassing is en voorgehou word in relevante wetgewing en die professionele praktyk;*
- *Die versameling van heersende norme, standaarde en ontwerpbeginsels betrokke by die herstrukturering van nedersettings te onderneem, dit te valideer en te evalueer ten einde te bepaal wat die impak hiervan op die beplanning en ontwerp van vervoerondersteunende nedersettings is;*
- *Die beplanning en ontwerp van nedersettings op eties en professionele wyse, deur toepaslike tekentegnieke en ontwerpbeginsels, te kan illustreer en bewustheid te toon van wat die*

besluite en etiese benadering van die beplanner op volhoubare en publieke vervoer, grondgebruik en integrasie op die toekomstige ontwikkeling van nedersettings sal wees.

Method of delivery: Full Time
Metode van aflewering: *Voltyds*

Assessment modes:
The final module mark is the non-weighted average of the formal formative and the summative assessment marks.
The average module mark has to be above 50% for the student to pass the module.
Students need at least 40% in order to qualify for the summative assessment opportunities./

Assesseringsmetodes:
Die finale modulepunt is die ongeweegde gemiddeld van die formele formatiewe assesseringspunt en die summatiewe assesseringspunt.
'n Student benodig ten minste 50% vir die gemiddelde punt om die module te slaag.
'n Minimumpunt van 40% word benodig om te kwalifiseer vir die summatiewe assesseringsgeleenthede.

Module code / ***Modulekode:*** **SBSS323**	**Semester 2**	**NQF level /** ***NKR vlak:*** **7** **Credits /** ***Krediete*****: 16**

Title/ *Titel*: **Planning Theory /** ***Beplanningsteorie***

Module outcomes:
Students should be able to:

- Demonstrate an integrated knowledge and clear understanding of the difference between theories in, theories of and theories for planning; various theories of planning and the evolution of planning thought and the implication for planning practice;
- Critically analyse and reflect upon the role of the planner and various stakeholders according to different theories of planning as well as how these theories shape plan-making;
- Display practical skill in terms of accessing and synthesising academic literature with regard to planning theory and presenting the literature in appropriate academic written and oral format whether individually or in a group;
- Display ethical behaviour and a professional attitude with regard to the reading, writing, interpretation and presentation of planning theory./

Module uitkomste:
Studente moet in staat wees om

- *Geïntegreerde kennis en duidelike begrip te demonstreer van die verkil tussen teorieë in, teorieë van en teorieë vir beplanning; verskeie teorieë van beplanning en die evolusie van beplanningsdenke en die implikasie daarvan vir beplanningpraktyk;*
- *Krities te kan analiseer en reflekteer oor die rol van die beplanner en verskillende rolspelers volgens verskillende teorieë van beplanning sowel as hoe hierdie teorieë die ontwikkeling van planne vorm;*
- *Praktiese vaardighede te demonstreer in terme van die toegang en sintese van akademiese literatuur rakende beplanningsteorie asook die aanbied van die literatuur in gepaste akademiese geskrewe en mondelinge formaat hetsy individueel of in groepsverband;*
- *Etiese gedrag en 'n professionele houding te demonstreer rakende die lees, skryf, interpretasie en aanbied van beplanningsteorie.*

Method of delivery: Full Time
Metode van aflewering: *Voltyds*

Assessment modes:
The final module mark is the non-weighted average of the formal formative and the summative assessment marks.
The average module mark has to be above 50% for the student to pass the module.
Students need at least 40% in order to qualify for the summative assessment opportunities./

Assesseringsmetodes:
Die finale modulepunt is die ongeweegde gemiddeld van die formele formatiewe assesseringspunt en die summatiewe assesseringspunt.
'n Student benodig ten minste 50% vir die gemiddelde punt om die module te slaag.
'n Minimumpunt van 40% word benodig om te kwalifiseer vir die summatiewe assesseringsgeleenthede.

Module code / ***Modulekode:*** **SBSS412**	**Semester 1**	**NQF level /** ***NKR vlak:*** **8** **Credits /** ***Krediete*****: 16**

Title/ *Titel:* **Integrated Housing Development /** ***Geïntegreerde Behuisingsontwikkeling***

Module outcomes:
Students should be able to:

- Demonstrate integrated understanding of the interface between housing and planning;
- Demonstrate critical insight into the complex and multi-dimensional nature of integrated housing development and how various paradigms, theoretical frameworks as well as policy and legislative frameworks shape housing practice in different contexts;
- Demonstrate critical thinking in order to evaluate various theoretical paradigms, theories, policies and acts and the progressive development of these in terms of the application of integrated housing development;
- Display advanced practical skills in terms of applying independent research in order to develop an integrated housing project for a specific context and presenting the project either in written, visual and oral format (or a combination of these) in a group;
- Develop criteria and judge the ethical and professional behaviour with regard to an integrated housing development project. /

Module uitkomste:
Studente moet in staat wees om

- *Geïntegreerde begrip van die koppelvlakke tussen behuising en beplanning te demonstreer;*
- *Kritiese insig te toon in die komplekse en multi-dimensionele aard van geïntegreerde behuisingontwikkeling en how verskillende paradigmas, teoretiese raamwerke sowel as beleid- en wetgewende raamwerke behuising praktyk vorm in verskeie kontekste;*
- *Kritiese denke te demonstreer ten einde verskeie teoretiese paradigmas, teorieë, beleide en wette en die progressiewe ontwikkeling van hierdie in terme van behuisingontwikkeling te kan evalueer aan die hand van toegepaste voorbeelde;*
- *Gevorderde praktiese vaardighede te toon in terme van die toepassing van onafhanklike navorsing ten einde 'n geïntegreerde behuisingprojek vir 'n spesifieke konteks te kan ontwikkel en die projek in of geskrewe, visuele of mondelinge formaat (of 'n kombinasie hiervan) te kan aanbied in groepverband; en*
- *Die vermoë demonstreer om kriteria te ontwikkel om die etiese en professionele gedrag betreffende 'n geïntegreerde behuisingontwikkelingprojek te kan beoordeel.*

Method of delivery: Full Time
Metode van aflewering: *Voltyds*

Assessment modes:
The final module mark is the non-weighted average of the formal formative and the summative assessment marks.
The average module mark has to be above 50% for the student to pass the module.
Students need at least 40% in order to qualify for the summative assessment opportunities./

Assesseringsmetodes:
Die finale modulepunt is die ongeweegde gemiddeld van die formele formatiewe assesseringspunt en die summatiewe assesseringspunt.
'n Student benodig ten minste 50% vir die gemiddelde punt om die module te slaag.
'n Minimumpunt van 40% word benodig om te kwalifiseer vir die summatiewe assesseringsgeleenthede.

Module code / *Modulekode:* **SBSS414**	**Semester 1**	**NQF level /** ***NKR vlak:*** **8** **Credits /** ***Krediete*****: 16**

Title/ *Titel*: **Land Use Planning and Development Policy / *Grondgebruikbeplanning en Ontwikkelingsbeleid***

Module outcomes:

Students should be able to:

- Demonstrate comprehensive knowledge of, and coherent understanding of theories, principles and processes of property development in South Africa;
- Demonstrate a relational understanding of the complexities of land markets and the generation of alternative development proposals;
- Demonstrate the ability to critically review spatial planning approaches in the evaluation of property development and land use management processes;
- Demonstrate an advanced skill to effectively analyse, synthesise and evaluate land use management systems in order to formulate a well-founded written and verbal opinion by offering creative insights, rigorous interpretations and solutions to issues appropriate to the context;
- Demonstrate ethical behaviour and a professional attitude with regard to the writing, interpretation and presentation of land use management and property development./

Module uitkomste:

Studente moet in staat wees om

- *In-diepte kennis en samehangende insig te demonstreer rakende die teorieë, beginsels en prosesse van eiendomsontwikkeling in Suid-Afrika;*
- *Relasionele begrip te demonstreer van die kompleksiteite van eiendomsmarkte en die daarstelling van alternatiewe ontwikkelingsvoorstelle;*
- *Die vaardigheid te demonstreer om beplanningsbenaderings ten opsigte van eiendomsontwikkeling en grondgebruikbestuur krities te hersien;*
- *Gevorderde vaardigheid te demonstreer om grondgebruikstelsels effektief te analiseer, sintetiseer en te evalueer ten einde goed gefundeerde skriftelike en mondelingse opinies weer te gee; en kreatiewe insigte, streng interpretasies en oplossings te bied vir aangeleenthede wat toepaslik is vir die konteks; en*
- *Etiese gedrag en professionele optrede met betrekking tot die daarstelling, interpretasie en voorstelling van grondgebruikstelsels en ontwikkelingsvoorstelle te demonstreer.*

Method of delivery: Full Time
Metode van aflewering: *Voltyds*

Assessment modes:

The final module mark is the non-weighted average of the formal formative and the summative assessment marks.
The average module mark has to be above 50% for the student to pass the module.
Students need at least 40% in order to qualify for the summative assessment opportunities./

Assesseringsmetodes:

Die finale modulepunt is die ongeweegde gemiddeld van die formele formatiewe assesseringspunt en die summatiewe assesseringspunt.
'n Student benodig ten minste 50% vir die gemiddelde punt om die module te slaag.
'n Minimumpunt van 40% word benodig om te kwalifiseer vir die summatiewe assesseringsgeleenthede.

Module code / *Modulekode:* **SBSS424**	**Semester 2**	**NQF level /** ***NKR vlak:*** **8** **Credits /** ***Krediete*****: 16**

Title/ *Titel:*: **Strategic and Participatory Planning /** ***Strategiese- en Deelnemende Beplanning***

Module outcomes:

Students should be able to:

- Demonstrate knowledge of and engagement in planning and professional practice by demonstrating an understanding of the requirements set by the professional body (SACPLAN) to the registered urban and regional planner, including the way in which this knowledge should be applied during community-based and participatory planning;
- Demonstrate an understanding of the complexities within the needs and aspirations of specific social and cultural groups in the context of urban and regional planning as well as an understanding of the social dimensions that must be taken into account during strategic planning processes;
- Demonstrate an understanding of the complexities of applying project planning and human resource management to community-based and participatory planning as a member of a multi-disciplinary team and also as a project leader;
- Use strategic planning skills to identify, analyse and address complex and abstract problems in community-based and participatory planning by systematically making use of an appropriate strategic approach and relevant project management methods for urban and regional planning;
- Identify and address ethical issues based on a critical reflection on the applicability of different ethical value systems within the context of community-based and participatory planning;
- Display skills in gathering, critically evaluating, accurately interpreting and managing information regarding community-based and participatory planning, as well as to communicate creative recommendations and solutions to problems graphically, in report form and orally by making use of appropriate computer-aided software. /

Module uitkomste:

Studente moet in staat wees om

- *Kennis van en betrokkenheid in die beplannings- en professionele praktyk te demonstreer deur 'n begrip te toon van die vereistes wat deur die professionele liggaam (SACPLAN) aan die geregistreerde stads- en streekbeplanner gestel word met inbegrip van die wyse waarop hierdie kennis toegepas moet word tydens gemeenskapsgebaseerde- en deelnemende beplanning;*
- *'n begrip te demonstreer van die kompleksiteite binne die behoeftes en aspirasies van spesifieke sosiale en kulturele groepe in die konteks van stads- en streekbeplanning asook 'n begrip van die sosiale dimensies wat in ag geneem moet word tydens strategiese beplanningsprosesse;*
- *'n begrip te demonstreer van die kompleksiteite om as lid van 'n multi-dissiplinêre span en ook as projekleier, projekbeplanning en –menslike hulpbronbestuur toe te pas op gemeenskapsgebaseerde- en deelnemende beplanning;*
- *Die vermoë te demonstreer om strategiese beplanningsvaardighede te gebruik om komplekse en abstrakte probleme in gemeenskapsgebaseeerde- en deelnemende beplanning te identifiseer, te analiseer en aan te spreek deur sistematies gebruik te maak van 'n gepaste strategiese benadering en toepaslike projekbestuurmetodes vir stads- en streekbeplanning;*
- *Die vermoë te demonstreer om etiese sake en die toepaslikheid van verskillende etiese waardesisteme binne die konteks van gemeenskapsgebaseerde- en deelnemende beplanning te identifiseer en aan te spreek by wyse van kritiese refleksie; en*
- *Vaardighede te demonstreer om inligting rakende gemeenskapsgebaseerde- en deelnemende beplanning te versamel, krities te evalueer, akkuraat te interpreteer en te bestuur asook om kreatiewe voorstelle en probleemoplossings grafies, in verslagvorm en mondeling aan die hand van gepaste rekenaargesteunde sagteware te kommunikeer.*

Method of delivery: Full Time
Metode van aflewering: *Voltyds*

Assessment modes:
The final module mark is the non-weighted average of the formal formative and the summative assessment marks.
The average module mark has to be above 50% for the student to pass the module.
Students need at least 40% in order to qualify for the summative assessment opportunities./

Assesseringsmetodes:
Die finale modulepunt is die ongeweegde gemiddeld van die formele formatiewe assesseringspunt en die summatiewe assesseringspunt. 'n Student benodig ten minste 50% vir die gemiddelde punt om die module te slaag. 'n Minimumpunt van 40% word benodig om te kwalifiseer vir die summatiewe assesseringsgeleenthede.

Module code / ***Modulekode:*** **SBSS472**	**Semester 1 & 2**	**NQF level /** ***NKR vlak:*** **8** **Credits /** ***Krediete*****: 32**

Title/ *Tite*: **Research Project /** ***Navorsingsprojek***

Module outcomes:
Students should be able to:

- Demonstrate the ability to independently conduct research under guidance, and collect, process, analyse, evaluate and interpret information and data, and to document these findings meaningfully in a research paper;
- Demonstrate the ability to apply advanced subject-specific and integrated planning knowledge and skills in addressing urban and regional planning issues and in identifying, analysing and solving complex and abstract problems;
- Demonstrate sufficient knowledge of related literature, mastery of appropriate techniques and analytical methods, and the ability to remain at the forefront of the latest policy and practices in urban and regional planning;
- Demonstrate an ability to effectively present and communicate academic and professional planning recommendations to a range of audiences, in order to offer creative insights, as well as scientific interpretations and solutions to problems and issues appropriate to the urban and regional planning context; and
- Demonstrate an ability to assume full responsibility for own research, learning, decision-making and use of resources, as well as writing of the research paper and presentation thereof.

Module uitkomste:
Studente moet in staat wees om

- *Die vermoë te demonstreer om selfstandig navorsing uit te voer onder toesig, inligting en data te versamel, te verwerk, te analiseer, te evalueer en te interpreteer en dit sinvol te dokumenteer in 'n navorsingartikel;*
- *Die vermoë te demonstreer om gevorderde vakspesifieke en geïntegreerde beplanningskennis en -vaardighede toe te pas om stads- en -streekbeplanningsvraagstukke aan te spreek en om komplekse en abstrakte probleme te identifiseer, te ontleed en op te los;*
- *Voldoende bekendheid te demonstreer met verbandhoudende literatuur, bemeestering van toepaslike en analitiese metodes en die vermoë om op die voorpunt te bly van die nuutste wetgewing en praktyke in stads- en –streekbeplanning;*
- *Die vermoë te demonstreer om akademiese en professionele beplanningsvoorstelle effektief aan te bied en te kommunikeer aan 'n verskeidenheid gehore, ten einde kreatiewe insigte te bied, asook wetenskaplike interpretasies en oplossings vir probleme en kwessies wat toepaslik is in die stads- en streekbeplanningskonteks; en*
- *Die vermoë te demonstreer om volle verantwoordelikheid te aanvaar vir eie navorsing, leer, besluitneming en gebruik van hulpbronne, as ook vir die skryf van die navorsingsartikel en aanbieding daarvan.*

Method of delivery: : Full Time
Metode van aflewering: *Voltyds*

Assessment modes:
The final module mark is the non-weighted average of the formal formative and the summative assessment marks.
The average module mark has to be above 50% for the student to pass the module.
Students need at least 40% in order to qualify for the summative assessment opportunities./

Assesseringsmetodes
Die finale modulepunt is die ongeweegde gemiddeld van die formele formatiewe assesseringspunt en die summatiewe assesseringspunt.
'n Student benodig ten minste 50% vir die gemiddelde punt om die module te slaag.
'n Minimumpunt van 40% word benodig om te kwalifiseer vir die summatiewe assesseringsgeleenthede.

Module code / ***Modulekode:*** **SECO321**	**Semester 2**	**NQF level /** ***NKR vlak:*** **7** **Credits /** ***Krediete*****: 16**

Title/ *Titel*: **Urban Ecology for Planners /** ***Stedelike Ekologie vir Beplanners***

Module outcomes:
Students should be able to:

- Demonstrate integrated knowledge and critical understanding of, as well as an ability to correctly evaluate and apply basic ecological principles, urban areas as unique ecosystems and the historical development of the discipline of urban ecology relevant to planning and design of urban areas;
- Demonstrate coherent understanding of the multiple sources of ecological knowledge (e.g. Abiotic aspects such as climate, water, soil and biotic aspects such as producers, consumers and decomposers and the ecosystem services they provide) and to critically evaluate how this knowledge can be integrated in ecological planning and design;
- Select, evaluate and apply different existing approaches and methods in ecological planning and design of urban areas addressing the issues of sustainability and resilience;
- Analyse and evaluate academic literature to demarcate a researchable problem in ecological planning and design and specify an appropriate method that can be used to address the identified problem;
- Identify, analyse and critically reflect on and address complex ecological issues in urban planning and design using arguments from current research with particular emphasis on the development of sustainable and resilient urban areas;
- Demonstrate accurate and coherent written and verbal communication with understanding of and respect for intellectual property conventions, copyright and rules on plagiarism; and
- Reflect on the values, ethical conduct and justifiability of decisions appropriate to the practice of responsible urban ecological planning and design./

Module uitkomste:
Studente moet in staat wees om

- *Geïntegreerde kennis en kritiese begrip van, asook die vermoë om basiese ekologiese beginsels, stedelike gebiede as unieke ekosisteme en die historiese ontwikkeling van die dissipline van stedelike ekologie wat relevant is vir die beplanning en ontwerp van stedelike gebiede, korrek te evalueer en toe te pas, te demonstreer;*
- *Samehangende begrip te demonstreer van die veelvuldige bronne van ekologiese kennis (bv. Abiotiese aspekte soos klimaat, water,grond en biotiese aspekte soos produseerders, verbruikers en ontbinders en die ekosisteemdienste wat hulle verrig) en om krities te evalueer hoe hierdie kennis in ekologiese beplanning en –ontwerp geïntegreer kan word;*
- *Verskillende bestaande benaderings en metodes in ekologiese beplanning en –ontwerp te selekteer, evalueer en toe te pas, deur die vraagstukke van volhoubaarheid en veerkragtigheid aan te spreek;*
- *Akademiese literatuur te analiseer en evalueer om 'n navorsingswaardige probleem in ekologiese beplanning en –ontwerp af te baken en om 'n geskikte metode wat gebruik kan word om die geïdentifiseerde probleem aan te spreek, te spesifiseer;*

- *Komplekse ekologiese vraagstukke in stedelike beplanning en ontwerp te identifiseer, analiseer en krities daarop te reflekteer deur argumente vanuit huidige navorsing te gebruik met 'n spesifieke klem op die volhoubaarheid en veerkragtigheid van stedelike gebiede;*
- *Akkurate en samehangende geskrewe en verbale kommunikasie met die begrip van en respek vir intellektuele eiendomswaarde, kopiereg en reëls met betrekking tot plagiaat te demonstreer;*
- *Op die waardes, etiese gedrag en verantwoordbaarheid van besluite wat geskik is vir die praktyk van verantwoordelike stedelike ekologiese beplanning en ontwerp, te reflekteer*.

Method of delivery: Full Time
Metode van aflewering: *Voltyds*

Assessment modes:
The final module mark is the non-weighted average of the formal formative and the summative assessment marks.
The average module mark has to be above 50% for the student to pass the module.
Students need at least 40% in order to qualify for the summative assessment opportunities./

Assesseringsmetodes:
Die finale modulepunt is die ongeweegde gemiddeld van die formele formatiewe assesseringspunt en die summatiewe assesseringspunt.
'n Student benodig ten minste 50% vir die gemiddelde punt om die module te slaag.
'n Minimumpunt van 40% word benodig om te kwalifiseer vir die summatiewe assesseringsgeleenthede.

Module code / ***Modulekode:*** **SGSS414**	**Semester 1**	**NQF level /** ***NKR vlak:*** **8** **Credits /** ***Krediete*****: 16**

Title/ *Titel*: **Research Methodology for Geo- and Spatial Sciences /** ***Navorsingsmetodologie vir Geo- en Ruimtelike Wetenskappe***

Module outcomes:
Students should be able to:
- Demonstrate the ability to independently conduct research under guidance, and collect, process, analyse, evaluate and interpret information and data, and to document these findings meaningfully in a research proposal in the field of Geo- and Spatial Sciences;
- Demonstrate integrated knowledge of and engagement in scientific research, and critical understanding and application of theories, research methodologies and techniques relevant to Geo- and Spatial research;
- Demonstrate an ability to critically interrogate multiple sources of knowledge within the field of Geo- and Spatial Sciences, and critically evaluate and review the knowledge and the manner in which the knowledge was produced;
- Demonstrate the ability to identify, analyse and effectively apply supervised research methods in order to reflect on and address complex or abstract problems in Geo- and Spatial Sciences;
- Demonstrate an ability to assume full responsibility for own research, learning, decision-making and use of resources, as well as writing of the research proposal and presentation thereof.

Module uitkomste:
Studente moet in staat wees om
- *Die vermoë te demonstreer om selfstandig navorsing uit te voer onder toesig, inligting en data te versamel, te verwerk, te analiseer, te evalueer en te interpreteer en dit sinvol te dokumenteer in 'n navorsingsvoorstel in die veld van Geo- en Ruimtelike wetenskappe;*
- *Geïntegreerde kennis van en deelname aan wetenskaplike navorsing te demonstreer, asook kritiese begrip en toepassing van teorieë, navorsingsmetodes en -tegnieke wat relevant is vir Geo- en Ruimtelike navorsing;*

- *Die vermoë te demonstreer om verskeie bronne van kennis in die veld van Geo- en Ruimtelike navorsing te kan raadpleeg, en daardie kennis en die wyse van produksie van daardie kennis krities te evalueer;*
- *Die vermoë te demonstreer om navorsingsmetodes te identifiseer, analiseer en effektief toe te pas onder leiding van 'n studieleier, ten einde komplekse of abstrakte probleme in Geo- en Ruimtelike Wetenskap te oorweeg en aan te spreek;*
- *Die vermoë te demonstreer om volle verantwoordelikheid te aanvaar vir eie navorsing, leer, besluitneming en gebruik van hulpbronne, as ook vir die skryf van die navorsingsartikel en aanbieding daarvan.*

Method of delivery: Full Time
Metode van aflewering: *Voltyds*

Assessment modes:
The final module mark is the non-weighted average of the formal formative and the summative assessment marks.
The average module mark has to be above 50% for the student to pass the module.
Students need at least 40% in order to qualify for the summative assessment opportunities./

Assesseringsmetodes:
Die finale modulepunt is die ongeweegde gemiddeld van die formele formatiewe assesseringspunt en die summatiewe assesseringspunt.
'n Student benodig ten minste 50% vir die gemiddelde punt om die module te slaag.
'n Minimumpunt van 40% word benodig om te kwalifiseer vir die summatiewe assesseringsgeleenthede.

Module code / ***Modulekode:*** **SRSK323**	**Semester 2**	**NQF level /** ***NKR vlak:*** **7** **Credits /** ***Krediete*****: 16**

Title/ *Titel*: **Urban Risk Management /** ***Stedelike Rampbestuur***

Module outcomes:
Students should be able to:
- Demonstrate integrated knowledge and logical understanding of , disaster risk management concepts and theories and how they relate to urban planning;
- Demonstrate coherent understanding of natural hazards and underlying socio-economic drivers of disaster risk in urban areas;
- Demonstrate the ability to reflect on and apply theoretical knowledge of disaster risk management to assess the level of urban disaster risk in case studies within developing world contexts;
- Demonstrate an advanced ability to analyse, evaluate and consider the efficacy of theories and practices that aim reduce disaster risk and build resilient urban environments; and
- Demonstrate an ability to develop and communicate own ideas and opinions in well-formed arguments, using appropriate academic, professional, or occupational discourse./

Module uitkomste:
Studente moet in staat wees om
- *Geïntegreerde kennis en logiese insig te demonstreer van ramprisikobestuurskonsepte en -teorieë die die verband daarmee met stedelike beplanning;*
- *Bewys te lewer van duidelike insig van natuurgevare en onderliggende sosio-ekonomiese stukragte van ramprisiko in stedelike gebiede;*
- *Bewys te lewer van die vermoë om teoretiese kennis van ramprisikobestuur ter assessering van die vlak van stedelike ramprisiko in die konteks van 'n ontwikkelende wêreld, te bepeins en toe te pas;*
- *Bewys te lewer van 'n gevorderde vermoë om die probaatheid van teorieë en praktyke wat op 'n verminderde vlak van stedelike ramprisiko gemik is, en om weerstandige stedelike omgewings te bou, te ontleed, evalueer en bedink; en*

- *Bewys te lewer van 'n vermoë om eie idees en opinies in goedgeformuleerde argumente te ontwikkel en oor te dra deur die gebruik van geskikte akademiese, professionele of beroepsredevoering.*

Method of delivery: Full-time
Metode van aflewering: *Voltyds*

Assessment modes:
The final module mark is the non-weighted average of the formal formative and the summative assessment marks.
The average module mark has to be above 50% for the student to pass the module.
Students need at least 40% in order to qualify for the summative assessment opportunities./

Assesseringsmetodes:
Die finale modulepunt is die ongeweegde gemiddeld van die formele formatiewe assesseringspunt en die summatiewe assesseringspunt.
'n Student benodig ten minste 50% vir die gemiddelde punt om die module te slaag.
'n Minimumpunt van 40% word benodig om te kwalifiseer vir die summatiewe assesseringsgeleenthede.

Module code / ***Modulekode:*** **SSBP421**	**Semester 2**	**NQF level /** ***NKR vlak:*** **8** **Credits /** ***Krediete*****: 16**

Title/ *Titel:* **Planning Practice /** ***Beplanningspraktyk***

Module outcomes:
Students should be able to:
- Function effectively in relation to other planners, the government and the public, within the context of planning legislation and the systems of ethical codes determined by the Council for Planners and the Planning Institute;
- Apply knowledge in professional practice relating to planning legislation and private law, liaising with other professions, the role and function of the government at national, provincial, district, local and traditional levels and to function effectively with other professions and these institutions;
- Understand the complexities in the practice of identifying legal procedures, analysing existing policies and development guidelines and consultation with stakeholders and the general public in order to propose cost effective procedures to clients at the submission of development applications;
- Collect and critically reflect on cadastral, legal and physical data relevant to development applications, criteria, norms, standards and design principles applicable in professional practice in order to propose creative, legally correct and cost effective procedures to clients;
- Through the application of specialised skills, analyse and address complex issues relating to the preliminary investigation, submission, assessment and approval of development applications within the context of current legislation, policies and development guidelines applicable in the professional practice;
- Reflect on what the planner's decisions and ethical value systems will be on the design of a site and the subsequent submission of a development application and to address it within the context of prevailing design principles, policy, legislation and professional practice principles./

Module uitkomste:
Studente moet in staat wees om
- *Binne die konteks van beplanningswetgewing en die sisteme van etiese kodes, bepaal deur die Raad vir Beplanners en die Beplanningsinstituut, effektief te funksioneer in verhouding met ander beplanners, die owerheid en die publiek;*
- *Kennis toe te pas in die professionele praktyk aangaande beplanningswetgewing en privaatreg, skakeling met ander professies, die rol en funksie van die owerheid op nasionale-, provinsiale-, distriks-, plaaslike- en tradisionele vlak en verantwoordelik met ander professies en hierdie instellings te skakel;*

- *Begrip te demonstreer van die kompleksiteite betrokke in die praktyk rakende die identifisering van wetlike prosedures, analisering van bestaande beleid en ontwikkelingsriglyne en konsultasie met belanghebbendes en die algemene publiek ten einde koste-effektiewe prosedures aan kliënte voor te stel by die loods van ontwikkelingsaansoeke;*
- *Die insameling van kadastrale-, wetlike- en fisiese data betrokke by ontwikkelingsaansoeke en kriteria, norme, standaarde en ontwerpbeginsels van toepassing in die professionele praktyk, krities te ondersoek ten einde kreatiewe, wetlik korrekte en koste-effektiewe prosedures aan kliënte voor te stel;*
- *Deur die toepassing van gespesialiseerde vaardighede, komplekse probleme by die voorafgaande ondersoek, indiening, assessering en goedkeuring van ontwikkelingsaansoeke te analiseer en aan te spreek binne die konteks van heersende wetgewing, beleid en ontwikkelingsriglyne wat van toepassing is in die professionele praktyk; en*
- *Te reflekteer wat die besluite en etiese waardesisteme van die beplanner op die ontwerp van 'n terrein en daaropvolgende indiening van 'n ontwikkelingsaansoek sal wees en dit binne die konteks van heersende ontwerpbeginsels, beleid, wetgewing en professionele praktykbeginsels, aan te spreek.*

Method of delivery: Full-time
Metode van aflewering: *Voltyds*

Assessment modes:
The final module mark is the non-weighted average of the formal formative and the summative assessment marks.
The average module mark has to be above 50% for the student to pass the module.
Students need at least 40% in order to qualify for the summative assessment opportunities./

Assesseringsmetodes:
Die finale modulepunt is die ongeweegde gemiddeld van die formele formatiewe assesseringspunt en die summatiewe assesseringspunt.
'n Student benodig ten minste 50% vir die gemiddelde punt om die module te slaag.
'n Minimumpunt van 40% word benodig om te kwalifiseer vir die summatiewe assesseringsgeleenthede.

NAS.2.7.20 STATISTICS / *STATISTIEK*

Module code: STTN111	Semester 1	NQF Level: 5

Title / *Titel*: **Descriptive Statistics / *Beskrywende Statistiek***

Module outcomes:
A student who has completed this module should be able to demonstrate the following knowledge:
- Fundamental knowledge of the most important elementary statistical techniques used every day, such as sampling methods, determining sample size, graphical representation of data, descriptive measures of locality and scattering, least squares line fitting, predictions by means of least squares line fitting, correlation coefficients, time series data and movement components in order to predict future outcomes, practical considerations with regard to questionnaires; fundamental knowledge of probabilities and probability distributions, the central limit theorem, to demonstrate problem solving skills by solving familiar and unfamiliar problems; to implement the acquired knowledge to problems involving the above-mentioned skills and techniques. /

***Module uitkomste*:**
'n Student wat hierdie module voltooi het behoort die volgende kennis te kan toon:
- *Fundamentele kennis van die belangrikste elementêre statistiese tegnieke wat daagliks gebruik word, soos steekproefnemingsmetodes, bepaling van steekproefgroottes, grafiese voorstelling van data, beskrywende maatstawwe van lokaliteit en spreiding, kleinste kwadrate lynpassing, voorspellings deur middel van kleinste kwadrate lynpassing, die*

korrelasiekoëffisiënt, tydreeks dataanalise, beweginskomponente om toekomstige uitkomstes te voorspel, praktiese oorwegings aangaande vraelyste, fundamentele kennis van waarskynlikhede en waarskynlikheidsverdelings, die sentrale limietstelling, probleemoplossingsvaardighede deur bekende en onbekende probleme op te los, en om kennis wat opgedoen is aan te wend in toepassings rakende bogenoemde onderwerpe en tegnieke.

Method of delivery: Full Time
Metode van aflewering: *Voltyds*

Assessment modes:
Formative assessments: Class Tests, Assignments, and Class Work.
Summative assessments: Exam

Module code: STTN115	**Semester 1**	**NQF Level: 5**

Title / *Titel*: **Descriptive Statistics and Inference / *Beskrywende Statistiek en Inferensie***

Module outcomes:
Students should be able to:

- Demonstrate fundamental knowledge and understanding of the most important elementary statistical techniques that are used daily, such as sampling methods, graphical representation of data, descriptive measures of location and spread, least squares line fitting, prediction from least squares lines, the coefficient of correlation, multiple regression, time series data, movement components to predict future outcomes, practical considerations regarding sample surveys and sample sizes;
- Demonstrate knowledge and understanding of the normal and t probability distributions, the central limit theorem, estimation of population parameters by the use of point and interval estimation, hypothesis testing for population means and proportions for one and two samples (parametric and non-parametric);
- Demonstrate skills to use statistical knowledge and techniques to solve known and unknown real world problems and to communicate methods, solutions and conclusions as an individual and/or part of a group, orally and in writing in an ethical, responsible and acceptable way./

Module uitkomste:
Studente moet in staat wees om

- *Fundamentele kennis en begrip te demonstreer van die belangrikste elementêre statistiese tegnieke wat daagliks gebruik word, soos steekproefneming metodes, grafiese voorstelling van data, beskrywende maatstawwe van lokaliteit en spreiding, kleinste kwadrate lynpassing, voorspellings deur middel van kleinste kwadrate lynpassing , die korrelasiekoëffisiënt, meervoudige regressie, tydreeks data, beweginskomponente om toekomstige uitkomstes te voorspel, en praktiese oorwegings aangaande vraelyste en steekproefgroottes;*
- *Die student behoort ook kennis en begrip te demonstreer van die normaal en t waarskynlikheidsverdelings, die sentrale limietstelling, beraming van populasie parameters deur middel van punt- en intervalberaming, hipotesetoetsing vir populuasiegemiddeldes en –proporsies vir een en twee steekproewe (parametries en nie-parametries);*
- *Vaardighede te demonstreer om statistiese kennis en tegnieke te gebruik om bekende en onbekende werklikheidsgetroue probleme op te los en metodes, oplossings en gevolgtrekkings as individu en/of as lid van 'n groep op eties, verantwoordelike en aanvaarbare wyse skriftelik en mondeling te kommunikeer.*

Method of delivery: Full Time
Metode van aflewering: *Voltyds*

Assessment modes:
Formative assessments: Class Tests, Assignments, and Class Work.
Summative assessments: Exam

Module code: STTN121	Semester 2	NQF Level: 5

Title / *Titel*: **Introductory Statistical Inference / *Inleidende Statistiese Inferensie***

Module outcomes:

Students should be able to:

- Demonstrate fundamental knowledge of probabilities and probability distributions, the central limit theorem, estimation of population parameters by means of point and interval estimation, hypothesis testing for population averages and proportions for one and two samples, one way analysis of variance (ANOVA) and categorical data analysis, contingency tables and basic tests on categorical data;
- Demonstrate problem solving skills by analyzing familiar and unfamiliar problems, using acquired knowledge to solve simple probability problems, applying the knowledge gained above on data where applicable. /

Module uitkomste:

Studente moet in staat wees om

- *Fundamentele kennis van waarskynlikhede en waarskynlikheidsverdelings, die sentrale limietstelling, beraming van populasie parameters deur middel van punt- en intervalberaming, hipotesetoetsing vir populasiegemiddeldes en –proporsies vir een en twee steekproewe, eenrigting variansieanalise (ANOVA) en kategoriese data analise, gebeurlikheidstabelle en basiese toetse op kategoriese data te demonstreer;*
- *Probleemoplossingsvaardighede te demonstreer deur oplossing van bekende en onbekende probleme, om kennis wat opgedoen is te gebruik om eenvoudige probleme op te los rakende bostaande onderwerpe*

Method of delivery: Full Time
Metode van aflewering: *Voltyds*

Assessment modes:
Formative assessments: Class Tests, Assignments, and Class Work.
Summative assessments: Exam

Module code: STTN122	Semester 2	NQF Level: 5

Title / *Titel*: **Introductory Statistics / *Inleidende Statistiek***

Module outcomes:

Students should be able to:

- Demonstrate statistical techniques used everyday, for example sampling methods, graphical representation of data and descriptive measures of locality and scattering;
- Use fitting linear regression curves to bivariate data and using the least squares method;
- Make simple predictions by using appropriate curves, as well as by interpreting the correlation coefficient;
- Handle time series data and calculate movement components in order to predict future outcomes;
- Carry out simple probability calculations and use probability distributions;
- Demonstrate the central limit theorem and applying it to practical problems;
- Estimate population parameters by means of point and interval estimation;
- Demonstrate hypothetical testing for population averages and population proportions in one or two sampling cases.
- Identify the presence and applicability of the above statistical concepts in a practical situation, as well as to perform statistical methods using manual analysis or statistical software./

Module uitkomste:

Studente moet in staat wees om

- *Statistiese tegnieke wat daagliks gebruik word bv. Steekproefmetodes, grafiese voorstelling van die data en beskrywende maatstawwe van lokaliteit en spreading, te demonstreer;*
- *Lineêre regressie krommes te pas op tweeveranderlike data en die kleinste kwadrate metode te kan gebruik;*
- *Eenvoudige voorspellings te maak met die gepaste kromme, asook die interpretasie van die korrelasiekoeffisiënt;*
- *Die hantering van tydreeksdata en die berekening van bewegingskomponente te demonstreer ten einde toekomstige uitkomstes te kan voorspel;*
- *Eenvoudige waarskynlikheidsberekeninge uit te voer en van waarskynlikheidsverdelings te gebruik;*
- *Die sentrale limietstelling en die toepassing daarvan op praktiese problem te demonstreer;*
- *Die beraming van populasieparameters m.b.v. Punt- en intervalberaming te demonstreer;*
- *Hipotesetoetsing vir populasiegemiddeldes en populasieproporsies vir een en twee steekproef gevalle te demonstreer;*
- *Die teenwoordigheid en toepasbaarheid van bostaande statistiese konsepte te kan herken in 'n praktiese situasie, asook die uitvoering van statistiese metodes deur gebruik te maak van ontleding per hand of d.m.v. Statistiese sagteware.*

Method of delivery: Full Time
Metode van aflewering: *Voltyds*

Assessment modes:
Formative assessments: Class Tests, Assignments, and Class Work.
Summative assessments: Exam

Module code: STTN124	**Semester 2**	**NQF Level: 5**

Title / *Titel*: **Practical Statistics / *Praktiese Statistiek***

Module outcomes:
Students should be able to:

- Demonstrate correlation and its interpretation, the method of least squares fitting to a regression function prediction by means of a regression function, multiple linear regression and selection of predictors;
- Do basic factor analysis and the interpretation of its results, interpretation of factor matrices and construct validity;
- Demonstrate the hypothesis testing procedure, probability calculations, the central limit theorem, level of significance and p values;
- Demonstrate one-way anova testing procedures and the interpretation of results;
- Discuss the practical significance of effect sizes of differences in averages and proportions for one and two populations;
- Do categorical data analysis by means of contingency tables, chi-squared tests and independence tests;
- Demonstrate distribution-free methods: the difference between parametric and nonparametric methods of inference, as well as deciding which method to use in a specific situation;
- Identify the presence and applicability of statistical concepts in a practical situation, as well as to perform statistical methods using manual analysis or statistical software./

Module uitkomste:
Studente moet in staat wees om

- *Korrelasie en die interpretasie daarvan, die metode van kleinste kwadrate, passing van 'n regressiefunksie, voorspelling m.b.v. 'N regressiefunksie, meervoudige lineêre regressie en die seleksie van voorspellers, te demonstreer;*
- *Basiese faktoranalise en die interpretasie van resultate daarvan, interpretasie van faktor matrikse en konstrukgeldigheid uit te voer;*

- *Die hipotesetoetsingsprosedure, waarskynlikheidsberekeninge, die sentrale limietstelling, betekenispeil en p-waardes te demonstreer;*
- *Een-rigting anova toetsingsprosedures, die interpretasie van resultate te demonstreer;*
- *Praktiese betekenisvolheid van effekgroottes van verskille in gemiddeldes en proporsies vir een en twee populasies te bespreek;*
- *Kategoriese data-analise m.b.v. Gebeurlikheidstabelle, chi-kwadraat passingstoetse en toetse vir onafhanklikheid uit te voer;*
- *Verdelingsvrye metodes te demonstreer: die verskil tussen parametriese en nie-parametriese metodes van inferensie asook om te besluit welke metode om te gebruik in 'n bepaalde situasie;*
- *Die teenwoordigheid en toepasbaarheid van bostaande statistiese konsepte te kan herken in 'n praktiese situasie, asook die uitvoering van statistiese metodes daarvan deur gebruik te maak van ontleding per hand of d.m.v. Statistiese sagteware.*

Method of delivery: Full Time
Metode van aflewering: *Voltyds*

Assessment modes:
Formative assessments: Class Tests, Assignments, and Class Work.
Summative assessments: Exam

Module code: STTN125	**Semester 2**	**NQF Level: 5**

Title / *Titel*: **Introductory Probability Theory / *Inleidende Waarskynlikheidsleer***

Module outcomes:
On completion of the module the learner should be able to

- Demonstrate knowledge and understanding of
  - concepts such as the sample space, events, probability measures, counting methods, random outcomes of events and the independence of events;
  - important probability theorems such as the law of total probability and the theorem of Bayes;
  - random variables, distribution functions and mass function, discrete random variables and the following distributions: binomial, geometric, negative binomial, hyper geometric, and Poisson as well as exponential, gamma and normal distributions and the functions of these variables;
- Demonstrate skills to use statistical knowledge and techniques to solve known and unknown real world problems and to communicate methods, solutions and conclusions as an individual and/or part of a group, orally and in writing in an ethical, responsible and acceptable way./

***Module uitkomste*:**
Na voltooiing van die module behoort die student

- *Kennis en begrip te demonstreer van*
  - *konsepte soos die uitkomsruimte, gebeurtenisse, waarskylikheidmate, telprosesse, stogastiese uitkomstes van gebeurtenisse en die onafhanklikheid van gebeurtenisse;*
  - *belangrike waarskylikheidsleerstellings soos die wet van totale waarskylikheid en die stelling van Bayes;*
  - *stogastiese veranderlikes, verdelingsfunksies en massafunksies, diskrete stogastiese veranderlikes en die volgende verdelings: binomiaal, geometries, negatief binomiaal, hipergeometries en Poisson sowel as die kontinue stogastiese veranderlikes tesame met hul verdelingsfunksies: eksponensieel, gamma en normaalverdelings en funksies van die veranderlikes;*
- *Vaardighede te demonstreer om statistiese kennis en tegnieke te gebruik om bekende en onbekende werklikheidsgetroue probleme op te los en metodes, oplossings en*

gevolgtrekkings as individu en/of as lid van 'n groep op eties, verantwoordelike en aanvaarbare wyse skriftelik en mondeling te kommunikeer

Method of delivery: Full Time
Metode van aflewering: *Voltyds*

Assessment modes:
Formative assessments: Class Tests, Assignments, and Class Work.
Summative assessments: Exam

Module code: STTN215	**Semester 1**	**NQF Level: 6**

Title / *Titel*: **Probability and Sampling Theory** ***/ Waarskynlikheidsleer en Steekproefteorie***

Module outcomes:
On completion of the module the student should be able to:

- Demonstrate knowledge of:
  - the probability structure of two or more random variables as well as their joint distributions;
  - copulas and their properties;
  - conditional distributions and the application of probability calculations on conditional distributions;
  - order statistics and the application thereof;
  - the expected value and variance of all the important discrete and continuous random variables that were discussed in earlier work;
  - the covariance and correlation of two random variables, in addition to conditional expected values and moment generating functions;
  - two of the most important theorems of Probability theory, the so-called Law of Large Numbers and the Central Limit Theorem.
  - distributions derived from the normal distribution;
- Demonstrate problem solving skills by analysing problems that had been previously encountered and problems that are new and unfamiliar.
- Use computer programming software to apply these concepts practically./

***Module uitkomste*:**
Na voltooiing van die module behoort die student in staat te wees om:

- *Kennis te toon van:*
  - *die waarskynlikheidstruktuur van twee of meer stogastiese veranderlikes sowel as hul gesamentlike verdelings;*
  - *copulas en die eienskappe daarvan;*
  - *voorwaardelike verdelings en die toepassing van waarskynlikheidsberekeninge op voorwaardelike verdelings;*
  - *orde-statistieke en die toepassing daarvan;*
  - *die verwagte waarde en variansie van belangrike diskrete en kontinue stogastiese veranderlikes wat in vorige werk behandel is;*
  - *die kovariansie en korrelasie van twee stogastiese veranderlikes, sowel as voorwaardelike verwagte waardes en momentvoortbringende funksies;*
  - *twee van die belangrikste stellings in Waarskynlikheidsleer, die sogenaamde Wet van Groot Getalle en die Sentrale Limietstelling;*
  - *verdelings afgelei uit die normaalverdeling;*
- *Probleemoplossingstegnieke te demonstreer deur bekende en nuwe, onbekende probleme te ontleed;*
- *Programmeringssagtewarete kan gebruik om hierdie konsepte prakties toe te pas.*

Method of delivery: Full Time
Metode van aflewering: *Voltyds*

Assessment modes:
Formative assessments: Class Tests, Assignments, and Class Work.
Summative assessments: Exam

Module code: STTN225	**Semester 2**	**NQF Level: 6**

Title / *Titel*: **Statistical Inference and Data Analysis / *Statistiese Inferensie en Data-analise***

Module outcomes:

On completion of the module the student should be able to:

- Demonstrate fundamental knowledge of the following statistical concepts: method of moments and the method of maximum likelihood to estimate parameters, efficiency of an estimator, sufficient statistics, the testing of hypotheses, the duality of confidence intervals and hypothesis testing, informal techniques for assessing goodness of fit, methods for summarizing data, measures of location and spread, density estimation, and the bootstrap.
- Demonstrate problem solving skills by analysing familiar and unfamiliar problems, estimating parameters by means of the method of moments and maximum likelihood, determining if an estimator is efficient and finding sufficient statistics in a variety of problems.
- Demonstrate the ability to construct complete and sufficient statistics, use the neyman-pearson paradigm to perform a hypothesis test, apply the connection between hypothesis testing and confidence intervals in the context of estimation, make conclusions using descriptive statistics, apply methods for summarizing data, calculate measures of location and spread, be able to use the bootstrap to (a) construct confidence intervals for a parameter and (b) estimate the variability of an estimator.
- Apply these concepts to real-world data.
- Use computer programming software to apply these concepts practically./

***Module uitkomste*:**

Met afhandeling van hierdie module moet die student instaat wees om:

- *Fundamentele kennis te demonstreer van die volgende statistiese konsepte: metode van momente en die metode van maksimum aanneemlikheid ten einde parameters te beraam, doeltreffendheid van 'n beramer, voldoende statistieke, hipotesetoetsing, die dualiteit tussen vertrouensintervalle en hipotesetoetsing, informele tegnieke vir pasgehaltetoetsing, metodes van data-opsomming, maatstawwe van lokaliteit en spreiding, digtheidsfunksieberaming, en die skoenlusmetode.*
- *Probleemoplossing kundigheid ten toon te stel vir die analisering van bekende en onbekende probleme, parameters te beraam deur middel van die metode van maksimum aanneemlikheid en momente, bepaal welke 'n beramer doeltreffend is en voldoende statistieke te vind vir 'n verskeidenheid probleme.*
- *Kundigheid ten toon stel in die opstel van volledige envoldoende statistieke, gebruik van die neyman-pearson paradigma ten einde hipotesetoetsing uit te voer, toepassing van die verband tussen hipotesetoetsing en vertrouensintervalle in die konteks van beraming, gevolgtrekkings te maak deur beskrywende statistiek te gebruik, metodes van data-opsomming toe te pas, berekening van maatstawwe van lokaliteit en spreiding, instaat te wees om die skoenlusmetode toe te pas vir (a) die opstel van vertrouensintervalle vir parameters en (b) beraming van 'n beramer se variasie.*
- *Bogenoemde konsepte toe te pas op data soos gevind in die praktyk.*
- *Programmeringssagteware te kan gebruik om hierdie konsepte prakties toe te pas*

Method of delivery: Full Time
Metode van aflewering: *Voltyds*

Assessment modes:
Formative assessments: Class Tests, Assignments, and Class Work.
Summative assessments: Exam

Module code: STTN316	**Semester 1**	**NQF Level: 7**

Title/*Titel*: **Linear Models I / *Lineêre Modelle I***

Module outcomes:
Students should be able to:

- Demonstrate integrated knowledge of linear statistical models including an understanding of, and an ability to apply, these models in theoretical and real-world settings;
- Identify, analyse, critically reflect on and address complex statistical problems, applying theory driven arguments based on linear statistical models;
- Display problem solving skills by analysing problems that had been previously encountered and problems that are new and unfamiliar./

Module uitkomste:
Studente moet in staat wees om

- *Geïntegreerde kennis van die toepassing van lineêre statistiese modelle insluitende begrip van, en 'n vermoë om, hulle toe te pas in teoretiese en werklikewereld scenarios, te demonstreer;*
- *Komplekse statistiese probleme te identifiseer, te analiseer, krities daaroor te reflekteer en aan te spreek, met toepassing van teoriegedrewe argumente gebaseer op lineêre statistiese modelle;*
- *Probleemoplossingstegnieke te openbaar deur bekende en nuwe, onbekende probleme te ontleed.*

Method of delivery: Full Time
Metode van aflewering: *Voltyds*

Assessment modes:
Formative assessments: Class Tests, Assignments, and Class Work.
Summative assessments: Exam

Module code: STTN317	**Semester 1**	**NQF Level: 7**

Title/*Titel*: **Statistical software and Applications I / *Statistiese Sagteware en Toepassings I***

Module outcomes:
Students should be able to:

- Demonstrate integrated knowledge of the application of statistical software to conduct various statistical analyses;
- Display problem solving skills by analysing proble;s that had been previously encountered and problems that are new and unfamiliar.
- Communicate his or her statistical results and conclusions in a well-formed argument using appropriate academic and professional language./

Module uitkomste:
Studente moet in staat wees om

- *Geïntegreerde kennis van die toepassing van statistiese sagteware om verskillende statistiese ontledings uit te voer, te demonstreer;*
- *Probleemoplossingstegnieke te openbaar deur bekende en nuwe, onbekende probleme te ontleed;*
- *Sy of haar statistiese resultate en gevolgtrekkings in 'n goed gevormde argument te kommunikeer deur gebruik te maak van toepaslike akademiese en professionele taal.*

Method of delivery: Full Time
Metode van aflewering: *Voltyds*

Assessment modes:
Formative assessments: Class Tests, Assignments, and Class Work.
Summative assessments: Exam

Module code: STTN326	**Semester 2**	**NQF Level: 7**

Title/*Titel*: **Analysis of Dependent Data / *Analise van Afhanklike Data***

Module outcomes:
Students should be able to:

- *Demonstrate integrated knowledge of time series models and critical understanding and application of these models;*
- *Demonstrate integrated knowledge of copulas and critical understanding and application of copulas;*
- *Select, apply, and critically judge the effectiveness of the implementation of relevant time series models and various types of copulas./*

Module uitkomste:
Studente moet in staat wees om

- *Geïntegreerde kennis van tydreeksmodelle en 'n kritiese begrip en toepassing van hierdie modelle te demonstreer;*
- *Geïntegreerde kennis van copulas en 'n kritiese begrip en toepassing van copulas te demonstreer;*
- *Krities die doeltreffendheid van die implementering van toepaslike tydreeksmodelle en verskeie soorte copulas te beoordeel.*

Method of delivery: Full Time
Metode van aflewering: *Voltyds*

Assessment modes:
Formative assessments: Class Tests, Assignments, and Class Work.
Summative assessments: Exam

Module code: STTN327	**Semester 2**	**NQF Level: 7**

Title/*Titel*: **Statistical Software and Applications II / *Statistiese Sagteware en Toepassings II***

Module outcomes:
Students should be able to:

- Demonstrate integrated knowledge of the application of statistical software to conduct various statistical analyses;
- Display problem solving skills by analysing problems that had been previously encountered and problems that are new and unfamiliar;
- Communicate his or her statistical results and conclusions in a well-formed argument using appropriate academic and professional language./

Module uitkomste:
Studente moet in staat wees om

- *Geïntegreerde kennis van die toepassing van statistiese sagteware om verskillende statistiese ontledings uit te voer, te demonstreer;*
- *Probleemoplossingstegnieke openbaar deur bekende en nuwe, onbekende probleme te ontleed;*
- *Sy of haar statistiese resultate en gevolgtrekkings in 'n goed gevormde argument te kommunikeer deur gebruik te maak van toepaslike akademiese en professionele taal.*

Method of delivery: Full Time
Metode van aflewering: *Voltyds*

Assessment modes:
Formative assessments: Class Tests, Assignments, and Class Work.
Summative assessments: Exam

Module code: STTK214	**Semester 1**	**NQF Level: 6**

Title / *Titel*: **Statistics for Life Sciences / *Statistiek vir Lewenswetenskappe***

Module outcomes:
Students should be able to:

- Demonstrate knowledge and the ability to effectively apply the following:
  - the most important statistical techniques that are used daily, such as sampling methods, graphical representation of data, descriptive measures of location and spread;
  - linear regression curves to bivariate data using the least squares technique;
  - simple predictions by means of the fitted curve, and interpretation of the coefficient of correlation;
  - time series data and the calculation of the movement components to predict future outcomes;
  - simple probability calculations and probability distributions;
  - the central limit theorem and the application of the theorem to practical problems;
  - estimating population parameters by using point and interval estimation;
  - hypothesis testing for population means and population proportions for one and two samples;
  - one way and two way ANOVA;
  - chi squared test for independence;
  - principle component analysis.
- Recognise the presence and applicability of statistical concepts in a practical situation and perform statistical methods to summarise, understand and analyse data sets by using statistical computer software.
- Identify the appropriate statistical technique applicable to the problem presented./

Module uitkomste:
Studente moet in staat wees om

- *Kennis te dra van die volgende begrippe en in staat te wees om die volgende toe te pas:*
  - *statistiese tegnieke wat daagliks gebruik word bv. steekproefmetodes, grafiese voorstelling van die data en beskrywende maatstawwe van lokaliteit en spreiding;*
  - *lineêre regressie krommes te pas op tweeveranderlike data en die kleinste kwadrate metode te kan gebruik;*
  - *eenvoudige voorspellings te maak met die gepaste kromme, asook die interpretasie van die korrelasiekoeffisiënt;*
  - *die hantering van tydreeksdata en die berekening van bewegingskomponente ten einde toekomstige uitkomstes te kan voorspel;*
  - *die uitvoering van eenvoudige waarskynlikheidsberekeninge en die gebruik van waarskynlikheidsverdelings;*
  - *die sentrale limietstelling en die toepassing daarvan op praktiese probleme;*
  - *die beraming van populasieparameters m.b.v. punt- en intervalberaming;*
  - *hipotesetoetsing vir populasiegemiddeldes en populasieproporsies vir een en twee steekproef gevalle;*
  - *Eenrigting- en tweerigting ANOVA;*
  - *Chi-kwadraat toets vir onafhanklikheid; en*
  - *Hoofkomponentontleding.*

- *Die toepaslikheid van bostaande statistiese konsepte in 'n praktiese omgewing te erken en statistiese metodes daarop kan toepas om datastelle op te som, te verstaan en te ontleed d.m.v. Statistiese rekenaarsagteware;*
- *Die statistiese tegniek te kan identifiseer wat toepaslik is vir 'n bepaalde probleem.*

Method of delivery: Full Time
Metode van aflewering: *Voltyds*

Assessment modes:
Formative assessments: Class Tests, Assignments, and Class Work.
Summative assessments: Exam

NAS.2.7.21 APPLIED MATHEMATICS / *TOEGEPASTE WISKUNDE*

Module code: APPM111 / APPM171	**Semester 1**	**NQF Level 5**

Title: **Introduction to Mechanics**

Module Outcomes:
On completion of this module, the student will demonstrate a thorough and advanced knowledge of, and skill in:
- The understanding of classical mechanics, in particular regarding the topics of vector algebra, forces at a point, friction, kinematics, composition of velocities, Newton's laws of motion, motion under gravity, work, power, energy, circular motion, simple harmonic motion;
- The identification of problems and the application of classical mechanics to solve the problems; and
- The interpretation of results and ability to communicate principles of classical mechanics to relevant stake holders.

Method of delivery: Full Time

Assessment modes:
Formative assessment:
Assignments, formal tests and class tests, homework, and projects that integrate the various outcomes of the module.
Summative assessment:
A written examination integrating the various aspects of the module wherein the extent to which students have attained the outcomes of the module will be assessed by means of both applied and theoretical questions.

Module code: APPM121	**Semester 2**	**NQF Level: 5**

Title / *Titel*: **Statics and Mathematical Modelling / *Statika en Wiskundige Modellering***

Module outcomes:
Students should be able to:
- Demonstrate fundamental knowledge of geometric vectors and their operational rules, vectors, forces, components, scalar and vector product, Cartesian forms, resultant of two- and three-dimensional systems of force through a point, the principle of transmissibility, moments, couples, reduction of systems of forces to a single force and a single couple, equilibrium in a plane and equilibrium in space, friction and moments rotating about axes, the modelling process, geometric similarity and proportionalities, dimensional analysis and the theorem of Buckingham;
- Demonstrate problem solving skills by analysing familiar and unfamiliar problems, by using knowledge of techniques to determine resultants of different types of systems of force, by solving equilibrium problems in two and three dimensions, by forming and solving models by means of proportionality relations and dimensional analysis, by fitting models to data and by solving simple differential equations./

Module uitkomste:

Studente moet in staat wees om

- *Fundamentele kennis demonstreer van meetkundige vektore en hul bewerkingsreëls, vektore, kragte, komponente, skalaar- en vektorproduk, Cartesiese vorms, resultant van 2 en 3-dimensionele kragtestelsels deur 'n punt, die beginsel van voortplaasbaarheid, momente, koppels, herleiding van stelsels kragte na 'n enkele krag en 'n enkele koppel, ewewig in die platvlak en ewewig in die ruimte, wrywing en momente om asse, die modelleringsproses, meetkundige soortgelykhied en eweredighede, dimensionele analise en die stelling van Buckingham;*
- *Probleemoplossingsvaardighede demonstreer deur bekende en onbekende probleme te analiseer, kennis van tegnieke gebruik om resultante van verskillende tipes kragtestelsels te bepaal, ewewigsprobleme in 2 en 3-dimensies oplos, modelle met eweredigheidsverbande en deur dimensionele analise te vorm en op te los en modelle by data te pas.*

Method of delivery: Full Time
Metode van aflewering: *Voltyds*

Assessment modes:
Formative assessment
Assignments, formal tests and class tests, homework, and projects that integrate the various outcomes of the module.
Summative assessment
A written examination integrating the various aspects of the module wherein the extent to which students have attained the outcomes of the module will be assessed by means of both applied and theoretical questions./

Assesseringsmetodes:
Formatiewe assessering
Opdragte, formele toetse en klastoetse, huiswerk, en projekte wat die verskillende uitkomstes van die module integreer.
Summatiewe assessering
'n Geskrewe eksamen waarin die verskillende aspekte van die module geïntegreer word, waarin die mate waarin studente die uitkomste van die module bereik het, deur middel van beide toegepaste en teoretiese vrae geassesseer word.

Module code: APPM122 / APPM172	**Semester 2**	**NQF Level: 5**

Title / *Titel*: **Mathematical Modelling and Vector Algebra / *Wiskundige Modellering en Vektoralgebra***

Module Outcomes:
On completing this module, students should demonstrate an advanced knowledge and applied insight into:

- Understanding the process of mathematical modelling, identifying and constructing models
- Geometric similarity and Proportionalities
- Fitting of curves to data by means of: graphical fitting, Chebyshev approximation and least-squares criterion
- Separable and first-order differential equations
- Growth and decay processes: Malthus growth and logistic growth
- Dimensional analysis: dimensions, theorem of Buckingham, a damped pendulum and similitude
- Vector algebra: force systems, coplanar equilibrium analysis and three-dimensional equilibrium./

***Module-uitkomste*:**
By voltooiing van die module, behoort studente gevorderde kennis en toepasbare insig kan demonstreer rakende:

- *Begrip vir die proses van wiskundige modellering, identifisering en konstruksie van modelle*
- *Meetkundige soortgelykheid en eweredighede*

- *Krommepassing aan data met behulp van: grafiese passing, Tsjebisjeff benadering en kleinste-kwadrate kriterium*
- *Skeibare en eerste-orde differensiaal vergelykings*
- *Groei en verval prosesse: Malthus groei en logistiese groei*
- *Dimensionele analise: dimensies, stelling van Buckingham, 'n gedempte pendulum en gelykvormigheid*
- *Vektor algebra: kragstelsels, saamvlakkige ewewigsanalise en drie-dimensionele ewewig.*

Method of delivery: Full Time
Metode van aflewering: *Voltyds*

Assessment modes:
Formative assessment
Assignments, formal tests and class tests, homework, and projects that integrate the various outcomes of the module.
Summative assessment
A written examination integrating the various aspects of the module wherein the extent to which students have attained the outcomes of the module will be assessed by means of both applied and theoretical questions./

Assesseringsmetodes:
Formatiewe assessering
Opdragte, formele toetse en klastoetse, huiswerk, en projekte wat die verskillende uitkomstes van die module integreer.
Summatiewe assessering
'n Geskrewe eksamen waarin die verskillende aspekte van die module geïntegreer word, waarin die mate waarin studente die uitkomste van die module bereik het, deur middel van beide toegepaste en teoretiese vrae geassesseer word.

Module code: APPM211	**Semester 1**	**NQF Level: 6**

Title / *Titel*: **Dynamics I / *Dinamika* I**

Module outcomes:
On completion of this module, students should be able to do the following:
- Demonstrate fundamental knowledge of kinematics and kinetics of a single particle, a system of particles and a rigid body, all moving along a straight line or a curved trajectory.
- Demonstrate problem solving skills by analysing familiar and unfamiliar problems and using knowledge of kinematics and kinetics to calculate time duration, displacements, velocities, accelerations, forces, work done, energy, momentum, impulse, moment of inertia, angular impulse and angular momentum./

Module-uitkomstes:
Na voltooiing van hierdie module behoort die studente die volgende te kan doen:
- *Fundamentele kennis demonstreer van die kinematika en kinetika van 'n enkel deeltjie, 'n stelsel deeltjies en 'n starre liggaam vir reglynige en kromlynige bane.*
- *Probleemoplossingsvaardighede demonstreer deur bekende en onbekende probleme te analiseer en kennis van kinematika en kinetika te gebruik om tydsverloop, verplasings, snelhede, versnellings, kragte, arbeid verrig, energie, momentum, impuls, traagheidsmoment, hoekimpuls en hoekmomentum te bereken.*

Method of delivery: Full Time
Metode van aflewering: *Voltyds*

Assessment modes:
Formative assessment
Assignments, formal tests and class tests, homework, and projects that integrate the various outcomes of the module.
Summative assessment

A written examination integrating the various aspects of the module wherein the extent to which students have attained the outcomes of the module will be assessed by means of both applied and theoretical questions./

Assesseringsmetodes:
Formatiewe assessering
Opdragte, formele toetse en klastoetse, huiswerk, en projekte wat die verskillende uitkomstes van die module integreer.
Summatiewe assessering
'n Geskrewe eksamen waarin die verskillende aspekte van die module geïntegreer word, waarin die mate waarin studente die uitkomste van die module bereik het, deur middel van beide toegepaste en teoretiese vrae geassesseer word.

Module code: APPM212	**Semester 1**	**NQF Level: 6**

Title / *Titel*: **Differential Equations / *Differensiaalvergelykings***

Module outcomes:
On completion of this module, the student will demonstrate a thorough and advanced knowledge of, and skill in

- the underlying principles,
- the methods, and
- the application of the theory

regarding selected aspects of the following topics:

- Solution methods for separable, linear, Bernoulli, homogenous, and exact first order differential equations;
- Euler's method for approximating the solution of a differential equation;
- Solution of homogenous linear second order differential equations with constant coefficients;
- Solution of linear second order differential equations using the methods of undetermined coefficients and of variation of parameters;
- Laplace transforms and inverse Laplace transforms;
- Solution of first and second order initial value differential equations using Laplace transforms of continuous and discontinuous functions;
- Elementary modelling of practical problems using differential equations./

Module-uitkomstes:
Na voltooiing van die module, sal die student 'n deeglike en geordende kennis van, en vaardigheid in

- *die onderliggende beginsels,*
- *die metodes, en*
- *die toepassings van die teorie*

rakende geselekteerde aspekte van die volgende onderwerpe demonstreer:

- *Oplossingstegnieke vir lineêre, Bernoulli, skeibare, homogene en eksakte eerste-orde differensiaalvergelykings;*
- *Euler se metode om 'n differensiaalvergelyking se oplossing te benader;*
- *Oplossing van tweede-orde lineêre homogene differensiaalvergelykings met konstante koëffisiënte;*
- *Oplossing van tweede-orde differensiaalvergelykings met behulp van die metodes van onbepaalde koëffisiënte, en van variasie van parameters;*
- *Laplace transforms en inverse Laplace transforms;*
- *Oplossing van eerste- en tweede-orde differensiaalvergelykings met behulp van Laplace transforms vir kontinue en diskontinue funksies;*
- *Elementêre modellering van praktiese probleme met behulp van differensiaalvergelykings.*

Method of delivery: Full Time
Metode van aflewering: *Voltyds*

Assessment modes:
Formative assessment
Assignments, formal tests and class tests, homework, and projects that integrate the various outcomes of the module.
Summative assessment
A written examination integrating the various aspects of the module wherein the extent to which students have attained the outcomes of the module will be assessed by means of both applied and theoretical questions./

Assesseringsmetodes:
Formatiewe assessering
Opdragte, formele toetse en klastoetse, huiswerk, en projekte wat die verskillende uitkomstes van die module integreer.
Summatiewe assessering
'n Geskrewe eksamen waarin die verskillende aspekte van die module geïntegreer word, waarin die mate waarin studente die uitkomste van die module bereik het, deur middel van beide toegepaste en teoretiese vrae geassesseer word.

Module code: APPM213	**Semester 1**	**NQF Level: 6**

Title / *Titel*: **Linear Programming**

Module outcomes:
On completion of this module, the student will demonstrate a thorough and advanced knowledge of, and skill in

- The understanding of linear programming, in particular regarding the topics of simplex algorithm; duality problems; sensitivity analysis; revised simplex algorithm; integer programming; transportation programming; dynamic programming;
- The identification of problems and the application of linear programming to solve these problems; and
- The interpretation of results and ability to communicate principles of linear programming to relevant stake holders.

Method of delivery: Full Time

Assessment modes:
Formative assessment
Assignments, formal tests and class tests, homework, and projects that integrate the various outcomes of the module.
Summative assessment
A written examination integrating the various aspects of the module wherein the extent to which students have attained the outcomes of the module will be assessed by means of both applied and theoretical questions.

Module code: APPM221	**Semester 2**	**NQF Level: 6**

Title / *Titel*: **Dynamics II / *Dinamika II***

Module outcomes:
On completing this module students should be able to do the following:

- Demonstrate fundamental knowledge of the theory of flexible cables, internal forces and deformation of simple beams, kinetics of rigid bodies and the motion of satellites and planets;
- Demonstrate problem solving skills by solving familiar and unfamiliar problems involving deformations in beams and cables and motion of rigid bodies acted on by forces, and determining the orbits and positions of satellites./

Module-uitkomste:
Na voltooiing van hierdie module behoort die studente die volgende te kan doen:

- *Fundamentele kennis demonstreer van die teorie van buigbare kabels, inwendige kragte en vervorming van eenvoudige balke, kinetika van starre liggame en die beweging van satelliete en planete;*

- *Probleemoplossingsvaardighede demonstreer deur bekende en onbekende probleme oor die vervormings in balke en kabels en beweging van starre liggame onder werking van kragte, sowel as bepaling van bane en posisies van satelliete te doen.*

Method of delivery: Full Time
Metode van aflewering: *Voltyds*

Assessment modes:
Formative assessment
Assignments, formal tests and class tests, homework, and projects that integrate the various outcomes of the module.
Summative assessment
A written examination integrating the various aspects of the module wherein the extent to which students have attained the outcomes of the module will be assessed by means of both applied and theoretical questions./

Assesseringsmetodes:
Formatiewe assessering
Opdragte, formele toetse en klastoetse, huiswerk, en projekte wat die verskillende uitkomstes van die module integreer.
Summatiewe assessering
'n Geskrewe eksamen waarin die verskillende aspekte van die module geïntegreer word, waarin die mate waarin studente die uitkomste van die module bereik het, deur middel van beide toegepaste en teoretiese vrae geassesseer word.

Module code: APPM222	**Semester 2**	**NQF Level: 6**

Title / *Titel*: **Numerical Methods / *Numeriese Metodes***

Module outcomes:
On completion of this module, the student will demonstrate a thorough and advanced knowledge of, and skill in
- the underlying principles,
- the methods,
- the application of the theory, and
- the proper use of computer algebra systems (such as MATLAB)

regarding selected aspects of the following topics:
- Solution of non-linear equations: Bisection method, Regula Falsi method, Newton's method (single equations), Secant method, Newton's method (systems of non-linear equations);
- Interpolation and polynomial approximation: Lagrange interpolation, Newton divided difference interpolation, Linear and Cubic splines;
- Numerical integration and differentiation: Trapezium method , Simpson' method , Romberg's method, Gauss-quadrature;
- Numerical solution of initial value differential equations: Euler's method, Taylor's first order and second order method, Runge-Kutta methods./

Module-uitkomste:
Na voltooiing van die module, sal die student 'n deeglike en gevordende kennis van, en vaardigheid in
- *die onderliggende beginsels,*
- *die metodes,*
- *die toepassings van die teorie, en*
- *die behoorlike gebruik van rekenaar-algebra stelsels (soos MATLAB).*

rakende geselekteerde aspekte van die volgende onderwerpe demonstreer:
- *Oplossings van nie-lineêre vergelykings: halveermetode, Regula Falsi metode, Newton se metode (enkel vergelykings), sekant(snylyn)metode, Newton se metode (stelsels nie-lineêre vergelykings);*
- *Interpolasie en polinoombenadering: Lagrange interpolasie, Newton se gedeelde differensie-interpolasie, lineêre en kubiese latfunksies;*

- *Numeriese integrasie en differensiasie: Trapesiummetode, Simpson se metode, Romberg se metode, Gauss-kwadratuurreël;*
- *Numeriese oplossing van aanvangswaardedifferensiaalvergelykings: Euler se metode, Taylor se eerste-orde- en tweede-ordemetode, Runge-Kutta-metodes.*

Method of delivery: Full Time
Metode van aflewering: *Voltyds*

Assessment modes:
Formative assessment
Assignments, formal tests and class tests, homework, and projects that integrate the various outcomes of the module.
Summative assessment
A written examination integrating the various aspects of the module wherein the extent to which students have attained the outcomes of the module will be assessed by means of both applied and theoretical questions.

Assesseringsmetodes:
Formatiewe assessering
Opdragte, formele toetse en klastoetse, huiswerk, en projekte wat die verskillende uitkomstes van die module integreer.
Summatiewe assessering
'n Geskrewe eksamen waarin die verskillende aspekte van die module geïntegreer word, waarin die mate waarin studente die uitkomste van die module bereik het, deur middel van beide toegepaste en teoretiese vrae geassesseer word.

Module code: APPM223	**Semester 2**	**NQF Level: 6**

Title / *Titel*: **Mathematical Methods**

Module outcomes:
On completion of this module, the student will demonstrate a thorough and advanced knowledge of, and skill in

- The understanding of mathematical methods, in particular as regards systems of linear ordinary differential equations, Riccati's equation, Clairaut's and Lagrange's equation, envelopes, reduction of order, equations of the form $Pdx + Qdy + Rdz = 0$, $dx/P = dy/Q = dz/R$, first-order partial differential equations, characteristics;
- The identification of problems and the application of mathematical methods to solve the problems; and
- The interpretation of results and ability to communicate the principles of this module to relevant stake holders.

Method of delivery: Full Time

Assessment modes:
Formative assessment
Assignments, formal tests and class tests, homework, and projects that integrate the various outcomes of the module.
Summative assessment:
A written examination integrating the various aspects of the module wherein the extent to which students have attained the outcomes of the module will be assessed by means of both applied and theoretical questions.

Module code: APPM311	**Semester 1**	**NQF Level: 7**

Title / *Titel*: **Partial Differential Equations / *Parsiële Differensiaalvergelykings***

Module outcomes:
On completing this module the student should be able to do the following:

- Demonstrate fundamental knowledge of real-life problems where the mathematical model led to partial differential equations and the analytical solving of partial differential equations such

as the wave, heat and potential equation and the electric charge problem, Fourier series, orthogonal functions and polynomial methods and the Sturm-Liousvile problem;
- Demonstrate problem solving skills by analysing familiar and unfamiliar problems, applying knowledge of techniques that are used to solve differential equations with methods using power series, to determine Fourier series and handling standard problems with the Fourier method./

Module-uitkomste:
Na voltooiing van hierdie module behoort die studente die volgende te kan doen:
- *Fundamentele kennis demonstreer van werklikheidprobleme waarin die wiskundige model lei tot parsiële differensiaalvergelykings en die analitiese oplos van parsiële differensiaalvergelykings soos die golf-, warmte- en potensiaalvergelyking en die elektriese-lading-probleem; Fourier-reekse, ortogonale funksies en magreeksmetodes en die Sturm-Liousville-probleem;*
- *Probleemoplossingsvaardighede demonstreer deur bekende en onbekende probleme te analiseer, kennis van tegnieke gebruik om differensiaalvergelykings met magreeksmetodes op te los, Fourier-reekse te bepaal en standaardprobleme met die Fourier-metode te hanteer*

Method of delivery: Full Time
Metode van aflewering: *Voltyds*

Assessment modes:
Formative assessment
Assignments, formal tests and class tests, homework, and projects that integrate the various outcomes of the module.
Summative assessment
A written examination integrating the various aspects of the module wherein the extent to which students have attained the outcomes of the module will be assessed by means of both applied and theoretical questions./

Assesseringsmetodes:
Formatiewe assessering
Opdragte, formele toetse en klastoetse, huiswerk, en projekte wat die verskillende uitkomstes van die module integreer.
Summatiewe assessering
'n Geskrewe eksamen waarin die verskillende aspekte van die module geïntegreer word, waarin die mate waarin studente die uitkomste van die module bereik het, deur middel van beide toegepaste en teoretiese vrae geassesseer word.

Module code: APPM312	**Semester 1**	**NQF Level: 7**

Title / *Titel*: **Numeric Methods for Partial Differential Equations / *Numeriese Metodes tot Parsiële Differensiaalvergelykings***

Module outcomes:
On completing this module the student should be able to do the following:
- Demonstrate fundamental knowledge and insight into the discretisation of ordinary and partial linear differential equations, the special properties of tri-diagonal matrices, calculation problems caused by ill-conditioned and sparse systems of linear equations, convergence properties of iterative methods of systems of linear equations and stability properties of numerical methods, solving parabolic, elliptical and hyperbolic differential equations numerically, performing iterative methods with MATLAB on a computer;
- Demonstrate problem solving skills in numerically solving, by means of finite difference methods, two point boundary value problems, the heat equation, the potential equation and the wave equation with the finite difference methods and in implementing these by computer; and
- Demonstrate insight into the relation between reality and abstraction, model and solution./

Module-uitkomste:
Na voltooiing van hierdie module behoort die student die volgende te kan doen:

- *Fundamentele kennis en insig demonstreer in die diskretisering van gewone en parsiële lineêre differensiaalvergelykings, spesiale eienskappe van tridiagonale matrikse, berekeningsprobleme wat sleggeaardheid en yl stelsels lineêre vergelykings meebring, konvergensie-eienskappe van iteratiewe metodes vir stelsels lineêre vergelykings en die stabiliteitseienskappe van numeriese metodes, die numeriese oplossing van paraboliese, elliptiese en hiperboliese differensiaalvergelykings, en die uitvoering van iteratiewe metodes per rekenaar met MATLAB;*
- *Probleemoplossingsvaardighede demonstreer in die numeriese oplos, deur middel van eindige-verskille-metodes, van tweepuntrandwaardeprobleme, die warmtevergelyking, die potensiaalvergelyking en die golfvergelyking en die rekenaarimplementering daarvan; en*
- *Begrip te toon vir die verband tussen werklikheid, abstraksie, model en oplossing.*

Method of delivery: Full Time
Metode van aflewering: *Voltyds*

Assessment modes:
Formative assessment
Assignments, formal tests and class tests, homework, and projects that integrate the various outcomes of the module.
Summative assessment:
A written examination integrating the various aspects of the module wherein the extent to which students have attained the outcomes of the module will be assessed by means of both applied and theoretical questions./

Assesseringsmetodes:
Formatiewe assessering
Opdragte, formele toetse en klastoetse, huiswerk, en projekte wat die verskillende uitkomstes van die module integreer.
Summatiewe assessering
'n Geskrewe eksamen waarin die verskillende aspekte van die module geïntegreer word, waarin die mate waarin studente die uitkomste van die module bereik het, deur middel van beide toegepaste en teoretiese vrae geassesseer word.

Module code: APPM313	**Semester 1**	**NQF Level: 7**

Title/Titel: **Numerical Analysis**

Module outcomes:
On completion of this module, the student will demonstrate a thorough and advanced knowledge of, and skill regarding selected aspects of the following topics:

- The understanding of numerical analysis, in particular regarding the topics of discrete least squares approximation; Taylor`s method and Richardson`s extrapolation; convergence and stability of numerical methods; Euler`s method and modified Euler`s method revisited; Runge-Kutta method of order four revisited; Multistep methods; numerical methods for systems of equations; numerical methods for higher order differential equations; introduction to finite difference approximations; introduction to the Crank-Nicolson method;
- The identification of problems and the application of numerical analysis to solve the problems; and
- The interpretation of results and ability to communicate principles of numerical analysis to relevant stake holders.

Method of delivery: Full Time

Assessment modes:
Formative assessment
Assignments, formal tests and class tests, homework, and projects that integrate the various outcomes of the module.
Summative assessment
A written examination integrating the various aspects of the module wherein the extent to which students have attained the outcomes of the module will be assessed by means of both applied and theoretical questions.

Module code: APPM321	**Semester 2**	**NQF Level: 7**

Title / *Titel*: **Dynamical Systems / *Dinamiese Stelsels***

Module outcomes:
On completion of this, the student will demonstrate a thorough and advanced knowledge of, and skill in

- the underlying principles,
- the methods, and
- the application of the theory

regarding selected aspects of one or more of the following topics:

- Linear and non-linear systems for both discrete and continuous time, in particular Markov chains (linear systems); fixed points, linearization, Lyapunov functions, periodicity, chaos and bifurcations (non-linear systems);
- Elementary theory of fractals./

Module-uitkomste:
Na voltooiing van die module, sal die student 'n deeglike en gevorderde kennis van, en vaardigheid in

- *die onderliggende beginsels,*
- *die metodes, en*
- *die toepassings van die teorie*

rakende geselekteerde aspekte van die volgende onderwerpe demonstreer:

- *Lineêre en nie-lineêre stelsels vir beide diskrete en kontinue tyd, in besonder Markov kettings (lineêre stelsels); dekpunte, linearisering, Lyapunov funksies, periodisiteit, chaos en bifurkasies (nie-lineêre stelsels);*
- *Elementêre teorie van fraktale.*

Method of delivery: Full Time
Metode van aflewering: *Voltyds*

Assessment modes:
Formative assessment
Assignments, formal tests and class tests, homework, and projects that integrate the various outcomes of the module.
Summative assessment
A written examination integrating the various aspects of the module wherein the extent to which students have attained the outcomes of the module will be assessed by means of both applied and theoretical questions./

Assesseringsmetodes:
Formatiewe assessering
Opdragte, formele toetse en klastoetse, huiswerk, en projekte wat die verskillende uitkomstes van die module integreer.
Summatiewe assessering
'n Geskrewe eksamen waarin die verskillende aspekte van die module geïntegreer word, waarin die mate waarin studente die uitkomste van die module bereik het, deur middel van beide toegepaste en teoretiese vrae geassesseer word.

Module code: APPM322	Semester 2	NQF Level: 7

Title / *Titel*: **Optimisation / *Optimalisering***

Module outcomes:

On completion of this module, the student will demonstrate a thorough and advanced knowledge of, and skill regarding selected aspects of the following topics:

- One-dimensional constrained optimisation: function comparison methods (Fibonacci search methods and golden section search methods); interpolation methods (curve fitting): quadratic interpolation (Powell's method), line minimisation technique, kubic interpolation (Davidson's method).
- Multi-dimensional unconstrained optimisation: test functions; direct search methods (Hooke and Jeeves, Nelder & Mead); gradient methods & Quasi-Newton methods.
- Constrained optimisation: theory of constrained optimisation (Equality Constraints, Inequality Constraints); numerical constrained optimisation: penalty functions, the complex method of Box, revised simplex method./

Module-uitkomste:

Na voltooiing van die module, sal die student 'n deeglike en gevorderde kennis van, en vaardigheid in geselekteerde aspekte van die volgende onderwerpe demonstreer:

- *Eendimensionele beperkte optimalisering: funksie-vergelykingstegnieke (Fibonacci, goue snede); Interpolasietegnieke (Kromme passing): kwadratiese interpolasie (Powell se metode), minimalisering langs 'n lyn en kubiese interpolasie (Davidsonmetode).*
- *Meerdimensionele onbeperkte optimalisering: toetsfunksies; direkte soekmetodes (Hooke & Jeeves, Nelder & Mead); gradiëntmetodes & Quasi-Newtonmetodes.*
- *Beperkte optimalisering: teorie vir beperkte optimalisering (gelykheidsbeperkings; onbelykheidsbeperkings); numeriese beperkte optimalisering: straffunksies, die komplekse metode van Box, aangepaste simpleksmetode..*

Method of delivery: Full Time
Metode van aflewering: *Voltyds*

Assessment modes:

Formative assessment

Assignments, formal tests and class tests, homework, and projects that integrate the various outcomes of the module.

Summative assessment

A written examination integrating the various aspects of the module wherein the extent to which students have attained the outcomes of the module will be assessed by means of both applied and theoretical questions./

Assesseringsmetodes:

Formatiewe assessering

Opdragte, formele toetse en klastoetse, huiswerk, en projekte wat die verskillende uitkomstes van die module integreer.

Summatiewe assessering

'n Geskrewe eksamen waarin die verskillende aspekte van die module geïntegreer word, waarin die mate waarin studente die uitkomste van die module bereik het, deur middel van beide toegepaste en teoretiese vrae geassesseer word.

Module Code: APPM323	Semester 2	NQF Level: 7

Title / *Titel:* **Fluid Mechanics / *Vloeimeganika***

Module outcomes:

On completion of this module, the student will demonstrate a thorough and advanced knowledge of, and skill regarding selected aspects of the following topics:

- The understanding of fluid mechanics, in particular regarding the topics of velocity of a fluid at a point; local and particle rate of change; acceleration; streamlines; equation of continuity. Euler's equation of motion; bernoulli's equation; flows involving axial symmetry; flow past a

sphere. The stream function; complex velocity potential; uniform streams; line sources; sinks; doublets; line vortices; vortex streets; karman's vortex street; the milne thomson circle theorem. The navier-stokes equations; some solvable problems in viscous flow; diffusion of vorticity; similarity; prandtl's boundary layer theory;

- The identification of problems and the application of fluid mechanics to solve the problems; and
- The interpretation of results and ability to communicate principles of fluid mechanics to relevant stake holders./

Module-uitkomste:

Na voltooiing van die module, sal die student 'n deeglike en gevorderde kennis van, en vaardigheid in geselekteerde aspekte van die volgende onderwerpe demonstreer:

- *Die begrip van vloeimeganika, veral met betrekking tot die onderwerpe van snelheid van 'n vloeistof in 'n punt; lokale en deeltjie tempo van verandering; versnelling; stroomlyne; vergelyking van kontinuïteit. Euler se bewegingsvergelyking; bernoulli se vergelyking; strome wat aksiale simmetrie behels; vloei verby 'n sfeer. Die stroomfunksie; komplekse snelheidspotensiaal; uniform strome; lynbronne; sinkgate, doeblette; lynwerwels; werwelstrate; karman se werwelstraat; die milne thomson sirkel stelling. Die navier-stokes vergelykings; 'n paar oplosbare probleme in viskose vloei; diffusie van vortisiteit; gelykvormighede; prandtl se randlaagteorie;*
- *Die identifisering van probleme en die toepassing van vloeimeganika om die probleme op te los; en*
- *Die interpretasie van resultate en vermoë om die beginsels van vloeimeganika aan relevante belanghebbendes te kommunikeer.*

Method of delivery: Full Time
Metode van aflewering: *Voltyds*

Assessment modes:

Formative assessment

Assignments, formal tests and class tests, homework, and projects that integrate the various outcomes of the module.

Summative assessment

A written examination integrating the various aspects of the module wherein the extent to which students have attained the outcomes of the module will be assessed by means of both applied and theoretical questions./

Assesseringsmetodes:

Formatiewe assessering

Opdragte, formele toetse en klastoetse, huiswerk, en projekte wat die verskillende uitkomstes van die module integreer.

Summatiewe assessering

'n Geskrewe eksamen waarin die verskillende aspekte van die module geïntegreer word, waarin die mate waarin studente die uitkomste van die module bereik het, deur middel van beide toegepaste en teoretiese vrae geassesseer word.

NAS.2.7.22 MATHEMATICS / *WISKUNDE*

Module code: MTHS111 / MTHS171	Semester 1	NQF Level: 5
Title / *Titel*: **Introductory Algebra and Calculus I / *Inleidende Algebra en Calculus I***		

Module outcome:

On completion of this module, the student will demonstrate a thorough and advanced knowledge of, and skill in

- the underlying principles,

- the methods, and
- the application of the theory

regarding selected aspects of the following topics:

- fundamental knowledge of the system of natural numbers including mathematical induction, integer numbers including the Euclidean algorithm and their applications, rational numbers, irrational numbers, real numbers and complex numbers including De Moivre's theorem and its applications, the concept of functions, absolute value functions, circle measure and trigonometric functions, inverse functions and inverse trigonometric functions, polynomials in one variable , rational functions, exponential and logarithmic functions, limits, continuity, differentiability and indefinite integrals of all the above mentioned functions, l'Hospital's rule and its applications;
- problem solving skills to calculate the domain and range, limits, continuity, derivatives and indefinite integrals of all the above mentioned functions, calculate limits using l'Hospital's rule, prove theorems with mathematical induction, determine greatest common divisors and use it to solve Diophantine equations, and perform operations with complex numbers./

Module-uitkomstes:

Na voltooiing van die module, sal die student 'n deeglike en geordende kennis van, en vaardigheid in

- *die onderliggende beginsels,*
- *die metodes, en*
- *die toepassings van die teorie*

rakende geselekteerde aspekte van die volgende onderwerpe demonstreer:

- *fundamentele kennis van die stelsels van natuurlike getalle insluitend wiskundige induksie, heelgetalle insluitend Euklidiese algoritme en sy toepassings, rasionale getalle, irrasionale getalle, reële getalle en komplekse getalle insluitend De Moivre se stelling en sy toepassings, funksiebegrip, absolutewaardefunksies, sirkelmaat en trigonometriese funksies, inverse funksies en inverse trigonometriese funksies, polinome in een veranderlike, rasionale funksies, eksponensiale en logaritmiese funksies, limiete, kontinuïteit, differensieerbaarheid en onbepaalde integrale van al bogenoemde funksies, l'Hospital se reël en sy toepassings;*

  probleemoplossingsvaardighede om definisie- en waardeversamelings te bereken, limiete, kontinuïteit, afgeleides en onbepaalde integrale van al bogenoemde funksies te bereken, limiete met behulp van l'Hospital se reël te bereken, stellings deur wiskundige induksie bewys, grootste gemene delers bepaal en dit gebruik om Diofantiese vergelykings op te los, en bewerkings met komplekse getalle uit te voer.

Method of delivery: Full Time

Metode van aflewering: *Voltyds*

Assessment modes:

Formative assessment

Assignments, formal tests and class tests, homework, and projects that integrate the various outcomes of the module.

Summative assessment:

A written examination integrating the various aspects of the module wherein the extent to which students have attained the outcomes of the module will be assessed by means of both applied and theoretical questions./

Assesseringsmetodes:

Formatiewe assessering

Opdragte, formele toetse en klastoetse, huiswerk, en projekte wat die verskillende uitkomstes van die module integreer.

Summatiewe assessering

'n Geskrewe eksamen waarin die verskillende aspekte van die module geïntegreer word, waarin die mate waarin studente die uitkomste van die module bereik het, deur middel van beide toegepaste en teoretiese vrae geassesseer word.

Module code: MTHS112 / MTHS123	**Semester 1**	**NQF Level: 5**

Title / *Titel*: **Mathematical Techniques / *Wiskundige Tegnieke***

Module outcomes:

On completion of the module, the student should be able to demonstrate:

- Basic knowledge and skills to manipulate and solve algebraic equations, including fractional and exponential and logarithmic equations.
- Domain specific knowledge and skills to solve systems of linear equations using matric reduction and matrix algebra.
- Domain specific knowledge and skills to solve systems of linear inequalities using graphical solutions (linear programming).
- Informed understanding of the concept of a mathematical function, which include linear functions, quadratic functions, exponential functions and logarithmic functions.
- Basic knowledge and informed understanding of the theory of arithmetic and geometric series and sequences.
- Basic knowledge and informed understanding of the terminology, principles and procedures of differentiation and integration.
- Basic knowledge of every day economical and financial concepts such as percentages, interest rates, demand and supply, cost, revenue and profit, budget equations, tax problems, growth of investments, annuities, marginal quantities.
- The ability to select and apply applicable mathematical concepts, procedures, rules, principles, methods and formulae to solve problems in financial and economic contexts, such as percentages, interest rates, demand and supply, cost, revenue and profit, budget equations, tax problems, growth of investments, annuities, marginal quantities./

Module uitkomste:

Aan die einde van hierdie module behoort studente die volgende te demonstreer:

- *Basiese kennis en vaardighede om algebraïese vergelykings te manipuleer en op te los, insluitende breuk- en eksponensiële en logaritmiese vergelykings.*
- *Domein spesifieke kennis en vaardighede om stelsels lineêre vergelykings op te los deur van matriksreduksie en matriksalgebra gebruik te maak.*
- *Domein spesifieke kennis en vaardighede om stelsels lineêre ongelykhede op te los deur gebruik te maak van grafiese oplossings (lineêre programmering).*
- *Ingeligte begrip van die konsep 'n wiskundige funksie, wat lineêre funksies, kwadratiese funksies, eksponensiële funksies en logaritmiese funksies insluit.*
- *Basiese kennis en ingeligte begrip van die teorie van rekenkundige en meetkundige rye en reekse.*
- *Basiese kennis en ingeligte begrip van die terminologie, beginsels en prosedures van differensiasie en integrasie.*
- *Basiese kennis van daaglikse ekonomiese en finansiële konsepte soos persentasies, rentekoerse, vraag en aanbod, koste, inkomste en wins, begrotingsvergelykings, belastingprobleme, groei van beleggings, annuïteite en marginale hoeveelhede.*
- *Die vermoë om toepaslike wiskundige begrippe, prosedures, reëls, beginsels, metodes en formules te kies en toe te pas om probleme in finansiële en ekonomiese kontekste op te los, byvoorbeeld persentasies, rentekoerse, vraag en aanbod, koste, inkomste en wins, begrotingsvergelykings, belastingprobleme, groei van beleggings, annuïteite en marginale hoeveelhede.*

Method of delivery: Full Time

Metode van aflewering: *Voltyds*

Assessment modes:

Formative assessment

Assignments, formal tests and class tests, homework, and projects that integrate the various outcomes of the module.

Summative assessment

A written examination integrating the various aspects of the module wherein the extent to which students have attained the outcomes of the module will be assessed by means of both applied and theoretical questions./

Assesseringsmetodes:

Formatiewe assessering

Opdragte, formele toetse en klastoetse, huiswerk, en projekte wat die verskillende uitkomstes van die module integreer.

Summatiewe assessering

'n Geskrewe eksamen waarin die verskillende aspekte van die module geïntegreer word, waarin die mate waarin studente die uitkomste van die module bereik het, deur middel van beide toegepaste en teoretiese vrae geassesseer word.

Module code: MTHS113	**Semester 1**	**NQF Level: 5**

Title / *Titel*: **Basic Mathematical Techniques / *Basiese Wiskundige Tegnieke***

Module outcomes:

At the end of this module, students have mastered the following topics at an introductory level:

- The concept of a mathematical function elucidated from examples that include exponential and logarithmic functions, the concept of differentiation and integration, a method to solve sets of linear equations, matrix algebra, linear programming problems in two variables, analysis of the rate of change of mathematical functions by using differentiation to investigate the characteristics of the function.
- The student acquires skills to recognize the presence and applicability of mathematical concepts in a scientific situation and to construct a mathematical model of the problem situation in order to reach a solution by applying differentiation techniques, integration, arithmetic techniques or linear algebra./

Module-uitkomste:

Aan die einde van hierdie module het die student die volgende onderwerpe op inleidende vlak bemeester:

- *Die konsep van 'n wiskundige funksie vanuit voorbeelde wat eksponensiale en logaritmiese funksies insluit, die konsep van differensiasie en integrasie, 'n oplosmetode vir stelsels lineêre vergelykings, matriksalgebra, lineêre programmeringsprobleme in twee veranderlikes, analise van die tempo van verandering van wiskundige funksies met die gebruik van differensiasie om die eienskappe van die funksie te ondersoek.*
- *Die student verwerf die vaardigheid om die teenwoordigheid en toepasbaarheid van wiskundige konsepte in 'n natuurwetenskaplike situasie te herken en 'n wiskundige model van die probleemsituasie te konstrueer ten einde 'n oplossing te verkry deur die toepassing van differensiasietegnieke, integrasie, rekenkundige tegnieke of lineêre algebra.*

Method of delivery: Full Time

Metode van aflewering: *Voltyds*

Assessment modes:

Formative assessment

Assignments, formal tests and class tests, homework, and projects that integrate the various outcomes of the module.

Summative assessment

A written examination integrating the various aspects of the module wherein the extent to which students have attained the outcomes of the module will be assessed by means of both applied and theoretical questions./

Assesseringsmetodes:
Formatiewe assessering
Opdragte, formele toetse en klastoetse, huiswerk, en projekte wat die verskillende uitkomstes van die module integreer.
Summatiewe assessering
'n Geskrewe eksamen waarin die verskillende aspekte van die module geïntegreer word, waarin die mate waarin studente die uitkomste van die module bereik het, deur middel van beide toegepaste en teoretiese vrae geassesseer word.

Module code: MTHS114 / MTHS173	**Semester 1**	**NQF Level: 5**

Title / *Titel*: **Toegepaste Calculus I / *Applied Calculus I***

Module outcomes:
Students will not be credited for more than one of MTHS111 and MTHS114. MTHS114 is intended for students who require mathematics at first year level only, and does not lead to admission to any second year mathematics or applied mathematics module**.**

On completion of this module, the student will demonstrate a thorough and advanced knowledge of, and skill in

- the basic principles,
- and the application of the theory

regarding selected aspects of the following topics:

- Functions;
- Rates of change, limiting behaviour, and the derivative;
- Techniques of differentiation;
- Functions revisited (exponential and logarithmic en trigonometric);
- Applications of the derivative;
- The concept of integration, its interpretation, and basic properties and basic integration rules.

All topics are studied in the context of applications./

Module-uitkomste:
Studente sal nie met meer as een van MTHS111 en MTHS114 gekrediteer word nie. MTHS114 is bedoel vir studente wat wiskunde slegs op eerstejaar vlak nodig het, en gee geensins toegang tot enige tweedejaar Wiskunde of Toegepaste Wiskunde modules nie.

Na voltooiing van die module, sal die student 'n deeglike en geordende kennis van, en vaardigheid in

- *die basiese beginsels,*
- *en die toepassing van die teorie*

rakende geselekteerde aspekte van die volgende onderwerpe demonstreer:

- *Funksies;*
- *Tempo van verandering, limiet gedrag, en die afgeleide;*
- *Differensiasietegnieke;*
- *Verdere funksies (eksponensieel, logaritmies, trigonometries);*
- *Toepassings van die afgeleide;*
- *Die konsep van integrasie, interpretasie daarvan, en basiese eienskappe en basiese integrasiereëls.*

Alle onderwerpe word in die konteks van toepassings bestudeer.

Method of delivery: Full Time
Metode van aflewering: *Voltyds*

Assessment modes:
Formative assessment
Assignments, formal tests and class tests, homework, and projects that integrate the various outcomes of the module.
Summative assessment

A written examination integrating the various aspects of the module wherein the extent to which students have attained the outcomes of the module will be assessed by means of both applied and theoretical questions./

Assesseringsmetodes:
Formatiewe assessering
Opdragte, formele toetse en klastoetse, huiswerk, en projekte wat die verskillende uitkomstes van die module integreer.
Summatiewe assessering
'n Geskrewe eksamen waarin die verskillende aspekte van die module geïntegreer word, waarin die mate waarin studente die uitkomste van die module bereik het, deur middel van beide toegepaste en teoretiese vrae geassesseer word.

Module code: MTHS115	**Semester: 1**	**NQF-Level: 5**

Title: **Pre-Calculus for Science I**

Module outcomes:
After completing this module, the learner should demonstrate:

- Knowledge (on an introductory level) of real number systems, exponents and radicals, algebraic expressions, rational expressions, equations and inequalities;
- Domain specific knowledge and skills to perform basic arithmetic operations and to manipulate functions, graph of functions, average rate of change, maxima and minima, one-to-one functions and compute inverse of functions;
- Basic knowledge and informed understanding of the properties of polynomial and rational functions;
- Basic knowledge of the algebra of complex numbers;
- The ability to select and apply applicable mathematical concepts, procedures, rules, principles, methods and formulae to solve problems.The ability to select and apply applicable mathematical concepts, procedures, rules, principles, methods and formulae to solve problems.

Method of delivery: Full Time

Assessment modes:
Formative assessment
Assignments, formal tests and class tests, homework, and projects that integrate the various outcomes of the module.
Summative assessment:
A written examination integrating the various aspects of the module wherein the extent to which students have attained the outcomes of the module will be assessed by means of both applied and theoretical questions.

Module code: MTHS119	**Semester: 1**	**NQF-Level: 5**

Title: **Pre-Calculus for Commerce I**

Module outcomes:
After completing this module, the learner should:

- Demonstrate knowledge (on an introductory level) of number systems and exponential laws;
- Perform basic arithmetic operations and simplifications, solve simple equations and inequalities, solve quadratic equations, convert currencies and calculate percentages;
- Identify straight lines, formulate linear functions as simple models, apply these models to represent demand, supply, cost and revenue functions and interpret the models of these functions;
- Solve and apply linear simultaneous equations in two variables and inequalities algebraically and graphically.

Method of delivery: Full Time

Assessment modes:
Formative assessment

Assignments, formal tests and class tests, homework, and projects that integrate the various outcomes of the module.

Summative assessment

A written examination integrating the various aspects of the module wherein the extent to which students have attained the outcomes of the module will be assessed by means of both applied and theoretical questions./

Assesseringsmetodes:

Formatiewe assessering

Opdragte, formele toetse en klastoetse, huiswerk, en projekte wat die verskillende uitkomstes van die module integreer.

Summatiewe assessering

'n Geskrewe eksamen waarin die verskillende aspekte van die module geïntegreer word, waarin die mate waarin studente die uitkomste van die module bereik het, deur middel van beide toegepaste en teoretiese vrae geassesseer word.

Module code: MTHS121 / MTHS172	**Semester 2**	**NQF Level: 5**

Title / *Titel*: **Introductory Algebra and Calculus II / *Inleidende Algebra en Calculus II***

Module outcomes:

On completion of this module, the student will demonstrate a thorough and advanced knowledge of, and skill in

- the underlying principles,
- the methods, and
- the application of the theory

regarding selected aspects of the following topics:

- Fundamental knowledge of vectors in three dimensional space, their properties and applications, rational functions including partial fractions, permutation, combinations, the Binomial theorem, introduction to linear algebra and its applications to systems of linear equations, the use of derivatives in optimisation and curve sketching, Taylor series including the basic theorems on the convergence of series, the fundamental theorems of differential and integral calculus, Riemann sums, the basic properties and applications of the definite integral, advanced integral techniques (including rational functions and partial fractions), hyperbolic and inverse hyperbolic functions, and applications of integration to surfaces, lengths and volumes;
- Problem solving skills to describe three dimensional spaces, to calculate dot, cross and triple products and use it to solve a variety of problems, decompose rational functions into partial fractions, determine the number of arrangements and selections from a set, do binomial expansions, solving systems of linear equations with Gauss-reduction, manipulating matrices, sketch functions, formulate optimisation problems mathematically and use knowledge of derivatives to solve them, calculate Taylor series and judge its convergence, determine Riemann sums, determine definite integrals, and calculate surfaces, lengths and volumes./

Module-uitkomste:

Na voltooiing van die module, sal die student 'n deeglike en geordende kennis van, en vaardigheid in

- *die onderliggende beginsels,*
- *die metodes, en*
- *die toepassings van die teorie*

rakende geselekteerde aspekte van die volgende onderwerpe demonstreer:

- *Fundamentele kennis van vektore in die driedimensionele ruimte, hul eienskappe en gebruike, permutasies, kombinasies, die binomiaalstelling, inleiding tot lineêre algebra en toepassing op stelsels lineêre vergelykings, die gebruik van afgeleides in optimalisering en krommesketsing, Taylor-reekse insluitend die basiese stellings oor die konvergensie van reekse, die fundamentele stellings van differensiaal- en integraalrekene, Riemannsomme, die bepaalde integraal se basiese eienskappe en gebruike, gevorderde integrasietegnieke*

(insluitend rasionale funksies en parsiële breuke), hiperboliese en inverse hiperboliese funksies, en toepassings van integrasie op oppervlaktes, lengtes en volumes;

- *Probleemoplossingsvaardighede om drie-dimensionele ruimtes te beskryf, punt-, kruis- en trippelprodukte te bereken en gebruik om 'n verskeidenheid van probleme op te los, rasionale funksies in parsiële breuke te ontbind, die aantal rangskikkings en keuses uit 'n versameling te bepaal, binomiaaluitbreidings te doen, oplos van stelsels lineêre vergelykings met Gauss-reduksie, manipulasie van matrikse, funksies te skets, optimeringsprobleme in 'n wiskundige formulering te giet en die kennis van afgeleides gebruik om dit op te los, Taylor-reekse te bereken en die konvergensie daarvan te beoordeel, Riemannsomme te bepaal, bepaalde integrale te bepaal, en oppervlaktes, lengtes en volumes te bereken.*

Method of delivery: Full Time
Metode van aflewering: *Voltyds*

Assessment modes:
Formative assessment
Assignments, formal tests and class tests, homework, and projects that integrate the various outcomes of the module.
Summative assessment
A written examination integrating the various aspects of the module wherein the extent to which students have attained the outcomes of the module will be assessed by means of both applied and theoretical questions./

Assesseringsmetodes:
Formatiewe assessering
Opdragte, formele toetse en klastoetse, huiswerk, en projekte wat die verskillende uitkomstes van die module integreer.
Summatiewe assessering
'n Geskrewe eksamen waarin die verskillende aspekte van die module geïntegreer word, waarin die mate waarin studente die uitkomste van die module bereik het, deur middel van beide toegepaste en teoretiese vrae geassesseer word.

Module code: MTHS124 / MTHS174	**Semester 2**	**NQF Level: 5**

Title / *Titel*: **Applied Calculus II / *Toegepaste Calculus II***

Module outcomes:
Students will not be credited for more than one of MTHS121 and MTHS124. MTHS124 is intended for students who require mathematics at first year level only, and does not lead to admission to any second year mathematics or applied mathematics module**.**

On completion of this module, the student will demonstrate a thorough and advanced knowledge of, and skill in

- the basic principles,
- and the application of the theory

regarding selected aspects of the following topics:

- Anti-derivatives and integration techniques;
- Applications of the integral;
- Introduction to functions of several variables (understanding two-variable functions, partial derivatives, basic optimisation);
- Review of trigonometric functions; differentiation and integration rules;
- Modelling with differential equations: introductory concepts;
- Introduction to series and their applications;
- Introduction to the basic concepts of elementary probability.

All topics are studied in the context of applications./

Module-uitkomste:
Studente sal nie met meer as een van MTHS121 en MTHS124 gekrediteer word nie. MTHS124 is bedoel vir studente wat wiskunde slegs op eerstejaar vlak nodig het, en gee geensins toegang tot enige tweedejaar Wiskunde of Toegepaste Wiskunde modules nie.

Na voltooiing van die module, sal die student 'n deeglike en geordende kennis van, en vaardigheid in

- *die basiese beginsels,*
- *en die toepassing van die teorie*

rakende geselekteerde aspekte van die volgende onderwerpe demonstreer:

- *Anti-afgeleides en integrasie tegnieke;*
- *Toepassings van die integraal;*
- *Inleiding tot meerveranderlike funksies (verstaan van twee-veranderlike funksies, parsiële afgeleides, basiese optimering);*
- *Oorsig oor trigonometriese funksies; differensiasie en integrasiereëls;*
- *Modellering met differensiaalvergelykings: inleidende konsepte;*
- *Inleiding tot reekse en toepassings;*
- *Inleiding tot die basiese konsepte van elementêre waarskynlikheid.*

Alle onderwerpe word in die konteks van toepassings bestudeer.

Method of delivery: Full Time
Metode van aflewering: *Voltyds*

Assessment modes:
Formative assessment
Assignments, formal tests and class tests, homework, and projects that integrate the various outcomes of the module.
Summative assessment
A written examination integrating the various aspects of the module wherein the extent to which students have attained the outcomes of the module will be assessed by means of both applied and theoretical questions./

Assesseringsmetodes:
Formatiewe assessering
Opdragte, formele toetse en klastoetse, huiswerk, en projekte wat die verskillende uitkomstes van die module integreer.
Summatiewe assessering
'n Geskrewe eksamen waarin die verskillende aspekte van die module geïntegreer word, waarin die mate waarin studente die uitkomste van die module bereik het, deur middel van beide toegepaste en teoretiese vrae geassesseer word.

Module code: MTHS125	**Semester: 2**	**NQF-Level: 5**

Title: **Pre-Calculus for Science II**

After completing this module, the learner should demonstrate:

- Domain specific knowledge and understanding of exponential and logarithmic functions;
- Knowledge and skills to manipulate trigonometric identities, equations, functions and angles;
- Understanding and skills to manipulate equations and functions in polar coordinates;
- Basic knowledge and skills to manipulate and solve algebraic equations;
- Basic knowledge of calculus (limit of functions, tangent lines and derivatives);
- The ability to select and apply applicable mathematical concepts, procedures, rules, principles, methods and formulae to solve problems.

Method of delivery: Full Time

Assessment modes:
Formative assessment
Assignments, formal tests and class tests, homework, and projects that integrate the various outcomes of the module.

Summative assessment:
A written examination integrating the various aspects of the module wherein the extent to which students have attained the outcomes of the module will be assessed by means of both applied and theoretical questions.

Module code: MTHS129	**Semester: 2**	**NQF Level: 5**

Title: **Pre-Calculus for Commerce II**

Module Outcomes:
After completing this module, the learner should:

- Demonstrate knowledge (on an introductory level) of functions, exponential laws, logarithmic laws and limit laws;
- Recognize the general form of equations representing quadratic, exponential and logarithmic functions as well as their graphs;
- Apply and demonstrate mathematical concepts and properties to exponential equations and logarithmic equations;
- Demonstrate knowledge on the rate of change of functions;
- Determine the slope of a curve and the derivatives of a range of functions;
- Apply differentiation to determine various marginal functions and average functions;
- Apply differentiation principles to graph polynomials;
- Identify arithmetic- and geometric sequences and series, solve problems based on these sequences, series and applications;
- Calculate present and future values based on simple and compound interest;
- Calculate depreciation, annuities and debt repayments.

Method of delivery: Full Time

Assessment modes:
Formative assessment
Assignments, formal tests and class tests, homework, and projects that integrate the various outcomes of the module.
Summative assessment:
A written examination integrating the various aspects of the module wherein the extent to which students have attained the outcomes of the module will be assessed by means of both applied and theoretical questions.

Module code: MTHS211	**Semester 1**	**NQF Level: 6**

Title / *Titel*: **Multivariable Calculus I / *Meerveranderlike Calculus I***

Module outcomes:
On completing this module, students should be able to do the following:

- Demonstrate a thorough knowledge and insight into all the aspects of the differential calculus of multivariate functions: partial and directional derivatives, the gradient function, optimisation problems, including Lagrange's method, directional derivatives and gradients, and double and triple integrals.
- Demonstrate problem solving skills by analysing familiar and unfamiliar problems, using knowledge of techniques to solve practical problems modelled with multivariate functions.
- Students should demonstrate the ability to use the geometric and physical meaning of the above-mentioned concepts describe the underlying mathematical structure of applied problems and to interpret the significance of the mathematical solutions./

Module-uitkomste:
Na voltooiing van hierdie module behoort die studente die volgende te kan doen:

- *Grondige kennis en begrip demonstreer in al die aspekte van differensiaalrekening van meerveranderlike funksies: parsiële- en rigtingafgeleides, die gradiëntfunksie; optimeringsprobleme insluitende Lagrange se metode, rigtingsafgeleides en gradiënte, asook berekening van dubbel- en drievoudige-integrale.*

- *Probleemoplossingsvaardighede demonstreer deur bekende en onbekende probleme analiseer, kennis van tegnieke gebruik om praktiese probleme wat deur meer veranderlike funksies gemodelleer word, op te los.*
- *Die meetkundige en fisiese betekenis van die bogenoemde konsepte gebruik om die onderliggende wiskundige struktuur van toegepaste probleme te kan formuleer, en die betekenis van die wiskundige oplossing kan interpreteer.*

Method of delivery: Full Time
Metode van aflewering: *Voltyds*

Assessment modes:
Formative assessment
Assignments, formal tests and class tests, homework, and projects that integrate the various outcomes of the module.
Summative assessment
A written examination integrating the various aspects of the module wherein the extent to which students have attained the outcomes of the module will be assessed by means of both applied and theoretical questions./

Assesseringsmetodes:
Formatiewe assessering
Opdragte, formele toetse en klastoetse, huiswerk, en projekte wat die verskillende uitkomstes van die module integreer.
Summatiewe assessering
'n Geskrewe eksamen waarin die verskillende aspekte van die module geïntegreer word, waarin die mate waarin studente die uitkomste van die module bereik het, deur middel van beide toegepaste en teoretiese vrae geassesseer word.

Module code: MTHS212	**Semester 1**	**NQF Level: 6**

Title / *Titel*: **Linear Algebra I / *Lineêre Algebra I***

Module outcomes:
On completion of this module, the student will demonstrate a thorough and advanced knowledge of, and skill in
- the underlying principles,
- the methods, and
- the application of the theory

regarding selected aspects of the following topics:
- Systems of linear equations and their solution(s), including geometrical interpretations where applicable;
- Matrices and their operations, including inverses of matrices;
- The vector spaces $\mathbf{R}^n$ and subspaces, including the column space and zero space of a matrix, linear dependence and independence, bases, dimension and the rank and nullity of a matrix;
- Linear transformations, including geometrical interpretations in two dimensions;
- Determinants with applications such as Cramer's rule, the area of a parallelogram and volume of a parallelepiped;
- Eigenvalues and eigenvectors of matrices.
- Applications to systems of linear differential equations./

Module-uitkomste:
Na voltooiing van die module, sal die student 'n deeglike en geordende kennis van, en vaardigheid in
- *die onderliggende beginsels,*
- *die metodes, en*
- *die toepassings van die teorie*

rakende geselekteerde aspekte van die volgende onderwerpe demonstreer:

- *Stelsels lineêre vergelykings en hulle oplossing(s), insluitend meetkundige interpretasies waar toepaslik;*
- *Matrikse en hulle bewerkings, insluitende inverses van matrikse;*
- *Die vektorruimtes* $\boldsymbol{R}^n$ *en deelruimtes, insluitend die kolomruimte en nulruimte van 'n matriks, lineêr afhanklikheid en onafhanklikheid, basisse, dimensie en die rang en kerndimensie (nulheidsgraad) van 'n matriks;*
- *Lineêre transformasies, insluitend meetkundige interpretasies in twee dimensies;*
- *Determinante met toepassings soos Cramer se reël, die oppervlakte van 'n parallelogram en die volume van 'n parallelepipedum;*
- *Eiewaardes en eievektore van matrikse.*
- *Toepassings op stelsels lineêre differensiaalvergelykings.*

Method of delivery: Full Time
Metode van aflewering: *Voltyds*

Assessment modes:
Formative assessment
Assignments, formal tests and class tests, homework, and projects that integrate the various outcomes of the module.
Summative assessment
A written examination integrating the various aspects of the module wherein the extent to which students have attained the outcomes of the module will be assessed by means of both applied and theoretical questions./

Assesseringsmetodes:
Formatiewe assessering
Opdragte, formele toetse en klastoetse, huiswerk, en projekte wat die verskillende uitkomstes van die module integreer.
Summatiewe assessering
'n Geskrewe eksamen waarin die verskillende aspekte van die module geïntegreer word, waarin die mate waarin studente die uitkomste van die module bereik het, deur middel van beide toegepaste en teoretiese vrae geassesseer word.

Module code: MTHS221	**Semester: 2**	**NQF-Level: 6**

Title / Titel: **Multivariable Calculus II / *Meerveranderlike Calculus II***

Module outcomes:
On completion of this module, the student will demonstrate a thorough and advanced knowledge of, and skill in
- the underlying principles,
- the methods, and
- the application of the theory

regarding selected aspects of the following topics:
- Functions from R^n to R^m (vector fields), the differentiation of and chain rule for such functions, Taylor's theorem, line integrals and the Fundamental Theorem of line integrals, Green's theorem, oriented surfaces and surface integrals, rotation and divergence, the theorems of Stokes and Gauss.
- Convergence criteria for sequences of real numbers (monotone convergence, Cauchy sequences, limsup=liminf), description of topological aspects in terms of sequences (Bolzano-Weierstrass property for sequences, limits and continuity of functions, properties of continuous functions).
- Convergence of series, standard convergence tests, absolute and conditional convergence, power series and convergence intervals for power series, power series representations of functions, differentiation and integration of power series, Taylor and Maclaurin series (approximating functions with polynomials).

Module-uitkomste:
Na voltooiing van die module, sal die student 'n deeglike en geordende kennis van, en vaardigheid in

- *die onderliggende beginsels,*
- *die metodes, en*
- *die toepassings van die teorie*

rakende geselekteerde aspekte van die volgende onderwerpe demonstreer:

- *Funksies van R^n na R^m (vektorvelde), die differensiasie van en kettingreël vir sulke funksies, Taylor se stelling, lynintegrale en die Grondstelling van lynintegrale, Green se stelling, gerigte oppervlakke en oppervlakintegrale, rotasie en divergensie, die stellings van Stokes en Gauss.*
- *Konvergensie kriteria vir rye reële getalle (monotone konvergensie, Cauchy rye, limsup=liminf), beskrywing van topologiese aspekte in terme van rye (Bolzano-Weierstrass eienskap vir rye, limiete en kontinuïteit van funksies, eienskappe van kontinue funksies).*
- *Konvergensie van reekse, standaard konvergensie toetse, absolute en voorwaardelike konvergensie, magreekse en konvergensieintervalle vir magreekse, magreeksvoorstellings van funksies, differensiasie en integrasie van magreekse, Taylor- en Macluarinreekse (benadering van funksies met polinome).*

Method of delivery: Full Time
Metode van aflewering: *Voltyds*

Assessment modes:
Formative assessment
Assignments, formal tests and class tests, homework, and projects that integrate the various outcomes of the module.
Summative assessment
A written examination integrating the various aspects of the module wherein the extent to which students have attained the outcomes of the module will be assessed by means of both applied and theoretical questions./

Assesseringsmetodes:
Formatiewe assessering
Opdragte, formele toetse en klastoetse, huiswerk, en projekte wat die verskillende uitkomstes van die module integreer.
Summatiewe assessering
'n Geskrewe eksamen waarin die verskillende aspekte van die module geïntegreer word, waarin die mate waarin studente die uitkomste van die module bereik het, deur middel van beide toegepaste en teoretiese vrae geassesseer word.

Module code: MTHS222	**Semester 2**	**NQF-Level: 6**

Title / *Titel*: **Linear Algebra II / *Lineêre Algebra II***

Module outcomes*:*
On completion of this module the student should:

- Demonstrate a thorough knowledge of and insight into general vector spaces and bases; inner products; vector norms; linear transformations, the use of eigenvalues and eigenvectors, diagonalisation and the advanced skill to apply vector norms, orthogonalisation, symmetric matrices, quadratic forms, and matrix factorisations.
- Demonstrate skill in problem solving and proof techniques by analysing known and unknown problems and applications and applying the knowledge and techniques of linear algebra./

Module-uitkomste:
By voltooiing van die module, behoort studente:

- *'n Deeglike kennis te hê van en insig te toon in algemene vektorruimtes en basisse; inprodukte; vektornorme; lineêre transformasies; die gebruik van eiewaardes en eievektore; diagonalisering; vaardigheid in die toepassing van elk van vektornorme, ortogonalisering, simmetriese matrikse, kwadratiese vorme en matriksfaktoriserings.*

- *Vaardigheid in probleemoplossing en bewystegnieke te toon deur bekende en onbekende probleme en toepassings te ontleed en die kennis en tegnieke van lineêre algebra toe te pas.*

Method of delivery: Full Time
Metode van aflewering: *Voltyds*

Assessment modes:
Formative assessment
Assignments, formal tests and class tests, homework, and projects that integrate the various outcomes of the module.
Summative assessment
A written examination integrating the various aspects of the module wherein the extent to which students have attained the outcomes of the module will be assessed by means of both applied and theoretical questions./

Assesseringsmetodes:
Formatiewe assessering
Opdragte, formele toetse en klastoetse, huiswerk, en projekte wat die verskillende uitkomstes van die module integreer.
Summatiewe assessering
'n Geskrewe eksamen waarin die verskillende aspekte van die module geïntegreer word, waarin die mate waarin studente die uitkomste van die module bereik het, deur middel van beide toegepaste en teoretiese vrae geassesseer word.

Module code: MTHS223	**Semester 2**	**NQF Level: 6**

Title / *Titel*: **Engineering Analysis / *Ingenieursanalise***

Module outcomes:
On completing this module, students should be able to demonstrate advanced knowledge of and insight into the application of:
- Vector fields, line integrals and the Fundamental Theorem of line integrals, Green's theorem, oriented surfaces and surface integrals, rotation and divergence, the theorems of Stokes and Gauss.
- Convergence criteria for sequences of real numbers and the monotone convergence principle, Convergence of series, standard convergence tests, absolute and conditional convergence, introduction to power series, Taylor's theorem.
- Definition of derivatives and contour integrals of complex functions, Laurent's theorem (as an extension of Taylor's theorem), algebraic manipulation of Laurent series, formal definition of the Z-transform and basic rules for Z-transforms, partial fraction method for computing inverse transforms, applications to difference equations./

Module-uitkomste:
By voltooiing van die module, behoort studente gevorderde kennis en insig in die toepassing van die onderstaande kan demonstreer:
- *Vektorvelde, lynintegrale en die Grondstelling van lynintegrale, Green se stelling, gerigte oppervlakke en oppervlakintegrale, rotasie en divergensie, die stellings van Stokes en Gauss.*
- *Konvergensie kriteria vir rye reële getalle en die monotoon konvergensiebeginsel, konvergensie van reekse, standaard konvergensie toetse, absolute en voorwaardelike konvergensie, inleiding tot magreekse, Taylor se stelling.*
- *Definisie van afgeleides en kontoerintegrale van komplekse funksies, Laurent se stelling (as 'n uitbreiding van Taylor se stelling), algebraïese manipulasie van Laurent reekse, formele definisie van die Z-transform en basiese reëls vir Z-transforms, die parsiële breuke metode om inverse transforms te bereken, toepassings op verskilvergelykings.*

Method of delivery: Full Time
Metode van aflewering: *Voltyds*

Assessment modes:
Formative assessment
Assignments, formal tests and class tests, homework, and projects that integrate the various outcomes of the module.
Summative assessment
A written examination integrating the various aspects of the module wherein the extent to which students have attained the outcomes of the module will be assessed by means of both applied and theoretical questions./

Assesseringsmetodes:
Formatiewe assessering
Opdragte, formele toetse en klastoetse, huiswerk, en projekte wat die verskillende uitkomstes van die module integreer.
Summatiewe assessering
'n Geskrewe eksamen waarin die verskillende aspekte van die module geïntegreer word, waarin die mate waarin studente die uitkomste van die module bereik het, deur middel van beide toegepaste en teoretiese vrae geassesseer word.

Module code: MTHS224	**Semester 2**	**NQF Level: 6**

Title / *Titel*: **Applied Linear Algebra / *Toegepaste Lineêre Algebra***

Module outcomes*:*
On completion of this module the student should:
- Demonstrate advanced knowledge of and insight into bases and linear independence of functions, and be able to use it in applications;
- Be able to use concepts like eigenvalues and eigenvectors in applications such as diagonalisation, discrete dynamical systems and systems of linear differential equations;
- Be able to use the concepts of inner product, length and othogonality to find orthogonal bases and master their applications such as for example the least squares method and linear models; symmetric matrices and further applications;
- Demonstrate problem-solving skills by analysing known and unknown problems and applications and applying the knowledge and techniques of linear algebra.
- Be able to do different matrix decompositions of matrices and know where and how it is applicable in applications./

Module-uitkomste:
By voltooiing van die module, behoort studente:
- *'n Deeglike kennis van en insig te toon in basisse en lineêr onafhanklikheid van funksies en in staat wees om dit in toepassings te gebruik;*
- *In staat te wees om begrippe soos eiewaardes en eievektore in toepassings soos diagonalisering, diskrete dinamiese stelsels en stelsels lineêre differensiaalvergelykings te gebruik;*
- *In staat wees om die begrippe van inproduk, lengte en ortogonaliteit te gebruik om ortogonale basisse te vind en hulle toepassings te bemeester, soos byvoorbeeld die kleinste-kwadrate-metode en lineêre modelle, simmetriese matrikse en verdere toepassings;*
- *Probleemoplossingsvaardighede te demonstreer deur bekende en onbekende probleme en toepassings te ontleed en die kennis en tegnieke van lineêre algebra te gebruik.*
- *In staat wees om verskillende matriksontbindings te doen en te weet hoe en waar dit van toepassing is.*

Method of delivery: Full Time
Metode van aflewering: *Voltyds*

Assessment modes:
Formative assessment
Assignments, formal tests and class tests, homework, and projects that integrate the various outcomes of the module.

Summative assessment
A written examination integrating the various aspects of the module wherein the extent to which students have attained the outcomes of the module will be assessed by means of both applied and theoretical questions./

Assesseringsmetodes:
Formatiewe assessering
Opdragte, formele toetse en klastoetse, huiswerk, en projekte wat die verskillende uitkomstes van die module integreer.
Summatiewe assessering
'n Geskrewe eksamen waarin die verskillende aspekte van die module geïntegreer word, waarin die mate waarin studente die uitkomste van die module bereik het, deur middel van beide toegepaste en teoretiese vrae geassesseer word.

Module code: MTHS225	**Semester 2**	**NQF Level: 6**

Title / *Titel*: **Discrete Mathematics / *Diskrete Wiskunde***

Module outcomes:
On completing this module, students should demonstrate an advanced knowledge and applied insight into:

- Propositional- and predicate logic and logical argumentation, also in practical situations;
- General proof techniques, including direct and indirect arguments and counter examples;
- Basic notation and the properties of set theory and boolean algebras;
- Calculation of probabilities by means of basic counting techniques;
- Properties of mathematical functions and the pigeonhole principle;
  Introductory graph theory;
- The correct programming of mathematical concepts./

***Module-uitkomste*:**
By voltooiing van die module, behoort studente gevorderde kennis en toepasbare insig kan demonstreer rakende:

- *Proposisionele- en predikaatlogika en logiese argumentering, ook in praktiese situasies;*
- *Algemene bewystegnieke, insluitende direkte en indirekte argumente asook teenvoorbeelde;*
- *Basiese notasie en die eienskappe van versamelingsteorie en boole algebra's;*
- *Die berekening van waarskynlikhede deur gebruik te maak van basiese teltegnieke;*
- *Eienskappe van wiskundige funksies en die vakkiebeginsel;*
- *Inleidende grafiekteorie;*
- *Die korrekte programmering van wiskundige konsepte.*

Method of delivery: Full Time
Metode van aflewering: *Voltyds*

Assessment modes:
Formative assessment
Assignments, formal tests and class tests, homework, and projects that integrate the various outcomes of the module.
Summative assessment
A written examination integrating the various aspects of the module wherein the extent to which students have attained the outcomes of the module will be assessed by means of both applied and theoretical questions./

Assesseringsmetodes:
Formatiewe assessering
Opdragte, formele toetse en klastoetse, huiswerk, en projekte wat die verskillende uitkomstes van die module integreer.

Summatiewe assessering
'n Geskrewe eksamen waarin die verskillende aspekte van die module geïntegreer word, waarin die mate waarin studente die uitkomste van die module bereik het, deur middel van beide toegepaste en teoretiese vrae geassesseer word.

Module code: MTHS311	**Semester: 1**	**NQF-Level: 7**

Title / Titel: **Real Analysis / *Reële Analise***

Module outcomes:
After the completion of this module the students should be able to do the following:

- Demonstrate a fundamental knowledge of the theory of real numbers; the topology of finite dimensional vector spaces; compactness and connectedness; continuous and uniformly continuous functions; continuous images of compact and connected sets; convergence and uniform convergence of sequences of functions; Riemann- integration; differentiation of vector functions of several variables revisited; the principle of nested sets and the Heine-Borel theorem; inequalities of Cauchy-Schwarz, Hölder and Minkowski; introduction to the theory of metric spaces;
- Demonstrate the ability to solve problems in the area of real analysis; be able to test functions for their continuity and differentiability, be able to solve problems in integration and differentiation theory, able to see how real analytic concepts and theory extend to the metric space context./

Module-uitkomste:
Na voltooiing van hierdie module behoort die studente die volgende te kan doen:

- *Fundamentele kennis demonstreer van die teorie van reële getalle; die topologie van eindig dimensionele vektorruimtes; kompaktheid en samehangendheid van versamelings; kontinue en gelykmatig kontinue funksies; kontinue beelde van kompakte en samehangende versamelings; konvergensie en gelykmatige konvergensie van rye funksies; riemann-integrasie; differensiasie van meerveranderlike vektorfunksies herbesoek; die beginsel van geneste versamelings en die heine-borel stelling; ongelykhede van cauchy-schwarz, hölder en minkowski; inleiding tot die teorie van metriese ruimtes;*
- *Probleemoplossingsvaardighede demonstreer deur bekende en onbekende analise-probleme te analiseer, funksies te toets vir kontinuïteit, probleme uit integrasie en differensiasieteorie op te los, in staat om te sien hoe reële analitiese konsepte en teorieë na die metriese ruimtes konteks uitbrei.*

Method of delivery: Full Time
Metode van aflewering: *Voltyds*

Assessment modes:
Formative assessment
Assignments, formal tests and class tests, homework, and projects that integrate the various outcomes of the module.
Summative assessment
A written examination integrating the various aspects of the module wherein the extent to which students have attained the outcomes of the module will be assessed by means of both applied and theoretical questions./

Assesseringsmetodes:
Formatiewe assessering
Opdragte, formele toetse en klastoetse, huiswerk, en projekte wat die verskillende uitkomstes van die module integreer.
Summatiewe assessering
'n Geskrewe eksamen waarin die verskillende aspekte van die module geïntegreer word, waarin die mate waarin studente die uitkomste van die module bereik het, deur middel van beide toegepaste en teoretiese vrae geassesseer word.

Module code: MTHS312	Semester 1	NQF Level: 7

Title / *Titel*: **Combinatorics / *Kombinatorika***

Module outcomes:

On completing this module, students should be able to do the following:

- Demonstrate a rounded and systematic knowledge and insight into the fundamental counting principles; the binomial theorem; the pigeon hole principle; generalised permutations and arrangements; recursion relations and their solutions, and generating functions; fundamental graph theoretical concepts; partition numbers; imbedding of graphs into surfaces; concept of connectedness; Menger's theorem; independence numbers; factorisation; Hamilton cycles and Eulerian revolutions; colouring of graphs;
- Demonstrate problem solving skills by interpreting familiar and unfamiliar combinatorial problems and using known techniques to solve them; by formulating problems in terms of graphs; by applying and calculating generating functions; by recognising classical discrete probability problems and solving them; by understanding the arguments and their motivations in proving of theorems and being able to give own formulations of them, and applying these results to solve concrete or abstract problems./

Module-uitkomste:

Na voltooiing van hierdie module behoort die studente die volgende te kan doen:

- *Afgeronde en sistematiese kennis en begrip demonstreer van grondliggende telbeginsels, die binomiaalstelling, die vakkiebeginsel, veralgemeende permutasies en rangskikkings, rekursierelasies en hulle oplossings, en voortbrengende funksies, asook van grondliggende grafiekteoretiese begrippe, partisiegetalle, inbeddings van grafieke in oppervlakke, begrippe van samehang, Menger se stelling, onafhanklikheidsgetalle, faktoriserings, Hamiltonsiklusse en Eulertoere, en kleurings van grafieke;*
- *Probleemoplossingsvaardighede demonstreer deur bekende en onbekende kombinatoriese probleme te interpreteer en met behulp van die bekende tegnieke op te los, probleme in terme van grafieke te formuleer, voortbrengende funksies toe te pas en te bereken, probleme in klassieke diskrete waarskynlikheid herken en oplos, die argumente en motiverings in die bewyse van stellings te verstaan en in eie formulerings te kan weergee, en hierdie resultate toe te pas om konkrete of abstrakte probleme op te los.*

Method of delivery: Full Time
Metode van aflewering: *Voltyds*

Assessment modes:

Formative assessment

Assignments, formal tests and class tests, homework, and projects that integrate the various outcomes of the module.

Summative assessment

A written examination integrating the various aspects of the module wherein the extent to which students have attained the outcomes of the module will be assessed by means of both applied and theoretical questions./

Assesseringsmetodes:

Formatiewe assessering

Opdragte, formele toetse en klastoetse, huiswerk, en projekte wat die verskillende uitkomstes van die module integreer.

Summatiewe assessering

'n Geskrewe eksamen waarin die verskillende aspekte van die module geïntegreer word, waarin die mate waarin studente die uitkomste van die module bereik het, deur middel van beide toegepaste en teoretiese vrae geassesseer word.

Module code: MTHS321	Semester 1	NQF Level: 7

Title / *Titel*: **Complex Analysis / *Komplekse Analise***

Module outcomes:

After completion of this module students ought to be able to do the following:

- Be able to define and determine the derivatives of complex and vector functions, demonstrate knowledge of the concept of differentiability and analyticity and be familiar with its use, demonstrate knowledge of the concept of a line integral and complex contour integral, be familiar with the theorems of Cauchy and their application in computing complex contour integrals.
- Be familiar with diverse consequences of Cauchy's theorem and their application, demonstrate knowledge of the theorems of Taylor and Laurent and their applications, demonstrate knowledge of singular points and residues of complex functions, be familiar with the description of singular points and the computation of residues, be familiar with Cauchy's Residue theorem and its use.
- Be able to solve several improper integrals and other important real integrals by means residue theory and be able to calculate the maxima and minima of complex functions, be able to apply these theorems in other areas./

Module-uitkomste:

Na voltooiing van hierdie module behoort die studente die volgende te kan doen

- *Die afgeleide van komplekse- asook vektorfunksies van meer veranderlike funksies kan definieer en bepaal, kennis demonstreer van die begrippe differensieerbaar en analities en vertroud wees met die gebruike daarvan, kennis demonstreer van die begrip van 'n lynintegraal en komplekse kontoerintegraal, vertroud wees met die stellings van Cauchy en die gebruik daarvan in die berekening van kontoerintegrale.*
- *Vertroud wees met diverse gevolge van Cauchy se stelling en die toepassing daarvan, kennis demonstreer oor die stellings van Taylor en Laurent en die gebruike daarvan, kennis demonstreer oor singuliere punte en residue van komplekse funksies, vertroud wees met die beskrywing van singuliere punte en berekening van residue, vertroud wees met Cauchy se residustelling en die gebruik daarvan.*
- *Verskeie oneintlike integrale en ander belangrike integrale kan oplos met behulp van residurekening, die maksima en minima van komplekse funksies kan bereken, en kan toepas in ander gebiede*

Method of delivery: Full Time
Metode van aflewering: *Voltyds*

Assessment modes:

Formative assessment

Assignments, formal tests and class tests, homework, and projects that integrate the various outcomes of the module.

Summative assessment

A written examination integrating the various aspects of the module wherein the extent to which students have attained the outcomes of the module will be assessed by means of both applied and theoretical questions./

Assesseringsmetodes:

Formatiewe assessering

Opdragte, formele toetse en klastoetse, huiswerk, en projekte wat die verskillende uitkomstes van die module integreer.

Summatiewe assessering

'n Geskrewe eksamen waarin die verskillende aspekte van die module geïntegreer word, waarin die mate waarin studente die uitkomste van die module bereik het, deur middel van beide toegepaste en teoretiese vrae geassesseer word.

Module code: MTHS322	Semester 2	NQF Level: 7

Title / *Titel*: **Algebraic Structures / *Algebraïese Strukture***

Module outcome:

On completion of this module, the student will demonstrate a thorough and advanced knowledge of, and skill in

- the underlying principles,
- the methods, and
- the application of the theory

regarding selected aspects of the following topics:

- Group theory, including the definition, elementary properties, subgroups, permutation groups, in particular of a finite set, isomorphisms, homomorphisms, the concept of order of an element, cyclic groups, normal subgroups, cosets and quotient groups;
- Ring theory, including the definition, elementary properties, subrings, ideals, isomorphisms and homomorphisms, quotient rings, examples of special rings such as commutative rings, integral domains and fields;
- The integers, its ideals, prime factorisation, division algorithm;
- The integers modulo n, its invertible elements and application in codes such as product or ISBN codes (self study)
- Polynomial rings, factorisation of polynomials over a field in general and more specifically over the known number systems./

***Module-uitkomste*s:**

Na voltooiing van die module, sal die student 'n deeglike en geordende kennis van, en vaardigheid in

- *die onderliggende beginsels,*
- *die metodes, en*
- *die toepassings van die teorie*

rakende geselekteerde aspekte van die volgende onderwerpe demonstreer:

- *Groepteorie, insluitend die definisie, elementêre eienskappe, ondergroepe, permutasiegroepe, in besonder van 'n eindige versameling, isomorfismes, homomorfismes, die konsep van die orde van 'n element, sikliese groepe, normale ondergroepe, neweklasse en faktorgroepe;*
- *Ringteorie, insluitend die definisie, elementêre eienskappe, deelringe, ideale, isomorfismes en homomorfismes, faktorringe, voorbeelde van spesiale ringe soos kommutatiewe ringe, integriteitsgebiede en liggame;*
- *Die heelgetalle, sy ideale, priemfaktorisering, delingsalgoritme;*
- *Die heelgetalle modulo n, sy omkeerbare elemente en toepassing in kodes soos produk- of ISBN-kodes (selfstudie);*
- *Polinoomringe, faktorisering van polinome oor 'n liggaam in die algemeen en meer spesifiek oor die bekende getalstelsels.*

Method of delivery: Full Time
Metode van aflewering: *Voltyds*

Assessment modes:

Formative assessment

Assignments, formal tests and class tests, homework, and projects that integrate the various outcomes of the module.

Summative assessment

A written examination integrating the various aspects of the module wherein the extent to which students have attained the outcomes of the module will be assessed by means of both applied and theoretical questions./

Assesseringsmetodes:
Formatiewe assessering
Opdragte, formele toetse en klastoetse, huiswerk, en projekte wat die verskillende uitkomstes van die module integreer.
Summatiewe assessering
'n Geskrewe eksamen waarin die verskillende aspekte van die module geïntegreer word, waarin die mate waarin studente die uitkomste van die module bereik het, deur middel van beide toegepaste en teoretiese vrae geassesseer word.

NAS.2.7.23 UNDERSTANDING THE ECONOMIC AND NATURAL WORLDS / *VERSTAAN DIE EKONOMIESE EN NATUURLIKE WÊRELD*

Module code: WVES221	**Semester 2**	**NQF Level: 6**

Title / *Titel*: **Understanding the Economic World / *Verstaan die Ekonomiese Wêreld***

Module outcomes:
Students should be able to:
- Have a fundamental knowledge base of a selection of world views and ideologies;
- Demonstrate their critical understanding through an ability to compare the nature and function, as well as different contemporary manifestations of these world views and ideologies;
- Have the ability to understand the interrelatedness of phenomena such as occurs in natural and social systems, and from this vantage point, analyse and evaluate real life problems or case studies based on core issues of our time, such as poverty, constant change, human rights, hiv-aids, power abuse, corruption, racism, xenophobia, etc.;
- Articulate their personal world view and use it as a point of departure for arguing and communicating feasible solutions to core issues and problems of our time in a typical academic manner./

Module uitkomste:
Studente moet in staat wees om:
- *'n Grondige kennisbasis te hê van 'n verskeidenheid wêreldbeskouings en ideologië;*
- *Sy/haar kritiese verstaan daarvan te demonstreer deur die aard en funksie, sowel as die verskillende moderne/kontemporêre manifestasies van die wêrelbeskouings en ideologië te vergelyk;*
- *Die verbande van fenomene soos dit in die natuurlike en sosiale sisteme voorkom te verstaan en vanuit sy/haar vertrekpunt, werklike lewensvraagstukke of gevalle studies te analiseer en evalueer, gebasseer op kernvraagstukke van ons tyd, soos armoede, voortdurende verandering, menseregte, hiv-vigs, magsmisbruik, korrupsie, rassisme, rassehaat, ens.;*
- *Sy/haar persoonlike wêreldbeskouing te kan oordra en dit te gebruik as 'n vertrekpunt om werkbare oplossings vir kernvraagstukke en probleme van ons tyd, op 'n tipies akademiese wyse te kan argumenteer en kommunikeer.*

Method of delivery: Full Time
Metode van aflewering: *Voltyds*

Assessment modes:
Assesseringsmetodes:

Module code: WVES311	**Semester 1**	**NQF Level: 7**

Title / *Titel*: **Business Ethics / *Bedryfsetiek***

Module outcomes:
Students should be able to:
- Possess knowledge of:
  - selected ethical theories;

- moral decision-making strategies;
- selected socio-economic ethical issues;
- selected issues and approaches with regard to business ethics;
- the nature of organizations and management from an ethical perspective;

- Possess the ability and skills to apply the above knowledge to case studies;
- Possess the ability and skills to analyse and evaluate the abovementioned theories and issues from different philosophical and ideological perspectives. /

Module uitkomste:
Studente moet in staat wees om:

- *Kennis te dra van:*
  - *geselekteerde etiese teorieë;*
  - *strategieë vir morele besluitneming;*
  - *geselekteerde sosio-ekonomiese etiese kwessies;*
  - *geselekteerde kwessies en benaderings in besigheidsetiek; en*
  - *die aard van organisasies en van bestuur vanuit 'n etiese perspektief.*
- *Oor die vermoë en vaardighede te beskik om bogenoemde kennis toe te pas op gevallestudies;*
- *Die bogenoemde teorieë en kwessies te kan analiseer en evalueer vanuit verskillende filosofiese en/of ideologiese perspektiewe.*

Method of delivery: Full Time
Metode van aflewering: *Voltyds*

Assessment modes:
Assesseringsmetodes:

Module code: WVNS211	**Semester 1**	**NQF Level: 6**

Title / *Titel*: **Understanding the Natural World / *Verstaan die Natuurlike Wêreld***

This module will, upon its successful completion, serve as a fundamental source of knowledge for students regarding the nature and function of worldviews and ideologies as these have developed historically from science, from the ancient to the postmodern era.
Student will also understand the relationship between norms and science, the influence of science and technology on the spiritual, cultural and material worldview of mankind, its community and environment.
Students must be able to understand, discuss and explain key concepts regarding the development of science in the context of value systems as they function in their worldview

Module outcomes:
Students should be able to:

- Develop a knowledge base consisting of a selection of world pictures/views and ideologies and be able to demonstrate their critical understanding thereof in the light of an ability to set out, analyse and evaluate the nature, function and various contemporary manifestations thereof;
- Demonstrate and make allowance for the influence of various world pictures/views on the scientific and technological development in their own forming of paradigm;
- Understand the interrelationship between scientific and social phenomena and to analyse and evaluate from this paradigm contemporary problems and to offer appropriate solution;
- Articulate and defend their personal world picture/view while using this as a point of departure in a quest for effective solutions for the major problems of our time./

Hierdie module sal, ná die suksesvolle voltooiing daarvan, vir die student as fundamentele kennisbron dien van die aard en funksie van wêreldbeskouings en ideologieë soos dit geskiedkundig uit die wetenskap ontwikkel het van die antieke tot die postmoderne era.

Die student sal ook die verhouding tussen norme en wetenskap, die invloed van wetenskap en tegnologie op die geestelike, kulturele en materiële wêreldbeskouing van die mens, sy gemeenskap en omgewing, verstaan.
Die student moet kernbegrippe rondom die ontwikkeling van die wetenskap in die konteks van waardesisteme, soos dit in hulle wêreldbeskouing funksioneer, kan verstaan en bespreek en verduidelik.

Module uitkomste:
Studente moet in staat wees om:

- *Kennisbasis van 'n seleksie van wêreldbeelde en ideologieë sal ontwikkel en hul kritiese begrip daarvan sal kan demonstreer aan die hand van 'n vermoë om die aard, funksie en verskillende kontemporêre manifestasies daarvan te kan weergee, analiseer en evalueer;*
- *Die invloed van verskillende wêreldbeelde op die natuurwetenskaplike en tegnologiese ontwikkeling sal kan demonstreer en verdiskonteer in hul eie paradigmavorming;*
- *Die interverwantskap van natuurwetenskaplike en sosiale fenomene te verstaan, en vanuit hierdie paradigma hedendaagse probleme te analiseer, te evalueer en oplossings aan te bied;*
- *Hul persoonlike wêreldbeeld te artikuleer en te verdedig, en dit as vertrekpunt te gebruik in 'n soeke na effektiewe oplossings vir die hoof-probleme van ons tyd.*

Method of delivery:
Flipped classroom approach (blended learning) with on-campus students attending classes and off-campus students being engaged via the internet (efundi).
Metode van aflewering:
Omgekeerde klaskamerbenadering (gemengde leer) met kampusstudente wat lesings bywoon en afkampusstudente wat via die internet (efundi) betrek word.

Assessment modes:
Process assessment is done by 11 online preparatory tests (efundi) as well as 3 written assignments. Summative assessment includes a semester assignment on the scientific method, as well as an exam project in the form of a written research paper on a relevant topic which requires students to apply all knowledge gained during the semester. The traditional semester test and exam paper are replaced by the semester assignment and the exam project./
Assesseringsmetodes:
Prosesassesering geskied dmv 11 voorbereidende toetse of efundi sowel as 3 geskrewe werksopdragte. Summatiewe assessering geskied deur 'n semesterreferaat oor die wetenskaplike navorsingsmetode (wat die tradisionele semestertoets vervang)sowel as 'n geskrewe eksamenprojek wat handel oor die toepassing van alle verworwe kennis op 'n gekose aktuele onderwerp wat jaarliks wissel. Die eksamenprojek vervang eweneens 'n traidsionele eksamenvraestel.

Module code: WVNS221	**Semester 2**	**NQF Level: 6**

Title / *Titel*: **Science, Technology and Society / *Wetenskap, Tegnologie en Samelewing***

Module outcomes:
Students should be able to:

- Develop the ability to identify, analyse and evaluate the reciprocal influence of world views and ideologies (society) on the development and continuation of science and technology;
- Able to demonstrate and make allowance for the influence of various world views on the natural scientific and technological development in forming their own paradigm;
- Develop the ability to understand the interrelationship of natural scientific and social phenomena and to analyse from this paradigm by means of systems thinking and an interdisciplinary approach, the ethical aspects of contemporary problems that pose a threat to sustainable development on earth;
- Write down their personal convictions regarding sts, put these into words and present it by means of a powerpoint presentation;
- Apply scientific research methodology with integrity;

- The specific outcomes for this module (WVNS211) as expressed in the nwu yearbook/calendar are as follows:
  - on successful completion of this module, the student must be able to identify, demonstrate and critically respond to the basic issues in contemporary discussions with regard to science, technology and society, with specific reference to the scientific and technology systems in South Africa;
  - the student must also be able to identify the most important ethical issues in the subject areas of a programme and react critically to these in accordance with a value-based orientation within a specific world view;
  - students must be able to form a carefully thought-out, reasoned point of view regarding the idea of sustainable development, one including the socio-economic implications thereof;
  - students must be able to discuss perspectives with regard to different systems of thought and to look closely at contemporary issues in science and technology within a system perspective./

Module uitkomste:

Studente moet in staat wees om:

- *Vermoë te ontwikkel om die wedersydse invloed van wêreldbeelde en ideologieë (samelewing) op die ontwikkeling en voortgang van die wetenskap en tegnologie te kan identifiseer, analiseer en evalueer;*
- *Die invloed van verskillende wêreldbeelde op die natuurwetenskaplike en tegnologiese ontwikkeling te kan demonstreer en verdiskonteer in hul eie paradigmavorming;*
- *Die interverwantskap van natuurwetenskaplike en sosiale fenomene te verstaan, en vanuit hierdie paradigma m.b.v. Stelseldenke en 'n interdissiplinêre benadering die etiese aspekte hedendaagse probleme wat volhoubare ontwikkeling op aarde bedreig te analiseer, te evalueer en oplossings aan te bied;*
- *Om hul persoonlike oortuigings oor wetenskap, tegnologie en samelewing te kan neerskryf in referaatvorm, dit te kan artikuleer en dit te kan oordra m.b.v. 'n powerpoint aanbieding;*
- *Die wetenskaplike navorsingsmetodiek met integriteit toe te pas;*
- *Die spesifieke uitkomste van hierdie module (WVNS211), soos in die jaarboek verwoord, is soos volg:*
  - *na suksesvolle voltooiing van hierdie module, moet die student die basiese kwessies in kontemporêre gesprekke oor wetenskap, tegnologie en die gemeenskap, met spesifieke verwysing na die wetenskap- en tegnologiesisteme in SA kan identifiseer, demonstreer en krities daarop reageer;*
  - *die student moet ook van die belangrikste etiese kwessies in die onderwerpareas van 'n program kan identifiseer en krities daarop reageer volgens 'n waardegebasseerde oriëntasie binne 'n spesifieke wêreldbeskouing;*
  - *'n deurdagte, beredeneerde standpunt oor die idee van volhoubare ontwikkeling, wat die sosio-ekonomiese implikasies daarvan insluit, moet deur die student gevorm kan word;*
  - *die student moet perspektiewe op verskillende denksisteme kan bespreek en kontemporêre kwessies in wetenskap en tegnologie moet binne 'n sisteemperspektief beskou kan word."*

Method of delivery:

Flipped classroom approach (blended learning) with on-campus students attending classes and off-campus students being engaged via the internet (efundi).

Metode van aflewering:

Omgekeerde klaskamerbenadering (gemengde leer) met kampusstudente wat lesings bywoon en afkampusstudente wat via die internet (efundi) betrek word.

Assessment modes:

Process assessment is done by 7 online revision tests (efundi). Summative assessment includes an individual written semester assignment on a topic of interest which differs annually, as well as

a group exam project in the form of a written research paper on a relevant topic which requires students to apply all knowledge gained during the semester, as well as a group presentation requiring every student to present a part of the presentation.
The traditional semester test and exam paper are replaced by the semester assignment and the group exam project.
***Assesseringsmetodes*:**
Prosesassessering geskied dmv 7 hersienings toetse op efundi. Summatiewe assessering geskied deur 'n individuele semester-referaat oor 'n geskikte aktuele onderwerp (wat die tradisionele semestertoets vervang) sowel as 'n geskrewe groeps-eksamenprojek wat handel oor die toepassing van alle verworwe kennis op 'n gekose aktuele onderwerp wat jaarliks wissel. Die groep-eksamenprojek behels ook ;n voordrag waartydens elke student die geleentheid kry om 'n deel van die voordrag aan te bied. Hierdie groepsreferaat en –voordrag vervang die tradisionele eksmanevraestel.

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