Faculty of Engineering
Postgraduate

Fakulteit Ingenieurswese
Nagraads

2026 YEARBOOK

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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.

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NWU OFFICE BEARERS

Chancellor

Vice-Chancellor

Deputy Vice-Chancellor:

- Community Engagement and Mahikeng Campus Operations
- Information Technology and Potchefstroom Campus Operations
- Planning and Vanderbijlpark Campus Operations
- Teaching and Learning
- Research and Innovation
- Registrar

Executive Director:

- Corporate Relations and Marketing
- Finance and Facilities
- People and Culture
- Student Life

NWU EXECUTIVE DEANS

- Faculty of Economics and Management
- Faculty of Education
- Faculty of Engineering
- Faculty of Health Sciences
- Faculty of Humanities
- Faculty of Law
- Faculty of Natural and Agricultural Sciences
- Faculty of Theology

FACULTY BOARD

Chairperson

Prof. L van Dyk (Executive Dean)

Deputy Dean: Teaching and Learning

Prof. M le Roux (Acting)

Deputy Dean: Research and Innovation, Community Engagement and Higher Degrees

Prof. K Moothi (Acting)

DIRECTORS

School of Chemical and Minerals Engineering

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School of Electrical, Electronic and Computer Engineering

Prof. H Marais

School of Mechanical Engineering

Prof. A Jonker

School of Industrial Engineering

Prof. J Bührmann

Industry and Community Engagement

Prof. R Siriram

Centre for Engineering Education

Dr. W van Niekerk

Unit for Energy and Technology Systems

Prof. R Coetzee

Centre of Excellence in Carbon based Fuels

Prof. HWJP Neomagus

ACADEMIC STAFF

Professor

Prof. A Jonker

Prof. VV Naicker

Associate Professors

Prof. M du Toit

Prof. P van Vuuren

Senior Lecturers

Vacant

Vacant

Lecturers

Dr. F Moyo

Vacant

Junior Lecturers

Vacant

Vacant

Student Representative

Chairperson FENG SAC

Faculty Administrator

Mrs. B Mackenzie

RESEARCH

Unit for Energy and Technology Systems

Prof. R Coetzee

Centre of Excellence in Carbon Based Fuels

Prof. HWJP Neomagus

Centre of Competence - Hydrogen Energy

Prof. DG Bessarabov

Niche Area: Multilingual Speech Technologies (MuST)

Prof. MH Davel

HIGHER DEGREES COMMITTEE CHAIRS

Engineering Research Ethics Committee (ENG-REC)

Prof. P van Vuuren

Higher Degrees Committee

To be confirmed

HIGHER DEGREES PROGRAMME MANAGERS

Chemical and Minerals Engineering

Dr. FH Conradie

Electrical, Electronic and Computer Engineering

Dr. M Ferreira

Industrial Engineering

Dr. MM van Zyl

Mechanical Engineering

Prof. JJ Bosman

Nuclear Engineering

Prof. VV Naicker

ENG.1 FACULTY RULES

ENG.1.1 AUTHORITY OF THE GENERAL RULES

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 Academic 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 Rules.

The Manual for Masters and Doctoral students, with specific guidelines and procedures for master's and doctoral studies, as well as quality measures of research entities also apply.

ENG.1.2 MASTER'S DEGREES

ENG.1.2.1 Requirements for the research component of a Master's degree

In accordance with General Academic Rule 4.4.2, students enrolled for a Master's degree may make use of the research article format.

ENG.1.2.2 Supervision

In accordance with General Academic Rule 4.10, at least one supervisor/promotor - that is of the status of being eligible to be appointed as a member of the Faculty Board - will be appointed for each student. However, applications for exceptions may be presented to the Higher Degrees Committee, who will make a recommendation to the Faculty Board for final consideration.

With reference to General Academic Rule 4.10.4, the faculty board may, in exceptional circumstances, approve the appointment of a co-supervisor on the grounds of relevant technical expertise despite such a person not being in possession of a master's degree. Such applications will be motivated by the applicable research director, the applicable scientific committee and recommended for approval by the Faculty Board Schools of the faculty

ENG.1.2.3 Examination and moderations

In accordance with A-Rule 4.18.2.3, Only the examination materials must be submitted for external moderation, not the additional summative assessment components.

ENG.1.3 DOCTORAL DEGREES

ENG.1.3.1 Completion requirements for a doctoral degree

In accordance with A-Rule 5.3.2., A doctoral candidate should Have at least one full-length research paper on aspects of the thesis accepted for publication in a DHET accredited journal. The list of DHET accredited journals is available at: https://collections.nwu.ac.za/dbtw-wpd/textbases/accredited-journals/accred.html

ENG.1.3.2 Requirements for the research component of a doctoral degree

In accordance with General Academic Rule 5.4.2, students enrolled for a doctoral degree may make use of the research article format.

ENG.1.3.3 Supervision

In accordance with General Academic Rule 5.9.2, for each student, at least one supervisor/promotor will be appointed that is of the status of being eligible to be appointed as a member of the Faculty Board. However, applications for exceptions may be presented to the Higher Degrees Committee, who will make a recommendation to the Faculty Board for final consideration.

ENG.1.3.4 Research Articles submitted as research product

In accordance with General Academic Rule 5.12.1, when the research product is submitted for examination, the candidate must provide proof that the research article was accepted by a scholarly journal

ENG.2 QUALIFICATIONS, PROGRAMMES AND CURRICULA

Table 1: Structured master's degree qualifications

MASTER'S DEGREES (Structured)	
Mode of delivery:	**Contact**
Campus	**Potchefstroom**
NQF Level	**9**

Qualification	Qualification Code
Master of Engineering in Nuclear Engineering with Nuclear Engineering	7DA-P01-I801P-FT/PT

Table 2: Research Master's degree qualifications

MASTER'S DEGREES (Research)	
Mode of delivery:	**Contact**
Campus	**Potchefstroom**
NQF Level	**9**

Qualification	Qualification Code
Master of Engineering in Chemical Engineering	7CE-N01-I801P-FT/PT
Master of Engineering in Computer and Electronic Engineering	7CD-N01-I801P-FT/PT
Master of Engineering in Electrical and Electronic Engineering	7CC-N01-I801P-FT/PT
Master of Engineering in Electrical and Electronic Engineering with Electromechanical Engineering	7CC-N02-I801P-FT/PT
Master of Engineering in Industrial Engineering	7CP-N01-I801P-FT/PT
Master of Engineering in Mechanical Engineering	7CB-N01-I801P-FT/PT
Master of Engineering in Mechanical Engineering *with* Electromechanical Engineering	7CB-N03-I801P-FT/PT
Master Of Engineering *with* Development and Management Engineering	7CF-N01-I801P-FT/PT
Master of Science in Engineering Sciences *with* Chemical Engineering	7CM-N02-I801P-FT/PT
Master of Science in Engineering Sciences *with* Computer and Electronic Engineering	7CM-N04-I801P-FT/PT
Master of Science in Engineering Sciences *with* Electrical and Electronic Engineering	7CM-N03-I801P-FT/PT
Master of Science in Engineering Sciences *with* Mechanical Engineering	7CM-N01-I801P-FT/PT
Master of Science in Engineering Sciences *with* Nuclear Engineering	7CM-N05-I801P-FT/PT
Master of Science in Engineering Sciences *with* Nuclear Engineering and Nuclear Technology Management	7CM-N06-I801P-FT/PT
Master of Science in Engineering Sciences *with* Industrial Engineering	7CM-N07-I801P-FT/PT

DOCTORAL DEGREES		
Mode of delivery:	**Contact**	
Campus	**Potchefstroom**	
NQF Level	**10**	
Qualification	**Specialisation**	**Qualification Code**
Doctor of Philosophy in Engineering	Chemical Engineering	7CA-R01-I901P-FT/PT
	Computer Engineering	7CA-R03-I901P-FT/PT
	Computer and Electronic Engineering	7CA-R02-I901P-FT/PT
	Electrical Engineering	7CA-R06-I901P-FT/PT
	Electronic Engineering	7CA-R07-I901P-FT/PT
	Electrical and Electronic Engineering	7CA-R05-I901P-FT/PT
	Industrial Engineering	7CA-R11-I901P-FT/PT
	Development and Management Engineering	7CA-R04-I901P-FT/PT
	Mechanical Engineering	7CA-R09-I901P-FT/PT
	Nuclear Engineering	7CA-R10-I901P-FT/PT

ENG.3 PROGRAMME OUTCOMES

Table 1: Program outcomes for Doctoral and Master's degrees

DOCTOR OF PHILOSOPHY (*PhD*)	**The programme outcomes have been achieved if the student has made an original contribution to knowledge in the chosen field as evidenced by a thesis with proper structure, style, and language that includes:** • Identification and formulation of an original engineering research problem; • Critical engagement with existing knowledge to compile a comprehensive and relevant exposition thereof, which also reveals the originality of the envisaged contribution; • Development and execution of appropriate and advanced research procedures to solve research problems and verify solutions • Assessment, validation and conclusion of research results and solutions; and • Communication and defense of the research problem, research process, research results and the originality of the contribution.
MASTER OF ENGINEERING (MEng)	**The programme outcomes have been achieved if the student demonstrates competence in applying research methodology as evidenced by a dissertation with proper structure, style, and language that includes:** • Identification and formulation of an engineering research problem; • Critical engagement with existing knowledge to compile a relevant literature survey; • Development and execution of appropriate research procedures to solve the research problem and verify the solution; • Assessment, validation and conclusion of research results and solutions; and • Communication of the research problem, research process and research results.
MASTER OF SCIENCE IN ENGINEERING SCIENCES (*MSc*)	**The programme outcomes have been achieved if the student demonstrates competence in applying research methodology as evidenced by a dissertation with proper structure, style, and language that includes:** • Identification and formulation of a research problem within the context of engineering science; • Critical engagement with existing knowledge to compile a relevant literature survey; • Development and execution of appropriate research procedures to solve the research problem and verify the solution; • Assessment, validation and conclusion of research results and solutions; and • Communication of the research problem, research process and research results.

ENG.4 PROGRAMME ASSESSMENT CRITERIA FOR THESES AND DISSERTATIONS

Table 2: Assessment criteria for Doctoral degrees and Master's degrees

DOCTOR OF PHILOSOPHY (*PhD*)	Question existing knowledge boundaries and practices in the field related to the research problem. Formulate complex, unfamiliar problems in the field of Engineering. Deal with complexity, lacunae and contradictions in the knowledge base of the field of Engineering to identify and formulate an original research problem.
	Demonstrate in-depth and critical knowledge and high levels of theoretical understanding in a complex and specialised area within the field of Engineering and/or across specialised or applied areas and expand or redefine existing knowledge in the field of Engineering. Show mastery of the literature and state of research in the area related to the research problem.
	Use intellectual independence and advanced research skills through the ability to apply sophisticated knowledge and research methodologies towards solving the research problem and to verify the solution.
	Execute autonomous independent judgements about information and concepts at highly abstract levels and make evaluations of research results on the basis of independently generated criteria and confirm that the proposed solution solves the research problem.
	Compile an appropriately structured and coherent written thesis to communicate and defend the research problem, research process, research results and originality of the contribution and to demonstrate accomplishments of all other outcomes. This may be presented in traditional monograph format, or as a thesis based on a series of journal articles authored by the candidate. Disseminate some research results by means of academic journals and/or conferences.
MASTER OF ENGINEERING **(MEng)**	Identify knowledge boundaries and practices in the field related to the research problem. Within this context, formulate a research problem in the field of Engineering.
	Demonstrate knowledge and theoretical understanding in a specialised area within the field of Engineering. Synthesise existing knowledge in the field of Engineering. Show mastery of the literature and state of the research area related to the research problem.
	Use appropriate research skills to apply appropriate knowledge and research methodologies towards solving the research problem and to verify the solution.
	Execute judgements and make evaluations to confirm that the proposed solution solves the research problem. Apply theoretical insights and research findings beyond the context of the research process.
	Compile an appropriately structured and coherent written dissertation to communicate the research problem, research process and research results, and to demonstrate accomplishment of all the other outcomes.

MASTER OF SCIENCE IN ENGINEERING SCIENCES (*MSc*)	Identify knowledge boundaries and practices in the field related to the research problem. Within this context, formulate a research problem in the field of Engineering science.
	Demonstrate knowledge and theoretical understanding in a specialised area within the field of Engineering and/or across specialised or applied areas and expand or redefine existing knowledge in the field of Engineering. Show mastery of the literature and state of research in the area related to the research problem.
	Use appropriate research skills to apply appropriate knowledge and research methodologies towards solving the research problem and to verify solution.
	Execute judgements and make evaluations to confirm that the proposed solution solves the research problem. Apply theoretical insights and research findings beyond the context of research process.
	Compile an appropriately structured and coherent written dissertation to communicate the research problem, research process and research results and to demonstrate accomplishment of all the other outcomes.

ENG.5 THE DEGREE MASTER OF ENGINEERING

ENG.5.1 RULES FOR THE DEGREE MASTER OF ENGINEERING

ENG.5.1.1 Duration

Refer to General Academic Rule 1.13.

The minimum term of study is one (1) year.

ENG.5.1.2 Minimum admission requirements for the qualification…

a) An applicable four (4) year bachelor's degree (ECSA-accredited) in engineering or an equivalent qualification.

ENG.5.1.3 Purpose and structure

In accordance with General Academic Rule 4.2.2., the master's degree consists of a total of 180 credits. Each credit represents 10 hours of notional study.

In accordance with General Academic Rule 4.2.3., the faculty of Engineering offers a general master's degree in the form of a research master's degree by dissertation with a minimum of 180 credits for research.

Table 6: Modules per research Master's degree

Qualification	Specialisation	Qualification Code	Module
Master of Engineering in Chemical Engineering		7CE N01	CEMI 871
Master of Engineering in Computer and Electronic Engineering		7CD N01	EERI 871
Master of Engineering in Electrical and Electronic Engineering		7CC N01	EERI 871
Master of Engineering in Electrical and Electronic Engineering	Electromechanical Engineering	7CC N02	EEEM 871
Master of Engineering in Industrial Engineering		7CP N01	INGB 871
Master of Engineering in Mechanical Engineering		7CB N01	MEGI 871
Master of Engineering in Mechanical Engineering	Electromechanical Engineering	7CB N03	MEEM 871

ENG.5.2 STRUCTURED MASTERS

ENG.5.2.1 Master of Engineering in Nuclear Engineering

Qualification code - 7DA P01

ENG.5.2.1.1 Minimum admission requirements for the qualification

- An appropriate four (4) year bachelor's degree (ECSA-accredited) in engineering or an equivalent qualification; or

- BSc degree with Mathematics, Applied Mathematics or Physics at NQF level 7 or a BTech degree in engineering (Mechanical, Electrical or Chemical) plus BSc Honours degree in Physics or Mathematics or Postgraduate diploma in Nuclear Science and Technology with an average of 65%.

ENG.5.2.1.2 Purpose and structure

Qualification Name	**Master of Engineering in Nuclear Engineering**		
Qualification Code	**7DA-P01-I801P-FT/PT**		
Mode of delivery:	**Contact**		
Campus	**Potchefstroom**		
NQF Level	**9**		
Module code	**Descriptive name**	**Co-requisites**	**Cr**
NUCI 872	Dissertation	-	100
NUCI 811	Nuclear Engineering I	-	16
NUCI 883	Nuclear Engineering II	NUCI 811	16
NUCI 887	Reactor Analysis	NUCI 811	16
NUCI 888	Reactor Safety	NUCI 811	16
NUCI 879	Nuclear Project Management	-	16
Total credits for the curriculum			**180**

ENG.6 THE DEGREE MASTER OF SCIENCE IN ENGINEERING SCIENCE

ENG.6.1 RULES FOR THE MASTER OF SCIENCE IN ENGINEERING SCIENCES

ENG.6.1.1 Duration

Refer to General Academic Rule 1.13.

The minimum term of study is **one (1) year**.

ENG.6.1.2 Minimum admission requirements for the qualification

ENG.6.1.3 Chemical, Computer, Electrical, Electronic, Industrial, and Mechanical

a) Applicable BSc (Hons) degree; or

b) Applicable four (4) year bachelor's degree (*ECSA-accredited*) in engineering; or

c) A Postgraduate diploma in Engineering,

d) Another recognised qualification that allows the student to attain equivalent status and which has been approved by the Faculty Board.

ENG.6.1.4 Nuclear Engineering:

a) Postgraduate Diploma in Nuclear Science and Technology; or

b) Postgraduate Diploma in Nuclear Science and Technology with Nuclear Technology Management; or

c) Applicable BSc (Hons) degree that provides the required theoretical knowledge in Nuclear Engineering; or

d) Applicable four (4) year bachelor's degree (ECSA-accredited) in engineering that provides the required theoretical knowledge in Nuclear Engineering; or

e) Another recognised qualification that allows the student to attain equivalent status and which has been approved by the Faculty Board.

ENG.6.1.5 Nuclear Engineering and Nuclear Technology Management:

a) NWU's Postgraduate Diploma in Nuclear Science and Technology with Nuclear Technology Management; or

b) Applicable BSc (Hons) degree that provides the required theoretical knowledge in Nuclear Engineering and Nuclear Technology Management; or

c) Applicable four (4) year bachelor's degree (ECSA-accredited) in engineering that provides the required theoretical knowledge in Nuclear Engineering and Nuclear Technology Management.

ENG.6.1.6 Purpose and structure

In accordance with General Academic Rule 4.2.2., the master's degree consists of a total of 180 credits. Each credit represents 10 hours of notional study.

In accordance with General Academic Rule 4.2.3., the faculty of Engineering offers a general master's degree in the form of a research master's degree by dissertation with a minimum of 180 credits for research.

Table 3: Modules per Master of Science degrees

Qualification	Specialisation	Qualification Code	Module
(MSc) Master of Science in Engineering Sciences with	Chemical Engineering	7CM-N02-I801P-FT/PT	CEMI 871
	Computer and Electronic Engineering	7CM-N04-I801P-FT/PT	EERI 871
	Electrical and Electronic Engineering	7CM-N03-I801P-FT/PT	EERI 871
	Mechanical Engineering	7CM-N01-I801P-FT/PT	MEGI 871
	Nuclear Engineering	7CM-N05-I801P-FT/PT	NUCE 871
	Nuclear Engineering and Nuclear Technology Management	7CM-N06-I801P-FT/PT	NUCE 871
	Industrial Engineering	7CM-N07-I801P-FT/PT	INGB871

ENG.7 THE DEGREE OF DOCTOR OF PHILOSOPHY IN ENGINEERING

ENG.7.1 RULES FOR THE DEGREE OF DOCTOR OF PHILOSOPHY IN ENGINEERING

ENG.7.1.1 Duration

Refer to General Academic Rule 1.13.

The minimum term of study is **two (2) years**.

ENG.7.1.2 Minimum admission requirements for the qualification

- MEng; or
- Applicable MSc in Engineering/Natural Sciences; or
- Another recognised qualification that allows the student to attain equivalent status approved by the Faculty Board.

ENG.7.1.3 Purpose and structure

In accordance with General Academic Rule 5.2.2, a doctoral degree consists of a total of 360 credits. Each credit represents 10 hours of notional study.

The faculty of Engineering offers a doctoral degree in the form of a research thesis of 360 credits.

Table 4: Modules per doctoral degrees

Program	Qualification Code	Module Code
Chemical Engineering	7CA-R01-I901P-FT/PT	CEMI 972
Computer Engineering	7CA-R03-I901P-FT/PT	EREI 972
Computer and Electronic Engineering	7CA-R02-I901P-FT/PT	REEI 972
Electrical Engineering	7CA-R06-I901P-FT/PT	EERI 972
Electronic Engineering	7CA-R07-I901P-FT/PT	EEEI 972
Electrical and Electronic Engineering	7CA-R05-I901P-FT/PT	ELEI 972
Industrial Engineering	7CA-R11-I901P-FT/PT	INGB 972
Development and Management Engineering	7CA-R04-I901P-FT/PT	IIOB 972
Mechanical Engineering	7CA-R09-I901P-FT/PT	MEGI 972
Nuclear Engineering	7CA-R10-I901P-FT/PT	NUCI 972

ENG.8 MODULE OUTCOMES

Table 5

NUCI 811	**NQF level: 9**
Title: Nuclear Engineering I	
Module outcomes: The module provides students with a broad overview of nuclear engineering to provide them with the basic knowledge they need to function in the nuclear reactor industry. The student should be able to demonstrate specialist knowledge to enable engagement with criticism of current nuclear research and nuclear practices. The student's problem solving skill should be developed to demonstrate the ability to use a wide range of specialist skills in identifying, conceptualizing, designing and implementing methods to address complex practical and theoretical nuclear problems. The student should also demonstrate an understanding of the consequences of any nuclear solution. Therefore, the following topics in nuclear engineering are covered: a) The history of nuclear engineering; b) Basics of anatomic and nuclear physics for engineers; c) Interaction of neutrons and nuclear radiation with matter; d) Basic types of nuclear power plants, neutron diffusion and moderation; e) Nuclear reactor theory; f) Time dependent behaviour and effects; g) Heat generation in nuclear cores; h) Radiation protection; i) Radiation shielding; and j) Reactor safety and licencing.	
NUCI 879	**NQF level: 9**
Title: Nuclear Project Management	
Module outcomes: After successful completion of the Nuclear Project Management (NPM) module the student should demonstrate mastery of basic knowledge and skills pertaining to the theory, concepts, processes, tools and techniques of project management. He/she will have applied it to a typical nuclear industry project.	
NUCI 883	**NQF level: 9**
Title: Nuclear Engineering II	
Module outcomes: On completion of this module, the student will have obtained the basic knowledge in understanding how nuclear power plants are designed and operated. With the knowledge the student have obtained from the module, he/she should be able to solve basic thermal-hydraulic problems related to nuclear reactor engineering and communicate with the engineering community about these problems. The student's knowledge in the thermal-hydraulic analysis of nuclear reactors, as well as knowledge of nuclear fuel and reactor operations, will enable him/her to work in the nuclear industry.	

NUCI 887	NQF level: 9
Title: Reactor Analysis	
Module outcomes: Upon successful completion of the module, the student should have acquired basic knowledge of nuclear reactor analysis, which includes the following topics: • Physics of neutron-nuclear interactions and fission chain reaction; • Neutron transport model and diffusion theory; • Neutron energy distribution, including slowing down, resonance absorption and group energy method; • Nuclear reactor dynamics; and • Fuel burn-up. This level of knowledge would enable the student to understand physical principles and apply computational methods for reactor design and analysis such as the calculation of neutron flux distribution in space and energy for simple homogenous geometrics and heterogeneous lattices.	

NUCI 888	NQF level: 9
Title: Reactor Safety	
Module outcomes: On completion of this module the student should have developed a basic knowledge in the field of reactor safety. With this knowledge he/she should be able to: • understand accidental situations and the student should have learned the necessary methods to evaluate them; • the student should be able to communicate with the engineering community about these problems; • the student should furthermore be able to carry out estimations for important accidents in nuclear plants; • use the basic knowledge to go deeper and to use complex programmes for safety analysis; and • use the knowledge to work in the nuclear industry or in safety organizations for supervision of nuclear power plants. The methods used in nuclear safety analysis are helpful in other fields of technology.	