University of Pretoria Yearbook 2024

BEngHons *Chemical Engineering* (12240022)

Department	Chemical Engineering
Minimum duration of study	1 year
Total credits	128
NQF level	08

Programme information

Refer also to G16-G29.

The curriculum is determined in consultation with the relevant heads of departments. A student is required to pass modules to the value of at least 128 credits.

The degree is awarded on the basis of examinations only.

Admission requirements

1. BEng degree awarded by the University of Pretoria **or** relevant four-year bachelor's degree in engineering that the Engineering Council of South Africa (ECSA) regards as acceptable for registration as a candidate engineer and for eventual registration as a professional engineer
2. An entrance examination may be required
3. Comprehensive intellectual CV

Other programme-specific information

A limited number of appropriate modules from other departments and from other divisions of Chemical Engineering are allowed.

Not all modules listed are presented each year. Please consult the departmental postgraduate brochure.

Examinations and pass requirements

Refer also to G18 and G26.

i. The examination in each module for which a student is registered, takes place during the normal examination period after the conclusion of lectures (i.e. October/November or May/June).
ii. G18(1) applies with the understanding that under exceptional circumstances an extension of a maximum of three years may be approved: provided that the Dean, on reccommendation of the relevant head of department, may approve a stipulated limited extension of this period.
iii. A student must obtain at least 50% in an examination for each module where no semester or year mark is required. A module may only be repeated once.
iv. In modules where semester or year marks are awarded, a minimum examination mark of 40% and a final

mark of 50% is required.

v. No supplementary or special examinations are granted at postgraduate level.

Pass with distinction

A student passes with distinction if he or she obtains a weighted average of at least 75% (not rounded) in the first 128 credits for which he or she has registered (excluding modules which were discontinued timeously). The degree is not awarded with distinction if a student fails any one module (excluding modules which were discontinued timeously). The degree must be completed within the prescribed study period.

Curriculum: Final year

Minimum credits: 128

Core modules

Bioprocessing 732 (CBP 732)

Module credits	32.00
NQF Level	08
Prerequisites	No prerequisites.
Contact time	32 contact hours per semester
Language of tuition	Module is presented in English
Department	Chemical Engineering
Period of presentation	Semester 2

Module content

Description of industrial biotechnology in a process engineering environment. Focus on specific applications in the mining, agricultural, paper and pulp, medical, pharmaceutical, veterinary, brewing and food industries. Principles including implications of bio-prospecting, bio-safety, inoculum production, aseptic growth, quality control and product formulation as applicable to bio-processes. Fermentation with various microbial groups, bio-leaching, gene transfer, solid-substrate fermentation, enzymatic catalysis and immunology. Bioreactors, batch and continuous processing. Bio-remediation.

Fluoro-materials science research and technology 732 (CFT 732)

Module credits	32.00
NQF Level	08
Prerequisites	Admission to relevant programme.
Contact time	2 lectures per week
Language of tuition	Module is presented in English
Department	Chemical Engineering
Period of presentation	Semester 2

Chemical engineering 702 (CIR 702)

Module credits	32.00
NQF Level	08
Prerequisites	Registration requires departmental approval.
Contact time	8 contact hours per semester
Language of tuition	Module is presented in English
Department	Chemical Engineering

Period of presentation	Year

Chemical engineering 780 (CIR 780)

Module credits	16.00
NQF Level	08
Prerequisites	No prerequisites.
Contact time	4 contact hours per semester
Language of tuition	Module is presented in English
Department	Chemical Engineering
Period of presentation	Year

Module content

A self-study module, intended for students who will be pursuing a Master's degree after completing the required Honours-modules. The content is discussed with the candidate by the research supervisor and will focus on a detailed literature study aimed towards preparation for the research dissertation or, in some cases, a specific selected topic.
Registration for this module is approved by the Head of Department.

Environmental nanomaterials 732 (CKO 732)

Module credits	32.00
NQF Level	08
Prerequisites	Admission to relevant programme.
Contact time	32 contact hours per semester
Language of tuition	Module is presented in English
Department	Chemical Engineering
Period of presentation	Semester 2

Module content

Introduction to nanotechnology, industrial production of nanomaterials, physico-chemical properties of nanomaterials, identification of nanomaterials sources (point vs diffuse sources) to aquatic systems. Fate, behaviour and transport of nanomaterials in different environmental media (freshwater, sediments, wastewater, and soil). Fractal theory and transformation pathways of nanomaterials: chemical, biological, physical and interactions with macromolecules transformations. Nanoecotoxicology: concept of toxicity within nanomaterials regime, nanomaterials toxicity tests (acute vs. chronic toxicity), mechanisms of nanomaterials toxicity, biocompatibility of nanomaterials, bioaccumulation and persistence. Risk assessment paradigm: Hazard identification (production volumes, material flows, nanowastes generation, bioaccumulation, long-range transport, and persistence), hazard characterization (in vitro vs. in vivo studies, adverse outcome pathways), exposure assessment (life cycle assessment and environmental uptake), risk assessment, and risk management (regulation, nanowastes and by-products management protocols). Sustainable nanotechnology paradigm: safe-by-design concept, risk modelling and predictions.

Carbon materials science research and technology 732 (CMS 732)

Module credits	32.00
NQF Level	08
Prerequisites	Admission to relevant programme.
Contact time	10 lectures per week
Language of tuition	Module is presented in English
Department	Chemical Engineering
Period of presentation	Semester 1 or Semester 2

Product design 732 (CPO 732)

Module credits	32.00
NQF Level	08
Prerequisites	Admission to relevant programme.
Contact time	24 contact hours per semester
Language of tuition	Module is presented in English
Department	Chemical Engineering
Period of presentation	Semester 1

Polymer processing 732 (CPP 732)

Module credits	32.00
NQF Level	08
Prerequisites	Admission to relevant programme.
Contact time	32 contact hours per semester
Language of tuition	Module is presented in English
Department	Chemical Engineering
Period of presentation	Semester 1 or Semester 2

Polymer materials science and research 732 (CPW 732)

Module credits	32.00
NQF Level	08
Prerequisites	Admission to relevant programme.
Contact time	32 contact hours per semester
Language of tuition	Module is presented in English
Department	Chemical Engineering
Period of presentation	Semester 1

Bio-reaction engineering 732 (CRH 732)

Module credits	32.00
NQF Level	08
Prerequisites	Admission to relevant programme.
Contact time	32 contact hours per semester
Language of tuition	Module is presented in English
Department	Chemical Engineering
Period of presentation	Semester 2

Module content

In depth understanding of the important metabolic pathways in microorganisms, black box models for describing stoichiometry of bioreactions, metabolic flux analysis as the basis for metabolic (genetic) engineering, kinetics of microbial conversions and basic bioreactor design.

Research orientation 700 (CRO 700)

Module credits	32.00
NQF Level	08
Prerequisites	Registration requires departmental approval.
Contact time	32 contact hours per semester
Language of tuition	Module is presented in English
Department	Chemical Engineering
Period of presentation	Semester 1 and Semester 2

Module content

Design, construction and testing of experimental setup. Initial test experiments, calibrations and modifications. Preliminary results. Experimental plan and schedule for the research dissertation. Detailed predictions on anticipated measurements. Directly relevant literature (core essentials taken from CIR 702).

Separation technology 732 (CSK 732)

Module credits	32.00
NQF Level	08
Prerequisites	No prerequisites.
Contact time	32 contact hours per semester
Language of tuition	Module is presented in English
Department	Chemical Engineering
Period of presentation	Semester 2

Process control system research and development 732 (CSP 732)

Module credits	32.00

NQF Level	08
Prerequisites	Admission to relevant programme.
Contact time	32 contact hours per semester
Language of tuition	Module is presented in English
Department	Chemical Engineering
Period of presentation	Semester 1

Additive technology 732 (CYM 732)

Module credits	32.00
NQF Level	08
Prerequisites	Admission to relevant programme.
Contact time	32 contact hours per semester
Language of tuition	Module is presented in English
Department	Chemical Engineering
Period of presentation	Semester 2

Biological water treatment 780 (WBW 780)

Module credits	32.00
NQF Level	08
Prerequisites	Admission to relevant programme.
Contact time	32 contact hours per semester
Language of tuition	Module is presented in English
Department	Chemical Engineering
Period of presentation	Semester 2

General Academic Regulations and Student Rules

The General Academic Regulations (G Regulations) and General Student Rules apply to all faculties and registered students of the University, as well as all prospective students who have accepted an offer of a place at the University of Pretoria. On registering for a programme, the student bears the responsibility of ensuring that they familiarise themselves with the General Academic Regulations applicable to their registration, as well as the relevant faculty-specific and programme-specific regulations and information as stipulated in the relevant yearbook. Ignorance concerning these regulations will not be accepted as an excuse for any transgression, or basis for an exception to any of the aforementioned regulations. The G Regulations are updated annually and may be amended after the publication of this information.

Regulations, degree requirements and information

The faculty regulations, information on and requirements for the degrees published here are subject to change and may be amended after the publication of this information.

University of Pretoria Programme Qualification Mix (PQM) verification project

The higher education sector has undergone an extensive alignment to the Higher Education Qualification Sub-Framework (HEQSF) across all institutions in South Africa. In order to comply with the HEQSF, all institutions are legally required to participate in a national initiative led by regulatory bodies such as the Department of Higher Education and Training (DHET), the Council on Higher Education (CHE), and the South African Qualifications Authority (SAQA). The University of Pretoria is presently engaged in an ongoing effort to align its qualifications and programmes with the HEQSF criteria. Current and prospective students should take note that changes to UP qualification and programme names, may occur as a result of the HEQSF initiative. Students are advised to contact their faculties if they have any questions.