University of Pretoria Yearbook 2016

BScHons Applied Science Applied Science: Chemical Technology (12243015)

Duration of study	1 year
Total credits	128

Programme information

The BScHons (Applied Science) degree is conferred by the following academic departments:

- Chemical Engineering
- Civil Engineering
- Industrial and Systems Engineering
- Materials Science and Metallurgical Engineering
- Mechanical and Aeronautical Engineering
- Mining Engineering

Any specific module is offered on the condition that a minimum number of students are registered for the module, as determined by the head of department and the Dean. Students must consult the relevant head of department in order to compile a meaningful programme, as well as on the syllabi of the modules. The relevant departmental postgraduate brochures must also be consulted.

Admission requirements

An appropriate bachelor's degree, a BTech degree or equivalent qualification is required for admission.

Other programme-specific information

A limited number of appropriate postgraduate modules from other departments are allowed. Not all modules listed are presented each year. Please consult the departmental postgraduate brochure.

Specialisation in Process Technology is possible by registering for specific modules. (Please note that a candidate selecting this option will not be allowed to register for any modules at 700-level before the modules of the first semester at 400-level had been completed successfully.) Please consult the department.

The modules CPB 410, CBI 410 and CSS 420 do not form part of the postgraduate block presentations. Individual arrangements have to be made with the relevant lecturer regarding attendance of lectures, study material, tests and assignments.

Curriculum: Final year

Minimum credits: 128

Core modules

Process integration 732 (CIP 732)

Module credits	32.00
Prerequisites	No prerequisites.
Contact time	44 contact hours per semester
Language of tuition	English
Academic organisation	Chemical Engineering
Period of presentation	Semester 1

Chemical engineering 707 (CIR 707)

Module credits	32.00
Prerequisites	No prerequisites.
Contact time	8 contact hours per semester
Language of tuition	English
Academic organisation	Chemical Engineering
Period of presentation	Year

Chemical Engineering 787 (CIR 787)

Module credits	16.00
Prerequisites	No prerequisites.
Contact time	10 lectures per week
Language of tuition	English
Academic organisation	Chemical Engineering
Period of presentation	Semester 1 or Semester 2

Carbon materials science and technology 732 (CMS 732)

Module credits	32.00
Prerequisites	No prerequisites.
Contact time	10 lectures per week
Language of tuition	English
Academic organisation	Chemical Engineering
Period of presentation	Semester 1 or Semester 2

Process control 410 (CPB 410)

Module credits	16.00
Prerequisites	CPN 321 GS
Contact time	3 tutorials per week, 4 lectures per week
Language of tuition	Both Afr and Eng
Academic organisation	Chemical Engineering
Period of presentation	Semester 1

Module content

Dynamic properties of equipment, instruments and processes. Mathematical modelling and computer simulation of processes in the time, Laplace and frequency domains. Linearisation and non-linear processes. Stability of control systems. Controller tuning. Methods for process identification. Digital process control. Z-transforms. Use of computers and microprocessors. Introduction to modern control theory: state-space approach. Applied process control. Choice of control instrumentation. Plantwide control strategy. Development of P and IDs.

Product design 732 (CPO 732)

Module credits	32.00
Prerequisites	No prerequisites.
Contact time	24 contact hours per semester
Language of tuition	English
Academic organisation	Chemical Engineering
Period of presentation	Semester 1

Polymer processing 732 (CPP 732)

Module credits	32.00
Prerequisites	No prerequisites.
Contact time	32 contact hours per semester
Language of tuition	English
Academic organisation	Chemical Engineering
Period of presentation	Semester 1 or Semester 2

Polymer materials science 732 (CPW 732)

Module credits	32.00
Prerequisites	No prerequisites.
Contact time	32 contact hours per semester
Language of tuition	English
Academic organisation	Chemical Engineering

Period of presentation	Semester 1

Reactor design 410 (CRO 410)

Module credits	16.00
Prerequisites	CKN 321 GS
Contact time	4 lectures per week, 3 tutorials per week
Language of tuition	Both Afr and Eng
Academic organisation	Chemical Engineering
Period of presentation	Semester 1

Module content

Heterogeneous catalysis: diffusion in reaction for catalyst pores and different catalyst geometries. Inter and intraparticle heat and mass transfer processes. Reactor design: energy and continuity equation for different types of reactor: stirred tank, pipe, radial flow, slurry and fluidised. Modelling of non-ideal flow in reactors.

Separation technology 732 (CSK 732)

Module credits	32.00
Prerequisites	No prerequisites.
Contact time	32 contact hours per semester
Language of tuition	English
Academic organisation	Chemical Engineering
Period of presentation	Semester 1

Specialisation 420 (CSS 420)

Module credits	16.00
Prerequisites	CPJ 421#
Contact time	4 lectures per week
Language of tuition	Both Afr and Eng
Academic organisation	Chemical Engineering
Period of presentation	Semester 2

Module content

A module to be selected from the list of available specialisation topics, including Process Control, Chemical Product Design, Environmental Engineering, Nuclear Engineering, Polymer Processing, Reactor Design, and Water Utilisation Engineering.

Additive technology 732 (CYM 732)

Module credits	32.00
Prerequisites	No prerequisites.

Contact time	32 contact hours per semester
Language of tuition	English
Academic organisation	Chemical Engineering
Period of presentation	Semester 1

Fluoro-materials science and technology 732 (CFT 732)

Module credits	32.00
Prerequisites	No prerequisites.
Contact time	2 lectures per week
Language of tuition	English
Academic organisation	Chemical Engineering
Period of presentation	Semester 2

Industrial waste engineering 787 (WAI 787)

Module credits	32.00
Prerequisites	No prerequisites.
Contact time	32 contact hours per semester
Language of tuition	English
Academic organisation	Chemical Engineering
Period of presentation	Semester 2

Module content

Identification of source materials, physical and chemical properties of waste. Release and transport mechanisms from source to air, groundwater, soil. Primary pathways of contaminants including sorption, volatilisation, biotic and abiotic transformations. Toxicology: absorption, distribution, biochemical transformation, and secretion of chemicals. Acute and chronic toxicity quantification and evaluation of risk. Hazard identification, exposure assessment, toxicity assessment and risk characterisation. Minimum requirements for the handling, classification and disposal of hazardous waste. Minimum requirements for waste disposal by landfill. Minimum requirements for water monitoring at waste management facilities. Recycling and resource management. Waste prevention, minimisation and optimisation.

Bioprocessing 732 (CBP 732)

Module credits	32.00
Prerequisites	No prerequisites.
Contact time	32 contact hours per semester
Language of tuition	English
Academic organisation	Chemical Engineering
Period of presentation	Semester 1

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.

Particle technology 410 (CPA 410)

Module credits	16.00
Prerequisites	COP 311
Contact time	3 tutorials per week, 4 lectures per week
Language of tuition	Both Afr and Eng
Academic organisation	Chemical Engineering
Period of presentation	Semester 1

Module content

Humidification and dehumidification of air. Water cooling, drying, crystallisation, ion exchange, particle technology, particle movement in a fluid, sedimentation. Hydrocyclones, flotation, filtration. Centrifuges. Fluidised bed technology. Mixing. Comminution. Pneumatic transport.