

University of Pretoria Yearbook 2016

BScHons Applied Science Applied Science: Structures (12243031)

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

The remainder of the credits to be chosen from the modules prescribed for the BEngHons (Structural Engineering) programme, as approved by the head of department, and after completion of the appropriate modules as listed.

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

Basic structural analysis 790 (SIC 790)

Module credits	24.00
Prerequisites	No prerequisites.
Contact time	40 Contact hours
Language of tuition	English
Academic organisation	Civil Eng
Period of presentation	Year

Module content

Virtual work and influence lines, analysis of statically indeterminate structures (two and three-dimensional), slope-deflection, superposition, stiffness and flexibility methods, matrix and computer methods, plastic analysis of portal frames.

Structural mechanics 777 (SIN 777)

Module credits	24.00
Prerequisites	No prerequisites.
Contact time	40 Contact hours
Language of tuition	English
Academic organisation	Civil Eng
Period of presentation	Year

Module content

A research term paper will be prepared.

Continuum mechanics. Classical and numerical (finite difference and finite element) solutions for plane and plate structures. Plasticity and failure criteria. Elastic stability. Non-linear analysis.

Timber design 779 (SIN 779)

Module credits	24.00
Prerequisites	No prerequisites.
Contact time	40 Contact hours
Language of tuition	English
Academic organisation	Civil Eng
Period of presentation	Year

Module content

A research term paper will be prepared.

Timber properties, grading, treatment, structural form, element design and bracing of structures. Analysis of I-beams, composite beams, frames and connections. Research project.

Pre-stressed concrete design 791 (SIN 791)

Module credits	24.00
Prerequisites	No prerequisites.
Contact time	40 Contact hours
Language of tuition	English
Academic organisation	Civil Eng
Period of presentation	Year

Module content

A research term paper will be prepared.

Material properties; prestressing systems; flexural design; losses; effects of continuity; shear; deflections; anchorage; cracking; prestressed concrete slabs and detailing.

Finite element applications in Civil Engineering 780 (SIR 780)

Module credits	24.00
Prerequisites	No prerequisites.
Language of tuition	English
Academic organisation	Civil Eng
Period of presentation	Year

Module content

A research term paper will be prepared.

This course covers general finite element theory; discretization aspects related to geometry, nodes and numbering, element type and shape; interpolation functions; formulation of element characteristic matrices and vectors for elasticity problems; assembly and solution of the finite element equations; modelling procedures and results processing. More advanced applications of finite elements such as non-linear static elasticity, buckling, dynamics and transient thermal problems will be covered. In terms of the application of the Finite Element method, the student will choose a specific field (e.g. structures, geotechnical, transportation or water/hydrology) to apply the theory that was covered in the course to solve typical Civil Engineering problems.

Numerical methods for Civil Engineers 780 (SIK 780)

Module credits	24.00
Prerequisites	No prerequisites.
Language of tuition	English
Academic organisation	Civil Eng

Period of presentation Year

Module content

A research term paper will be prepared.

In this course, numerical procedures for solving complex engineering systems with the aid of linear equations, eigenvalue procedures, numerical integration, finite differences analyses, finite elements review, Fourier transformation and optimization will be reviewed and discussed.

Some underlying theory for these numerical algorithms will be demonstrated and applicable and relevant problems associated with the use of these algorithms in the field of Civil Engineering will be covered.

Basic structural design 793 (SIC 793)

Module credits 24.00

Prerequisites No prerequisites.

Contact time 40 Contact hours

Language of tuition English

Academic organisation Civil Eng

Period of presentation Year

Module content

This course comprises two sections: reinforced concrete design and structural steel design. Reinforced concrete design covers the design of beams; behaviour and design of slabs; design of slender columns and columns subjected to bi-axial bending; design of simple and combined footings; staircase design; and an introduction to prestressed concrete. Structural steel design covers the characteristics of steel; design of structural steel members including elements in bending, and bending combined with tension and compression; design of portal frames; composite construction and the bending resistance of composite sections; and plastic design.

The information published here is subject to change and may be amended after the publication of this information. The [General Regulations \(G Regulations\)](#) apply to all faculties of the University of Pretoria. It is expected of students to familiarise themselves well with these regulations as well as with the information contained in the [General Rules](#) section. Ignorance concerning these regulations and rules will not be accepted as an excuse for any transgression.