

BACHELOR OF ENGINEERING TECHNOLOGY HONOURS IN METALLURGICAL ENGINEERING

BEngTechHons (Metallurgical Engineering) - NQF Level 8 (140 credits)

Qualification code: BHML23

SAQA ID: 117943, CHE NUMBER: H/H16/E206CAN

Campus where offered: Pretoria Campus

REMARKS

a. *Admission requirement(s):*

A Bachelor of Engineering in Metallurgical/Chemical Engineering, **or** a Bachelor of Engineering Technology in Metallurgical/Chemical Engineering, **or** a Baccalaureus Technologiae: Engineering: Metallurgy, **or** Baccalaureus Technologiae: Engineering: Chemical, **or** an Advanced Diploma in Metallurgical Engineering, **or** an equivalent qualification with an aggregate of 60% for the final-year of study, or an NQF Level 7 qualification in a closely related field, obtained from an accredited South African university.

Holders of any other equivalent South African or international qualification may also be considered, see Chapter 1 of Students' Rules and Regulations.

b. *Selection criteria:*

Admission is subject to selection. Prospective students will be evaluated based on the marks obtained in the previous qualification and/or work experience.

All completed applications received within the published due dates will be ranked. After consideration of the Departmental Student Enrolment Plan, only the top ranking applicants will be selected. Once a programme is full, a waiting list will be in place to provide an opportunity for applicants to fill places of those who did not register on time. Applicants will be informed of their status per official letter from the Office of the Registrar, alternatively, they can check their application status on the TUT website, www.tut.ac.za.

c. *Recognition of Prior Learning (RPL), equivalence and status:*

See Chapter 30 of Students' Rules and Regulations.

d. *Intake for the qualification:*

January only.

e. *Presentation:*

Block-mode classes offered over a period of two years.

f. *Minimum duration:*

A minimum of one or two years (depending on the programme offering).

g. *Exclusion and readmission:*

See Chapter 2 of Students' Rules and Regulations.

h. *Re-registration:*

A student may re-register for the module Research Project: Metallurgical Engineering only with the permission of the Head of the Department. The purpose of the re-registration is to provide students with an opportunity to complete the project only, and not to redo it, should they fail the module.



CURRICULUM

FIRST YEAR

CODE	MODULE	NQF-L	CREDIT
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FIRST SEMESTER

DAN118S	Data Analysis	(8)	(10)
REL118S	Research Methodology	(8)	(10)
SYD118S	System Dynamics	(8)	(15)

SECOND SEMESTER

OTY118S	Optimisation Theory	(8)	(15)
SMG118S	Sustainable Management	(8)	(10)

plus one of the following electives (only CTS116S, EPY116S and ETN116S will be offered until further notice):

IBO116S	International Business Communication	(6)	(5)
CTS116S	Contracts	(6)	(5)
EPY116S	Energy Economics and Policy	(6)	(5)
EGU116S	Engineering Education	(6)	(5)
ETN116S	Entrepreneurship	(6)	(5)
IND116S	Industrial Design	(6)	(5)
ITR116S	Intellectual Property	(6)	(5)

TOTAL CREDITS FOR THE FIRST YEAR: **65**

SECOND YEAR

CODE	MODULE	NQF-L	CREDIT
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RMY108S	Research Project: Metallurgical Engineering	(8)	(30)
RMY118R	Research Project: Metallurgical Engineering (re-registration) (semester module, see paragraph h)	(8)	(0)

FIRST SEMESTER

EXM118S	Extractive Metallurgy	(8)	(15)
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SECOND SEMESTER

EME118S	Engineering Metallurgy	(8)	(15)
MPG118S	Metallurgical Processes and Plant Design	(8)	(15)

TOTAL CREDITS FOR THE SECOND YEAR: **75**

TOTAL CREDITS FOR THE QUALIFICATION: **140**



MODULE INFORMATION (OVERVIEW OF SYLLABUS)

The syllabus content is subject to change to accommodate industry changes. Please note that a more detailed syllabus is available at the Department or in the study guide that is applicable to a particular module. At time of publication, the syllabus content was defined as follows:

C

CONTRACTS (CTS116S)

CONTINUOUS ASSESSMENT

(Module custodian: Department of Civil Engineering)

The place of the law of contract; Concept of contract; Requirements of valid contracts; Mistakes, duress, misrepresentation and undue influence; Valid, void and voidable contracts; Termination of contracts; Remedies available to affected parties; and Legal rules. (Total notional time: 50 hours)

D

DATA ANALYSIS (DAN118S)

CONTINUOUS ASSESSMENT

(Module custodian: Department of Electrical Engineering)

Exploring data; Describing the distribution of a simple variable; Finding relationships amongst variables; Probability and decision making under uncertainty; Probability and probability distribution; Normal, binomial, poisson and exponential distributions; Statistical inference; Sampling and sampling distributions; Confidence interval estimation; Hypothesis testing; Regression analysis; and Regression analysis - estimating relationships. (Total notional time: 100 hours)

E

ENERGY ECONOMICS AND POLICY (EPY116S)

CONTINUOUS ASSESSMENT

(Module custodian: Department of Electrical Engineering)

Energy management; Energy accounting; Energy systems and renewable energy. (Total notional time: 50 hours)

ENGINEERING EDUCATION (EGU116S)

CONTINUOUS ASSESSMENT

(Module custodian: Department of Chemical, Metallurgical and Material Engineering)

Higher education environment; Teaching and learning methods; Assessment; and Lecture planning and design. (Total notional time: 50 hours)

ENGINEERING METALLURGY (EME118S)

1 X 3-HOUR PAPER

(Module custodian: Department of Chemical, Metallurgical and Material Engineering)

Principles of physical metallurgy; Failure analysis; Metallurgical analysis; Mechanical metallurgy; Foundry technology; Corrosion; Welding processes and engineering; Design of welded structures; Fabrication engineering. (Total notional time: 150 hours)

ENTREPRENEURSHIP (ETN116S)

CONTINUOUS ASSESSMENT

(Module custodian: Department of Civil Engineering)

Entrepreneurship and entrepreneurial characteristics; Steps to establish a business; Forms of business ventures; Funding options in business; and Business plans. (Total notional time: 50 hours)

EXTRACTIVE METALLURGY (EXM118S)

1 X 3-HOUR PAPER

(Module custodian: Department of Chemical, Metallurgical and Material Engineering)

Review on mineral processing; Metallurgical thermodynamics; Applied concept of sampling; Ferrous and non-ferrous metallurgy; Extraction solution chemistry - mechanisms and processes; Auxiliary operations; Plant practice and material handling. (Total notional time: 150 hours)

I

INDUSTRIAL DESIGN (IND116S)

CONTINUOUS ASSESSMENT

(Module custodian: Department of Architecture and Industrial Design)

Design thinking; Design, make, test, refine; Business model canvas; Costing and break-even graphs; and Spin outs and licensing. (Total notional time: 50 hours)



INTELLECTUAL PROPERTY (ITR116S)**CONTINUOUS ASSESSMENT***(Module custodian: Department of Industrial Engineering)*

Disclosure analysis; Novelty assessment; IP forms; Methods of protecting IP; IP laws/legislations; Patent protection strategies; and Commercialisation of IP (route to market). (Total notional time: 50 hours)

INTERNATIONAL BUSINESS COMMUNICATION (IBO116S)**CONTINUOUS ASSESSMENT***(Module custodian: Department of Applied Languages)*

Introduction to the language of choice (culture, sounds, syllables and words); Introducing oneself; Formation of simple sentences; Greeting/address forms (work/industry); and Business protocol in chosen language (organogram). (Total notional time: 50 hours)

M**METALLURGICAL PROCESSES AND PLANT DESIGN (MPG118S)****CONTINUOUS ASSESSMENT***(Module custodian: Department of Chemical, Metallurgical and Material Engineering)*

Analysis of design problems; Design and operations of plants; Economic and environmental considerations; Furnaces and fuels; and Nuclear reactor materials. (Total notional time: 150 hours)

O**OPTIMISATION THEORY (OTY118S)****CONTINUOUS ASSESSMENT***(Module custodian: Department of Electrical Engineering)*

Convexity; Optimality conditions; Nonlinear programming; Linear programming and duality; Quadratic programming; and Mixed integer programming. (Total notional time: 150 hours)

R**RESEARCH METHODOLOGY (REL118S)****CONTINUOUS ASSESSMENT***(Module custodian: Department of Industrial Engineering)*

Conceptual Design (research objective, research framework, research questions, defining concepts, conceptual modelling); Technical Design (research strategies, research material, research planning); Communicating your research (thesis/dissertation/project layout, research proposal, oral presentation, referencing, style; research paper writing); Statistics in research; and Research Professionalism (plagiarism, ethics in research, predator journal avoidance, intellectual property (IP) in research). (Total notional time: 100 hours)

RESEARCH PROJECT: METALLURGICAL ENGINEERING (RMY108S, RMY118R)**PROJECT ASSESSMENT***(Module custodian: Department of Chemical, Metallurgical and Material Engineering)*

Project Design and Development; Conference poster and oral presentation; Proposed design and preliminary results; Conference paper and oral presentation; Final implementation and results; Final Report: Introduction and project plan, literature review, detail design and implementation, test results and conclusion. (Total notional time: 300 hours)

S**SUSTAINABLE MANAGEMENT (SMG118S)****CONTINUOUS ASSESSMENT***(Module custodian: Department of Civil Engineering)*

An overview of the technical processes found in systems engineering; The emergence of sustainable strategic management; In search of sustainability; Environmental analysis for sustainable strategic management; Sustainable strategic management resource assessment; Concepts and instruments for corporate sustainability management; Innovation and technology management in the engineering field; Project management in the engineering field; and Sustainable management assignment and group presentation. (Total notional time: 100 hours)

SYSTEM DYNAMICS (SYD118S)**CONTINUOUS ASSESSMENT***(Module custodian: Department of Chemical, Metallurgical and Material Engineering)*

Introduction to system dynamics and mechanistic models; Causal models; Dynamics of mechanistic models, based on fundamental conservation principles; Structure and behaviour of dynamics systems, based on causal dependencies; Steps in fundamental and causal modelling; Agent-based modelling; and Distributed systems in engineering modelling. (Total notional time: 150 hours)

