




**DUT**  
DURBAN UNIVERSITY OF TECHNOLOGY  
INYUVESI VASETHEKWINI YEZOBUCHWEPHESHE



**FACULTY OF  
ENGINEERING  
& THE BUILT  
ENVIRONMENT**

A photograph of a surveyor wearing a white hard hat and a yellow high-visibility vest, looking through a surveying instrument. The image is partially obscured by a large green diagonal overlay on the left side.

# **CIVIL ENGINEERING & GEOMATICS (DBN)**

## **2020 HANDBOOK**

# HANDBOOK FOR 2020

## FACULTY of ENGINEERING AND THE BUILT ENVIRONMENT

**DEPARTMENT of  
CIVIL ENGINEERING  
and GEOMATICS  
(Steve Biko Campus)**

## **MISSION STATEMENT**

As a progressive department, our mission is to contribute innovatively to the socio-economic development of South Africa by:

- Offering a portfolio of relevant programmes
- Producing well-rounded graduates who are attuned to the needs of the profession
- Generating, integrating and applying knowledge to stimulate socio-economic development
- Partnering stake holders in sustainable development
- Acting as an incubator for advanced study in clearly defined areas of strength
- Being student centered and quality driven
- Providing an enabling environment for continued staff development.

## **VISION OF THE DEPARTMENT OF CIVIL ENGINEERING AND GEOMATICS**

To be a quality driven department of Civil Engineering and Geomatics that provides a well-rounded, professional education that ensures that graduates are innovative and have a competitive edge.

## **What is a University of Technology?**

A university of technology is characterized by being research informed rather than research driven where the focus is on strategic and applied research that can be translated into professional practice. Furthermore, research output is commercialized thus providing a source of income for the institution. Learning programmes, in which the emphasis on technological capability is as important as cognitive skills, are developed around graduate profiles as defined by industry and the professions.

## **QUALIFICATION PURPOSE**

***The purpose of The National Diploma: Engineering: Civil*** is to train civil engineering technicians who will meet the criteria for registration as a candidate professional technician by the Engineering Council of South Africa (ECSA), and who will display competence as part of the engineering team in the execution of technical tasks under remote supervision by using and applying their knowledge in independent judgement in the identification and solution of civil engineering problems.

***The purpose of the Bachelor of Engineering Technology in Civil Engineering BEngTech (Civil)*** is for students to acquire knowledge, understanding, abilities and skills of civil engineering. This combined with a period of post qualification mentored work experience will enable them to become competent practicing civil engineering technologists, able to apply engineering judgment and work independently and responsibly. To provide students with the preparation required for careers in civil engineering, the ability to make a contribution to the economy and national development, the educational base required for registration with ECSA as a Professional Engineering Technologist in civil engineering and with entry to NQF level 8 programmes, e.g. honours and masters programmes. To contribute to the critical mass of civil engineering technologists educated specifically for the world of work and research, and who also play a pivotal role in the infrastructure development of our country.

The duration of these modules is 3 years of full-time study. The programmes will prepare students for further post graduate studies and research.

***The purpose of The National Diploma: Surveying*** is to train surveyors who are needed for the highly technical skills required for the mapping of the country's assets as well as to provide the infra-structure for the development of the country. Many job opportunities exist in this field and therefore skilled technicians need to be trained continuously. Learners qualifying with this qualification will be able to register as a Survey Technician with the South African Geomatics Council (SAGC). They will be employed in the field of the surveying industry, which includes civil engineering, topographical mapping and GIS. After six years' experience they will be able to register as a Surveyor, *this only applies to students who were registered for the qualification prior to 31 December 2014.*

## ***The purpose of the Bachelor of the Built Environment in Geomatics***

***BBE (Geomatics)*** is for students to assimilate the necessary knowledge, understanding, abilities and skills in geomatics. This combined with a period of post

qualification mentored work experience will enable them to become competent practicing engineering surveying technologists (engineering surveyors), able to apply geomatics knowledge to make judgment, work independently and responsibly. To provide students, with the preparation required for careers in geomatics, the ability to make a contribution to the economy and national development, the educational base required for registration with the South African Geomatics Council (SAGC) as an engineering surveyor and entry to NQF level 8 programmes, i.e. honours and masters programmes. To contribute to the critical mass of engineering surveyors educated specifically for the world of work and research, and who also play a pivotal role in the infrastructure development of our country. The duration of these modules is 3 years of full-time study. The programmes will prepare students for further post graduate studies and research.

***The purpose of the Baccalaureus Technologiae: Engineering: Civil*** is to train civil technologists who will meet the criteria for registration as a candidate professional technologist by the Engineering Council of South Africa (ECSA), in the chosen field of specialisation. The technologist, by a combination of education, training and experience, will be able to display a high level of technical competence and ethical conduct, which enable them to apply engineering principles and techniques independently to problems of varying complexity within their specialist discipline.

***The purpose of the Baccalaureus Technologiae: Surveying*** is to educate and train competent, responsible and accountable surveyors who can be registered as professional surveyors. They will be qualified to work independently, perform advanced surveying skills and manage a survey practice. The need exists for the training of specialists in the field of engineering surveying to provide for the academic requirements as set out by the South African Geomatics Council (SAGC) so that candidates can register as Geomatics Technologists and to produce qualified entrepreneurs in the surveying field who can contribute positively to the development of the South African economy.

On analysis, the purpose as outlined here has good alignment with the institutional mission and vision statements. Students qualifying with these qualifications have little or no problem in gaining meaningful employment and with the construction boom that the country has experienced over the last few years, they are much in demand.

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## IMPORTANT NOTICE

The departmental rules in this handbook must be read in conjunction with the Durban University of Technology's General Rules contained in the current General Handbook for Students

## NOTE TO ALL REGISTERED STUDENTS

Your registration is in accordance with all current rules of the Institution. If, for whatever reason, you do not register consecutively for every year/semester of your programme, your existing registration contract with the Institution will cease. Your re-registration anytime thereafter will be at the discretion of the Institution and, if permitted, will be in accordance with the rules applicable at that time.

## **I. CONTACT DETAILS**

### **All departmental queries to:**

Secretary: Ms Pauline Steel  
Telephone No: 031 373 2224  
Fax No: 031 373 2816  
Location of Department: Block S6 Level 3, Steve Biko Campus  
(Civil Engineering & Geomatics)

### **All Faculty queries to:**

Faculty officer: Mrs Neetha Singh  
Telephone No: 031 373 2718  
Fax No: 031 373 2719  
Location of Faculty office: Block S4 Level 3, Steve Biko Campus

Executive Dean: Prof B Twala

Telephone No: 031 373 2762  
Fax No: 031 373 2668  
Location of Executive Dean's office: Block S6 Level 5, Steve Biko Campus

## 2. STAFFING

<b>Head of Department</b>	Mr G M Hoosen, M.Dip.Tech. (CE) (MLST)
<b>Associate Professor</b>	Prof D Allopi, Pr.Tech. (Eng); D.Tech (CE) (MLST); M.Dip.Tech (CE) (TN); Postgrad. Dip. Eng. GDE (UN); Dip Datametrics (cum Laude) (Unisa); FSAICE; MIPET; MSAT; MCITSA.
<b>Associate Director</b>	Mr G K Parrott, PR.Tech (Eng); M.DIP. Tech (CE) (TN); FSAICE
<b>Senior Lecturers</b>	Mr R Govender, Pr Tech (Eng) M.Dip.Tech (CE) (MLST) Dr M Seyam, PhD (UM, Malaysia); MSc (IUG, Palestine); BSc (CE) (IUG, Palestine), WISA. Mr Y S Vahed, M.Dip.Tech (MLST); NHD Post School Education (MLST) Mr Y M Vawda, Pr.Tech. (Eng); M.Dip.Tech. (CE) (MLST); BSc (Hons) (UP); MSc (APP SC) STRUCTURAL
<b>Lecturers</b>	Mr J Gwena, MSc (GISc) (UFH); BScHons (Sur) (UZ); PGD (Project Management) (MGSB) Mr S Hariparsad, MEng (DUT); B.Sc. (Eng) (UDW); Mr S Jairam, Pr Tech (Eng) B.Tech (CE) (TN), MSAICE Mr HA Jajbhay Pr.Techni. (Eng); BSc Hons (App Sc. - Structures) (UP); B.Tech (DUT) Mr B Khuzwayo, Pr Tech (Eng) MEng (DUT); B.Tech Mr M Phiri, MSc.Eng Mr A Raghubar, B.Tech (Sur) (DUT); AMSAGI. ST (SA) *Mr B J Saane, M.EnvDev (UKZN); B.Tech (Sur) (MLST); N.Dip (Civil) (MT); AMSAGI, ST (SA) Mr C Singh, MSc (GISc)(Manchester); Med (UDW); Pr GISc (SA); Pr S(SA); Dip Data (UNISA); B.Tech (Man) (MLST); ACE (Maths) (UNISA); PGD (NMMU) Ms S Vahed, Pr.Tech (Eng); M.Tech. (CE) (DUT) Ms X Feikie B.Tech (CE) (CUT)
<b>nGap Lecturer</b>	
<b>Senior Technician</b>	Mr K M Paul, MSAT
<b>Technicians</b>	Mr W Kinghorn, N.Dip (Sur) (TN) Mr S Rampursad, B.Tech (Sur) (TN) Mr A S Sewpal, MSAT
<b>Senior Technical Asst</b>	Mr A Chetty, B.Tech (Sur) (DUT)

\*Geomatics Head of Programme



### 3. PROGRAMMES OFFERED BY THE DEPARTMENT

Programmes are offered in this Department which, upon successful completion, lead to the award of the following qualifications:

Qualification	SAQA NLRD Number
National Diploma: Engineering: Civil	72226 (currently being phased out)
Bachelor of Engineering Technology in Civil Engineering	98956
National Diploma: Surveying	72264 (currently being phased out)
Bachelor of the Built Environment in Geomatics	101432
B. Tech: Engineering: Civil	72128
B. Tech: Surveying	72161
Master of Engineering	96827
Master of the Built Environment	96844
Doctor of Engineering	96812
Doctor of Philosophy in the Built Environment	96821

Please note that due to National legislation, signed into effect by the Minister of Higher Education in the Government Gazette no. 40123 of 6th July 2016, the last permitted enrolment for any non-HEQSF aligned programme will be the 31st December 2019. This means that you will not be able to enrol in a Bachelor of Technology (B Tech) degree at DUT, or at any other institution in South Africa after this date.

### 4. PROGRAMME INFORMATION AND RULES

On the basis of a variety of placement assessments, successful applicants for study towards a National Diploma will be accepted into a three-year programme of study.

#### 4.1 PHASE OUT RULES FOR THE NATIONAL DIPLOMA: ENGINEERING: CIVIL

**Important information for current and prospective students (effective as of January 2016):**

The current National Diploma: Engineering: Civil will be phased out starting in 2016 to allow for the introduction of the new Bachelor of Engineering Technology in Civil Engineering.

The last cohort of first-time entering students admitted to this National Diploma qualification will be in January 2016.

Notwithstanding all the current rules (both General rules and Departmental Rules) that regulate this diploma, the last semester in which any student may register for each of the modules is listed as follows:

<b>Module Name</b>	<b>Last Possible Semester of Registration</b>
Applied Mechanics I	July 2016
Computer Skills I	July 2016
Construction Materials I	July 2016
Drawing I	July 2016
Mathematics I	July 2016
Surveying I (Module 1)	July 2016
Surveying I (Module 2)	July 2016
Communication Skills I	July 2017
Construction Methods I	July 2017
Drawing II	July 2017
Management Civil I	July 2017
Surveying (Civil) II (M1)	July 2017
Surveying (Civil) II (M2)	July 2017
Mathematics II	July 2017
Geotechnical Engineering II	July 2018
Management (Civil) II (M1)	July 2018
Management (Civil) II (M2)	July 2018
Structural Analysis II (M1)	July 2018
Structural Analysis II (M2)	July 2018
Structural Steel & Timber Design III (M1)	July 2018
Structural Steel & Timber Design III (M2)	July 2018
Transportation Engineering II (M1)	July 2018
Transportation Engineering II (M2)	July 2018
Water Engineering II (Hydraulics) (M1)	July 2018
Water Engineering II (Public Health) (M2)	July 2018
Documentation III (M1)	July 2019
Documentation III (M2)	July 2019
Geotechnical Engineering III (M1)	July 2019
Geotechnical Engineering III (M2)	July 2019
Reinforced Concrete & Masonry Design III (M1)	July 2019
Reinforced Concrete & Masonry Design III (M2)	July 2019
Structural Analysis III (M1)	July 2019
Structural Analysis III (M2)	July 2019
Transportation Engineering III (M1)	July 2019
Transportation Engineering III (M2)	July 2019
Transportation Engineering III (M3)	July 2019
Water Engineering III (Hydrology) (M1)	July 2019
Water Engineering III (Hydraulics) (M2)	July 2019
Water Engineering III (M3)	July 2019
Experiential Learning (P2)	January 2020
Experiential Learning (P3)	July 2020

### **Experiential Learning (P3)**

Pre-requisites: Complete Experiential Learning (P2)

**The dates stated in this rule are module to change depending on the effective approval date for the new HEQF aligned programmes.**

## 4.2 PHASE OUT RULES FOR THE NATIONAL DIPLOMA: SURVEYING

**Important information for current and prospective students (effective as of January 2017):**

The current National Diploma: Surveying will be phased out starting in 2017 to allow for the introduction of the new Bachelor of the Built Environment in Geomatics.

The last cohort of first-time entering students admitted to this National Diploma qualification will be in January 2017.

Notwithstanding all the current rules (both General rules and Departmental Rules) that regulate this diploma, the last semester in which any student may register for each of the modules is listed as follows:

Module Name	Last Possible Semester of Registration
Computer Skills I	July 2017
Drawing I	July 2017
Geography I	July 2017
Mathematics I	July 2017
Physics I	July 2017
Surveying I (Module 1)	July 2017
Surveying I (Module 2)	July 2017
Communication Skills I	July 2018
Civil Engineering I	July 2018
Mathematics II	July 2018
Photogrammetry II	July 2018
Surveying II (M1)	July 2018
Surveying II (M2)	July 2018
Survey Drawing II (M1)	July 2018
Survey Drawing II (M2)	July 2018
Management Civil I	July 2019
Control Surveying III	July 2019
Legal Principles I	July 2019
Statistics I	July 2019
Photogrammetry III	July 2019
Adjustment of Errors III	July 2020
Cadastral Surveying III	July 2020
Computer Applications III	July 2020
Geographic Information Systems III	July 2020
Surveying III	July 2020
Experiential Learning (P2)	January 2021

**The dates stated in this rule are module to change depending on the effective approval date for the new HEQF aligned programmes.**

### 4.3 PHASE OUT RULES FOR THE BACCALAUREUS TECHNOLOGIAE: ENGINEERING: CIVIL

Important information for current and prospective students (effective from 2019).

The last cohort of first-time entering students admitted to the Baccalaureus Technologiae qualification will be July 2019.

Notwithstanding all the current rules (both General rules and Departmental rules) that regulate this degree, the last semester in which any student may register for each of the subjects is listed as follows:

#### Baccalaureus Technologiae: Engineering: Civil

**Disciplines : Construction Management, Transport, Urban, Structures and Water options.**

Module Name	Last Possible Semester of Registration
Principles of Management Economics III	July 2021
Project Management (Civil) IV	July 2021
Reinforced Concrete Design IV	July 2021
Structural Steel Design IV	July 2021
Transportation Planning IV	July 2021
Urban Planning & Design IV	July 2021
Wastewater Treatment Technology IV	July 2021
Industrial Relations & Negotiations II	July 2021
Pavement Technology IV	July 2021
Prestressed Concrete IV	July 2021
Structural Masonry Design IV	July 2021
Traffic Engineering IV	July 2021
Reticulation Design & Management IV	July 2021
Hydrology IV	July 2021
Contract Management IV	January 2022
Construction Materials Technology IV	January 2022
Foundation Engineering IV	January 2022
Structural Timber Design IV	January 2022
Solid Waste Management IV	January 2022
Water Treatment Technology IV	January 2022
Management Principles & Practice IV	January 2022
Transport Technology IV	January 2022
Structural Analysis IV	January 2022
Theory of Structures IV	January 2022
Geometric Design IV	January 2022
Hydraulics IV	January 2022

#### **4.4 PHASE OUT RULES FOR THE BACCALAUREUS TECHNOLOGIAE: SURVEYING**

**Important information for current and prospective students (effective from 2019).**

The last cohort of first-time entering students admitted to the Baccalaureus Technologiae qualification will be July 2019.

Notwithstanding all the current rules (both General rules and Departmental rules) that regulate this degree, the last semester in which any student may register for each of the subjects is listed as follows:

##### **Baccalaureus Technologiae: Surveying**

<b>Module Name</b>	<b>Last Possible Semester of Registration</b>
Digital Photogrammetry IV	July 2021
Town Planning IV	July 2021
Geographic Information Systems IV	July 2021
Surveying IV	July 2021
Survey Project IV	January 2022
Geodesy IV	January 2022
Geometric Design IV	January 2022
Practice Management IV	January 2022

## MINIMUM ADMISSION REQUIREMENTS

### BACHELOR OF ENGINEERING TECHNOLOGY IN CIVIL ENGINEERING – BEngTech (Civil)

### BACHELOR OF THE BUILT ENVIRONMENT IN GEOMATICS BBE (Geomatics)

In addition to the relevant General Rules pertaining to Registration (e.g. Rules G3, G4, G5, G6, G7, G8, G9 & G10).

School leaving applicants who wish to enrol for the programme must apply through the CAO system by no later than 30 September of the previous year. The number of students enrolled in the program is determined by the University and departmental growth policies and a ranking system is used to determine the number of applicants as required.

The minimum admission requirement is the National Senior Certificate, Senior Certificate or the National Certificate (Vocational) with appropriate module combinations and levels of achievement as defined in the *Government Gazette*, Vol. 751, No. 32131 of 11 July 2008, and in the *Government Gazette*, Vol. 533, No. 32743, November 2009.

In addition to the above, the following is required for admission

Compulsory Modules	NSC	SC		NCV Level 4
	Rating	HG	SG	
English	4	E	C	60%
Mathematics	4	E	C	70%
Physical Science	4	E	C	70%
Life Orientation				60%
				+ 2 vocational subs (70%)

The module NSC Mathematical Literacy will not be accepted as a substitute for the module NSC Mathematics.

The exit certificate of the applicant must qualify the applicant for degree study at an institution of higher learning.

Applicants with a NSC will be ranked according to the sum of their scores for Mathematics and Physical Science, module to a minimum combined score of 120.

Prospective applicants may also present an NQF level 6 Diploma in Engineering for entry into the degree programme. A possibility of transfer of credits for cognitive previous studies would be considered dependant on the discipline nature of the Diploma being presented.

**Note: This Department only considers First and Second choice for BEng Tech**

*(Civil) and First – Fourth choice for BBE (Geomatics) CAO applicants.*

## **EC2 GENERAL RULES**

Except where otherwise laid down in Rules EC3 to EC9 and in the rules for specific instructional programmes, the General Rules for all courses shall apply to instructional programmes in this department.

## **EC3 REGISTRATION**

In addition to the General Rules pertaining to Registration a student whose fees are being paid by an employer shall provide a letter of authority to this effect.

## **EC4 ENTRANCE REQUIREMENTS**

In addition to the General Rules pertaining to Entrance Requirements specific requirements apply to both of the revised instructional programmes offered in this department and these are set out in the rules for the instructional programmes.

## **EC5 WORK DONE DURING THE SEMESTER**

In addition to Rule G12 the following specific rules apply to all modules:

1. The determination of the year/semester mark, where applicable, for each module for the purpose of issuing a certificate in terms of the General Rules is indicated with the syllabus for each module.
2. A student who for any reason is absent from a particular practical or laboratory practical/test, must provide proof of his/her reason for absence to the particular lecturer concerned in accordance with Rule EC10. Failure to do so will result in a zero mark being recorded for the practical or laboratory practical/test.
3. In the case where a module is evaluated by a continuous or 100% course work system, then any student failing to obtain a final result of 50% or higher, and any sub-minimum stipulated for such module, will have to repeat that module.
4. Where a module year mark has a project or practical component, then the mark for such component may not be carried over to a subsequent semester where the module is failed, unless the project is a separate registered module.

## **EC6 CONDUCT OF STUDENTS IN LABORATORY**

Rules of conduct pertaining to the specific laboratory, as approved by the department, shall apply to all students registered for the particular module.

## **EC7 SUPPLEMENTARY EXAMINATIONS**

The provisions as contained in the General Rules will apply to all examinable modules in this department.

### **EC8.1 PROMOTION TO HIGHER LEVEL (NATIONAL DIPLOMAS)**

For each of the programmes in this department standard module combinations for the semesters of University attendance (semesters 1, 2, 3 and 4) are prescribed in the Programme Structure (see section 5).

In addition to the requirements of the General Rules no student shall be permitted to register:

- (a) for any second level module (i.e. S2) when more than **three** modules from the standard first semester module combination are outstanding;
- (b) for any module of the standard third semester module combination (i.e S3)

- when more than **three** modules from the standard first and second semester module combination (ie S1 & S2) are outstanding.
- (c) for any module of the standard fourth semester module combination (i.e. S4) when more than **three** modules from the standard first, second and third semester module combination (i.e. S1, S2 & S3) are outstanding.
  - (d) furthermore, students who are repeating a module will only be offered a place module to the availability of space where laboratory or specialised equipment is involved.

## **EC8.2 PROMOTION TO A HIGHER LEVEL / PROGRESSION RULES BEngTech (Civil) and BBE (Geomatics)**

Engineering students completing this qualification shall demonstrate competence in all the following Exit Level Outcomes (ELO) indicated below, as required by the Accrediting body – the Engineering Council of South Africa (ECSA) / South African Geomatics Council (SAGC). Assessment of these ELO's are embedded in the modules of the degree. In modules where Exit Level Outcomes (ELO) are assessed, the student must meet both the academic and the ELO requirements, as specified in the relevant study guide, to pass the module.

In modules where Graduate Attributes are assessed, the student needs to achieve a minimum final mark of 50% as well as satisfy the Graduate Attributes outcome. A student that achieves a minimum final mark of 50% but fails to achieve the outcome would fail the module. In addition, students must achieve sub-minimum marks for practicals, tests or other assessments.

### **Graduate Attribute 1: Problem Solving**

Students will be required to apply engineering principles to systematically diagnose and solve broadly-defined engineering problems in modules at all levels.

### **Graduate Attribute 2: Application of scientific and engineering knowledge**

Students will be required to apply knowledge of mathematics, natural science, and engineering sciences to define and applied engineering procedures, processes, systems and methodologies to solve broadly-defined engineering problems.

### **Graduate Attribute 3: Engineering Design**

Students will be required to perform design tasks in Projects at all levels. Work will be more of a procedural nature at the first level, and will increase in complexity through the levels. In Design Projects A & B, the preliminary part of the design will be carried out in part A, while part B will see to the project completion. The project will include one or more of the following impacts: social, economic, legal, health, safety, and environmental. Design Projects A & B are to be seen collectively as one large project.

### **Graduate Attribute 4: Investigation**

Students will conduct investigations of broadly-defined problems through locating, searching, and selecting relevant data from codes, data bases, and literature, designing and conducting experiments, analysing and interpreting results to provide valid



conclusions.

Graduate Attribute 5: Engineering methods, skills, tools, including Information technology. Use of appropriate techniques, resources, and modern engineering tools, including information technology, prediction and modelling, for the solution of broadly-defined engineering problems, with an understanding of the limitations, restrictions, premises, assumptions and constraints will be embedded in all modules.

Graduate Attribute 6: Professional and Technical Communication

Students will be required to demonstrate the ability to communicate effectively, by submitting research assignments and deliver oral presentations, with engineering audiences and the affected parties.

Graduate Attribute 7: Impact of Engineering Activity

Demonstrate knowledge and understanding of the impact of engineering activity will be embedded in many courses as well as specifically in the module of Environmental Engineering.

Graduate Attribute 8: Individual and Teamwork

Knowledge and understanding of engineering management principles will be specifically covered in the Module of Entrepreneurship Skills. Individual and teamwork competency will be addressed in other modules as well. The ability to manage a project will be demonstrated in the module Design Projects A & B.

Graduate Attribute 9: Independent Learning

Engage in independent and life-long learning through well-developed learning skills.

Graduate Attribute 10: Engineering Professionalism

Students will be assessed on their comprehension and application of ethical principles and commitment to professional ethics, responsibilities, and norms of engineering technology practice.

***In addition to the requirements of the General Rules no student shall be permitted to register:***

- ***for any second year modules when more than six modules from the first year module combination are outstanding;***
- ***for any third year modules when more than twelve modules from the first and second year module combination are outstanding.***
- ***for any third year modules (2<sup>nd</sup> semester) when any first, second and third year (1<sup>st</sup> semester) module combinations are outstanding.***

## **EC9 MINIMUM INSTRUCTIONAL PROGRAMME**

Notwithstanding anything to the contrary in the General Rules, the minimum instructional programme for each qualification in this department shall be as set out under the rules for that instructional programme.

## **EC10 SPECIAL TESTS**

A special test may be granted by the Head of Department to a student who has been prevented from taking a test:

(1) by illness on the day of the test or immediately before it, provided that he submits a medical certificate on **the prescribed form** on which a medical practitioner, registered by the Health Professions Council of SA, homoeopath or chiropractor, registered with the South African Associated Health Board, specifies the nature and duration of the illness and that for health reasons it was impossible or undesirable for the student to sit for the test, and that he submits such certificate to the head of department on the day as determined by the practitioner that the student should return to lectures immediately following such illness, or on one of the two following working days;

or

(2) by circumstances which in the opinion of the head of department were beyond his control at the time of the test provided that satisfactory evidence of such circumstances is provided. Such circumstances shall not include:

- (i) any misinterpretation by him of the date, time or venue of the test,
- (ii) transportation difficulties, where his residential term time address is within the area serviced by a scheduled bus or commuter train service to the central Durban area, and provided otherwise that he informs the head of department of such difficulty prior to the time of commencement of the test,
- (iii) failure by him to bring to the test venue any equipment normally required for that module as specified in the study guide for the particular module.  
For the purpose of this rule test shall mean any written, oral or practical test, set for the purpose of determining or contributing towards a semester mark for a module, and shall include tests set for modules which are evaluated by continuous evaluation.

Any student who misses a test and who does not qualify for a special test, and any student who qualifies for a special test but fails to write it, shall be awarded a zero mark for the missed test.

Special tests for all modules shall be written within the last two weeks of official lectures of each semester and may be based on the entire semesters work.

## **EC11 REFUSAL OF RE-REGISTRATION**

11.1 A student who has not successfully completed any module after two periods of registration for that module shall only be permitted to re-register full-time for that module at the discretion of the Departmental Appeal.

11.2 A student who has been refused permission to re-register for a module in terms of Rule 11.1 will not be permitted to register for any other module in that qualification. A student will thereby be unable to complete the qualification unless the outstanding modules are attended and passed at another institution, approved by the Department, and exemptions granted in accordance with the General Rules.

11.3 A student who has not completed the National Diploma within five years of

the first registration, may, at the discretion of the Departmental Appeal Committee, be refused permission to re-register, or may be accepted module to special conditions.

- 11.4 A student wishing to appeal to the Faculty Board of Engineering and the Built Environment against the application of this rule must submit to the Faculty Officer a statement in which he/she explains the reasons for his/her appeal. This appeal must be submitted to the Faculty Officer within five (5) University working days of being officially notified in writing that he/she has not been permitted to re-register. No appeals will be considered after this.
- 11.5 Where a student has appealed against exclusion in terms of these rules or rule G17, and such appeal has been refused, then said student may not submit a further appeal until the conditions of the refused appeal have been fully complied with.

11.6 **EXCLUSION DUE TO LACK OF PROGRESS (applicable to BEng Tech (Civil) and BBE (Geomatics))  
(UNSATISFACTORY ACADEMIC PROGRESS)**

Further to Rule G17, a student will be excluded if the student fails to:

- Pass at least half, by credit value, of their first year modules by the end of their first year of registration;
- Pass all first year modules by the end of their second year of registration;
- Pass all second year modules by the end of their third year of registration;
- Pass at least half of the third year modules by the end of their fourth year of registration;
- Complete the qualification by the end of five years of registration.

## **EC12 EXPERIENTIAL LEARNING**

This programme requires the student/candidate to undergo a period of experiential learning as part of the course. All prescribed compulsory and elective modules (instructional offerings) and the prescribed experiential component must be passed in order to obtain sufficient credits to qualify for the qualification.

Although the University undertakes to assist the student/candidate in obtaining suitable experiential learning placement, the onus is on the student/candidate to find an employer. The employer must be accredited by the University for the purposes of experiential learning. An experiential learning agreement creates a separate contract between the employer and the student/candidate.

All students must register with the University within two weeks of commencement of all in-service/experiential learning or after changing employer.

A student may not register for the second module of Experiential Learning until he/she has satisfied all the requirements for the first module.

***It is the students' responsibility to ensure that the University appointed mentor is contacted regarding conducting a work based interview during the experiential learning period for Module 1 and 2.***

### **EC13 LATE REGISTRATION**

- 13.1 No student will be permitted to register for any module offered by this department later than one week after the official commencement of full-time semester lectures.
- 13.2 No student will be permitted to add or delete any module later than one week after the official commencement of full-time semester lectures, except where the result of a supplementary examination has delayed such change or addition.

### **EC14 TIMETABLE CLASHES**

No student will be permitted to register for any module combination where there will be any timetable or test clashes. In the event of there being a clash then the student will be required to register for the module from the lowest level of the qualification for which they are registering. Furthermore, it is the students' responsibility to check prior to registration that there are no clashes as no special arrangements will be made to accommodate such instances. In the event of a student missing a test/practical/deadline as a result of a clash a zero mark will be awarded.

### **EC15 STUDENT DRESS**

Students must be neat and tidy at all times. Closed shoes and protective clothing must be worn for the duration of the time spent in any departmental laboratory. Appropriate safety equipment needs to be worn where applicable, or as detailed in the laboratory practical manual.

### **EC16 ACCESS TO DEPARTMENTAL COMPUTER LABORATORIES**

No student is permitted to have access to any of the dedicated departmental computer laboratories unless he/she has been granted the necessary authority to do so, and:

16.1 the module lecturer or an approved departmental tutor is present;

**or**

16.2 the Departmental Computer Technician is present;

**or**

16.3 the necessary authentication has been done to your active student card by the departmental technician. Your activated card may not be used by any student other than the student to whom the card belongs. Should an activated student card be found in the possession of anyone other than the authorised user then such student card shall be confiscated and invalidated.

### **EC17 COMPETENCY MODULES**

Where a module comprises more than one module, and one of the modules includes a competency based assessment, then such competency module must also be passed before a student will be permitted to register for any module for which the modularized module is a prerequisite.

### **EC18 AWARDING OF DIPLOMA/DEGREE**

- 18.1. Diplomas/Degrees are not automatically awarded to candidates who have satisfied all of the requirements for each instructional programme. The onus is on the student to apply to the University for the Award of the Diplo-

ma/Degree. In this regard the candidate should obtain the necessary forms from the Secretary of the Department.

- 18.2. Duly completed experiential learning log books, reports and any other documentation must accompany the application. Alternate documentation may be submitted to the Department for approval.
- 18.3. A certified copy of a valid identity document must be attached to the diploma application.

### **EC19 LINKING OF MODULES**

The following modules are linked as per G1 and G14 (3) (approved by Senate on 14 March 2018) of the general handbook. As such, where the credit-weighted average of all the modules in the linked group is 50% or more, the result of those modules with less than 50% will be recorded as a PASS, with no mark indicated.

Engineering Mathematics 1A and Engineering Mathematics 1B  
Engineering Mathematics 2A and Engineering Mathematics 2B

## **5. PROGRAMME STRUCTURE**

### **5.1 NATIONAL DIPLOMA: ENGINEERING: CIVIL**

The instructional programme shall have a minimum duration of four (4) semesters of full-time study and two (2) semesters of experiential learning and shall consist of the modules listed below.

**Note: The subjects above which have a strikethrough, have been phased out**

## 5.2 BACHELOR OF ENGINEERING TECHNOLOGY IN CIVIL ENGINEERING.

All modules in the programme are compulsory, offered on a full time basis and require attendance to lectures. There are no electives given for the programme.

Name of module	Code	Study Level	NQF Level	Module Credits	C/E*	Pre-Requisite Modules
<b>Year 1 Semester 1</b>						
Engineering Mathematics 1A	EMTA101	1	5	12	C	*
Engineering Physics 1A	EPHA101	1	5	12	C	
Law for Life	LWLF101	1	5	8	C	
Cornerstone 101	CSTN101	1	5	12	C	
Civil Mechanics 1A	CVMC101	1	5	8	C	
Drawings 1A (intro to CAD basic incl)	DRNS101	1	5	12	C	
<b>Year 1 Semester 2</b>						
Engineering Mathematics 1B	EMTB101	1	5	12	C	**
Engineering Physics 1B	EPHB101	1	5	12	C	
Surveying for Civil Engineering 1B	SRCV101	1	5	16	C	
Civil Engineering Methods 1B	CVMT101	1	5	12	C	
Structural Mechanics 1B	STMC101	1	5	12	C	
Technical Literacy	TCLT101	1	5	8	C	
<b>Year 2 Semester 1</b>						
Engineering Mathematics 2A	EMTA201	2	6	12	C	Engineering Mathematics 1B *
Engineering Management 2A	ENMG201	2	6	8	C	
Structural Mechanics 2A	STMC201	2	6	12	C	Civil Mechanics 1A and Structural Mechanics 1B
Water/Hydraulics 2A	WHYD201	2	6	12	C	Civil Mechanics 1A, Engineering Mathematics 1A and Engineering Mathematics 1B
Civil Eng Material 2A	CMTL201	2	6	12	C	
Transport Technology 2A	TRTA201	2	6	12	C	
<b>Year 2 Semester 2</b>						
Engineering Mathematics 2B	EMTB201	2	6	12	C	Engineering Mathematics 2A **
Structural Design Theory Intro 2B	SDTI201	2	6	16	C	Structural Mechanics 2A
Structural Analysis 2B	STAN201	2	6	12	C	Structural Mechanics 2A
Water/Hydrology2B	WHDL201	2	6	12	C	Civil Mechanics 1A, Engineering Mathematics 1A and Engineering Mathematics 1B
Geotechnical Engineering 2B	GEOT201	2	6	12	C	
Transport Technology 2B	TRTB201	2	6	12	C	
<b>Year 3 Semester 1</b>						
CAD Civil Engineering Drawings3A	CCED301	3	7	12	C	Drawings 1A
Reinforced Concrete Design 3A	RFC301	3	7	12	C	Structural Design Theory Intro 2B and Structural Analysis 2B
Water/ Reticulation Design 3A	WRTD301	3	7	12	C	Water/Hydraulics 2A, Water/Hydrology2B,
Transport Technology 3A	TRTA301	3	7	16	C	Transport Technology 2A
Construction Management 3A	CNMN301	3	7	12	C	Engineering Management 2A
Civil Engineering Documentation 3A	CEDC301	3	7	12	C	Civil Eng Material 2A, Engineering Management 2A
<b>Year 3 Semester 2</b>						
Design Project	DSNP301	3	7	20	C	all 3 <sup>rd</sup> year 1 <sup>st</sup> sem modules
Structural Steel Design 3B	STSD301	3	7	12	C	Structural Design Theory Intro 2B and Structural Analysis 2B
Project Management	PMAN301	3	7	8	C	
Transport Technology 3B	TRTB301	3	7	12	C	Transport Technology 2A
Water Treatment	WTRM301	3	7	12	C	Water/Hydrology 2A

**Exposure Module – The following subjects (denoted by an \*\*) are exposed to the lower level subject, (denoted by \*), on condition a student obtains a subminimum mark of 40%.**

### 5.3 NATIONAL DIPLOMA: SURVEYING

AERR301	Adjustment of Errors III	C	Fourth	3 hr exam	6	MATH201 and STAS103 and EXSV201
CSUR301	Cadastral Surveying III	C	Fourth	3 hr exam	6	SDRG202 and EXSV201
CAPP302	Computer Applications III	C	Fourth	Continual	6	CSKL102, EXSV201 MATH201 and STA103
GEIS301	Geographical Information	C	Fourth	Continual	6	GEGR101, Systems III EXSV201 CSKL102 and SURV112
SURV302	Surveying III	C	Fourth	3 hr exam	6	SURV212, EXSV201 and SDRG212
EXSV201	Survey Practice II	C	Fifth			SURV112

C = Compulsory: O = Optional

- # Denotes that the module is modularised and comprises one or more theoretical and a proficiency module, in which case the proficiency module must also be passed to register for any module for which the modularized module is a prerequisite in accordance with Rule EC17.
- \* Civil Engineering Practice II need not necessarily consist of two consecutive semesters, nor need it necessarily involve the fifth and sixth semesters. However, all students must attend at least one academic semester before registering for Module One of Civil Engineering Practice.
- \* Survey Practice II need not necessarily consist of two consecutive semesters, nor need it necessarily involve the third and fourth semesters. However, all students must attend at least one academic semester and pass Surveying I (SURV102) before commencing a semester of Surveying Practice II. Furthermore a student may not register for any modules in the fifth or sixth semester unless at least six months of experiential learning has been completed.
- \*\* Denotes that the module may be taken as an alternative elective to Civil Engineering I
- \$ Computer Applications III may only be taken if registered concurrently for Adjustment of Errors III, or if Adjustment of Errors III has already been passed.

**Note: The subjects above which have a strikethrough, have been phased out**

### 5.4 BACHELOR OF THE BUILT ENVIRONMENT IN GEOMATICS

All modules in the programme are compulsory, offered on a full time basis and require attendance to lectures. There are no electives given for the programme.

Name of module	Code	Study Level	NQF Level	NQF Credits	C/E*	Pre-requisite module/s
<b>Year I Semester I</b>						
Engineering Mathematics IA	EMTA101	I	5	12	C	*
Cornerstone 101	CSTN101	I	5	12	C	



Sociology of Work 101	SCLW101	1	6	8	C	
Geomatics 1A	GMTA101	1	5	16	C	
Drawing 1A	DRWN101	1	5	12	C	
Engineering Physics 1A	EPHA101	1	5	12	C	
<b>Year 1 Semester 2</b>						
Engineering Mathematics 1B	EMTB101	1	5	12	C	**
Geomatics 1B	GMTB101	1	6	16	C	Geomatics 1A
Survey Drawing 1B	SVDR101	1	5	12	C	Drawing 1A, Geomatics 1A
Environmental Science 1B	EVSC101	1	5	12	C	
Technical Literacy	TCLT101	1	5	8	C	
Engineering Physics 1B	EPHB101	1	5	12	C	
<b>Year 2 Semester 1</b>						
Engineering Mathematics 2A	EMTA201	2	6	12	C	Engineering Mathematics 1B
Photogrammetry 2A	PHGR201	2	6	12	C	Geomatics 1B
Settlement History 101	STHS102	2	6	8	C	
Basic Engineering Management 2A	BEMN201	2	6	8	C	
Control Surveying 2A	CTSU201	2	6	20	C	Geomatics 1B
Geographic Information System 2A	GISS201	2	6	12	C	Environmental Science 1B
<b>Year 2 Semester 2</b>						
Legal Principles 2B	LPPL201	2	6	12	C	
Engineering Surveying 2B	ENSV201	2	7	24	C	Geomatics 1B
Map projections and Coordinate Systems 2B	MPSC201	2	6	12	C	Geomatics 1B
Digital Photogrammetry and Remote Sensing 2B	DPRS201	2	7	12	C	Photogrammetry 2A
Statistics 2B	STST201	2	6	12	C	Engineering Mathematics 1B
<b>Year 3 Semester 1</b>						
Geodesy 3A	GDSY301	3	7	16	C	Map Projections and Coordinate Systems 2B, Engineering Mathematics 2A
Cadastral Surveying 3A	CDSV301	3	7	12	C	Geomatics 1B, Survey Drawing 1B
Theory of Errors and Network Adjustment 3A	TENA301	3	7	20	C	Statistics 2B
Geographic Information System 3A	GISS301	3	7	12	C	Geographic Information Systems 2B
Computer Applications 3A	CPTA301	3	7	12	C	Survey Drawing 1B
Town and Regional Planning: Layout & Design 3A	TRLD301	3	6	12	C	Settlement History 101
<b>Year 3 Semester 2</b>						
Project Management	PMAN301	3	7	8	C	Basic Engineering Management 2A
The Global Environment	GENV101	3	6	8	C	Environmental Science 1B
Survey Project 3B	SVPJ301	3	7	32	C	All 1 <sup>st</sup> and 2 <sup>nd</sup> year modules and all year 1 <sup>st</sup> semester modules

**Exposure Module – The following subjects (denoted by an \*\*) are exposed to the lower level subject, (denoted by \*), on condition a student obtains a subminimum mark of 40%.**

#### 5.4 BACCALAUREUS TECHNOLOGIAE: ENGINEERING: CIVIL

This instructional programme has a minimum duration of four (4) semesters when undertaken on a part-time or block basis and may be offered in five specialist options listed below:

A student may not change disciplines during the course of his/her B.Tech studies, without prior permission from the HOD.

Where a student fails the project module, but obtains a mark of 45% or more, such student will be permitted to re-submit the project for re-assessment within a minimum stipulated period. Should the final result of such re-submitted project be a pass, then the student will be awarded a mark of 50% irrespective of the mark achieved.

### Construction Management Discipline

Students who wish to register with ECSA will be required to do three (3) engineering modules from **any** of the other specialist disciplines. Project Management (Civil) IV is a compulsory module for this option.

Code	Modules	C/O	Assessment Method	NQF Level
CNTM411	Contract Management: Civil IV (Module 1 - Theory)	C	3 hr exam - restricted open book	7
CNTM421	Contract Management: Civil IV (Module 2 - Project)	C	100% year mark	7
IRNG211	Industrial Relations & Negotiation II (Module 1 - Theory)	C	3 hr exam - restricted open book	7
IRNG221	Industrial Relations & Negotiation II (Module 2 - Project)	C	100% year mark	7
MTPP411	Management Principles & Practice IV (Module 1 - Theory)	C	3 hr exam	7
MTPP421	Management Principles & Practice IV (Module 2 - Project)	C	100% year mark	7
PMCV311	Principles of Management Economics III (Module 1 - Theory)	C	3 hr exam	7
PMCV321	Principles of Management Economics III (Module 2 - Project)	C	100% year mark	7
PRJM412	Project Management: Civil IV (Module 1 - Theory)	C	3 hr exam	7
PRJM422	Project Management: Civil IV (Module 2 - Project)	C	100% year mark	7

Plus any three electives from the other specialist disciplines.

### Structural Discipline

FNDE411	Foundation Engineering IV (Module 1 - Theory)	C	3 hr exam	7
FNDE421	Foundation Engineering IV (Module 2 - Project)	C	100% year mark	7
RCDE412	Reinforced Concrete Design IV (Module 1 - Theory)	C	4 hr exam - restricted open book	7
RCDE422	Reinforced Concrete Design IV (Module 2 - Project)	C	100% year mark	7
PCDS411	Pre-stressed Concrete Design IV (Module 1 - Theory)	C	4 hr exam - restricted open book	7
PCDS421	Pre-stressed Concrete Design IV (Module 2 - Project)	C	100% year mark	7
SANA411	Structural Analysis IV (Module 1 - Theory)	C	3 hr exam	7
SANA421	Structural Analysis IV (Module 2 Project)	C	100% year mark	7
SMDE411	Structural Masonry Design IV (Module 1 - Theory)	C	4 hr exam - restricted open book	7
SMDE421	Structural Masonry Design IV (Module 2 - Project)	C	100% year mark	7
SSDE411	Structural Steel Design IV (Module 1 - Theory)	C	4 hr exam - restricted open book	7
SSDE421	Structural Steel Design IV (Module 2 - Project)	C	100% year mark	7
STDE411	Structural Timber Design IV (Module 1 - Theory)	C	4 hr exam - restricted open book	7
STDE421	Structural Timber Design IV (Module 2 - Project)	C	100% year mark	7
TSTR412	Theory of Structures IV (Module 1 - Theory)	C	3 hr exam	7
TSTR422	Theory of Structures IV (Module 2 - Project)	C	100% year mark	7

### Transportation Discipline

GMDS411	Geometric Design IV (Module 1 Theory)	C	4 hr exam - restricted open book	7
GMDS421	Geometric Design IV (Module 2 Project)	C	100% year mark	7
PVTC411	Pavement Technology IV (Module 1 Theory)	C	3 hr exam	7
PVTC421	Pavement Technology IV (Module 2 Project)	C	100% year mark	7
TENG411	Traffic Engineering IV (Module 1 Theory)	C	3 hr exam	7
TENG421	Traffic Engineering IV (Module 2 Project)	C	100% year mark	7
TPLN411	Transport Planning IV (Module 1 Theory)	C	3 hr exam	7
TPLN421	Transport Planning IV (Module 2 Project)	C	100% year mark	7

TPTE41I	Transportation Technology IV (Module 1 Theory)	C	3 hr exam	7
TPTE42I	Transportation Technology IV (Module 2 Project)	C	100% year mark	7

Plus any three electives from the other specialist disciplines.

### Urban Engineering Discipline

Code	Modules	C/O	Assessment Method	NQF Level
CMTT41I	Construction Materials Technology IV (Module 1 Theory)	C	3 hr exam	7
CMTT42I	Construction Materials Technology IV (Module 2 Project)	C	100% year mark	7
GMDS41I	Geometric Design IV (Module 1 Theory)	C	4 hr exam - restricted open book	7
GMDS42I	Geometric Design IV (Module 2 Project)	C	100% year mark	7
PVTC41I	Pavement Technology IV (Module 1 Theory)	C	4 hr exam - open book	7
PVTC42I	Pavement Technology IV (Module 2 Project)	C	100% year mark	7
RDMT41I	Reticulation Design & Management IV (Module 1 Theory)	C	3 hr exam	7
RDMT42I	Reticulation Design & Management IV (Module 2 Project)	C	100% year mark	7
SWMT41I	Solid Waste Management IV (Module 1 Theory)	C	3 hr exam	7
SWMT42I	Solid Waste Management IV (Module 2 Project)	C	100% year mark	7
UPDS41I	Urban Planning & Design IV (Module 1 Theory)	C	3 hr exam	7
UPDS42I	Urban Planning & Design IV (Module 2 Project)	C	100% year mark	7

Plus any two electives from the other specialist disciplines

### Water Discipline

HYDR412	Hydraulics IV (Module 1 Theory)	C	3 hr exam	7
HYDR422	Hydraulics IV (Module 2 Project)	C	100% year mark	7
HLGY41I	Hydrology IV (Module 1 Theory)	C	3 hr exam	7
HLGY42I	Hydrology IV (Module 2 Project)	C	100% year mark	7
RDMT41I	Reticulation Design & Management IV (Module 1 Theory)	C	3 hr exam	7
RDMT42I	Reticulation Design & Management IV (Module 2 Project)	C	100% year mark	7
WWTT412	Waste Water Treatment Technology IV (Module 1 Theory)	C	3 hr exam	7
WWTT422	Waste Water Treatment Technology IV (Module 2 Project)	C	100% year mark	7
WTTC41I	Water Treatment Technology IV (Module 1 Theory)	C	3 hr exam	7
WTTC42I	Water Treatment Technology IV (Module 2 Project)	C	100% year mark	7

Plus any three electives from the other specialist disciplines

#### Note:

1. A total of **eight** modules must be selected from those listed above, such that at least **five** modules are selected from the chosen specialist option, and such that a minimum of **four** modules are at Level IV.
2. Construction Materials Technology IV may not be selected in combination with Concrete Technology IV and/or Asphalt Technology IV.
3. Not all of the specialist options and not all of the modules within those options will necessarily be available at any particular time.

## 5.5 BACCALAUREUS TECHNOLOGIAE: SURVEYING

This instructional programme has a minimum duration of four (4) semesters when undertaken on a part-time basis as per the criteria below:-

Code	Modules	C/O	Assessment Method	NQF Level
GEOD402	Geodesy IV	C	Continual	7
GISY402	Geographic Information Systems IV	C	Continual	7
PRMT40I	Practice Management IV	C	3 hr exam - open book	7
SVPR40I	Survey Project IV	C	Continual	7
SURV403	Surveying IV	C	3 hr exam	7
DPHT40I	Digital Photogrammetry IV	O	3 hr exam	7
DOCU30I	Documentation III	O	3 hr exam	6
FIMG10I	Financial Management I	O	3 hr exam	6
GMDS40I	Geometric Design IV	O	4 hr exam - open book	7
PHTG40I	Photogrammetry IV	O	3 hr exam	7

RSMT101	Research Methodology I	○	Continual	6
TNPL401	Town Planning IV	○	3 hr exam	7

**Note:**

1. In addition to the compulsory modules candidates must select a minimum of three additional modules representing a minimum total NATED credit rating of 0,291 from the list of optional modules and/or from modules of the Engineering, Cartography or Town Planning B.Tech.programmes. (Refer to the relevant departments for these module credit ratings.)
2. No more than two modules may be selected from the Engineering, Cartography or Town Planning programmes and these may not represent a total NATED credit rating exceeding 0,200. (Refer to the relevant departments for these module credit ratings.)
3. Experiential learning related practical modules may not be included in the modules chosen from the above-mentioned programmes.
4. Not all of the modules listed for this programme will necessarily be available at any particular time.

\*\*C = Compulsory : ○ = Optional

## **5.6 MASTER OF ENGINEERING ENTRANCE REQUIREMENTS**

Every candidate for this qualification shall have:

1. completed the requirements for the BEngTechHons (Civil Eng) or equivalent  
**or**
2. have been granted a conferment of status for the above-mentioned qualification.

### **INSTRUCTIONAL PROGRAMME**

This is a research-based qualification requiring advanced studies on behalf of the student in any module/s related to the specific field of study. Students are required to undertake research under the guidance of a supervisor.

## **5.7 MASTER OF THE BUILT ENVIRONMENT ENTRANCE REQUIREMENTS**

Every candidate for this qualification shall have:

1. completed the requirements for the BBEHons (Geomatics) or equivalent  
**or**
2. have been granted a conferment of status for the above-mentioned qualification.

### **INSTRUCTIONAL PROGRAMME**

This is a research-based qualification requiring advanced studies on behalf of the student in any module/s related to the specific field of study. Students are required to undertake research under the guidance of a supervisor.

## **5.8 DOCTOR OF ENGINEERING ENTRANCE REQUIREMENTS**

Every candidate for this qualification shall have:

1. completed the requirements for the Master of Engineering;  
**or**
2. have been granted a conferment of status for the above-mentioned qualification.

### **INSTRUCTIONAL PROGRAMME**

This is a research-based qualification requiring advanced studies on behalf of the student in any module/s related to the specific field of study. Students are required to undertake research under the guidance of a supervisor.

## **5.9 DOCTOR OF PHILOSOPHY IN THE BUILT ENVIRONMENT ENTRANCE REQUIREMENTS**

Every candidate for this qualification shall have:

1. completed the requirements for the Master of the Built Environment;
- or**
2. have been granted a conferment of status for the above-mentioned qualification.

## **INSTRUCTIONAL PROGRAMME**

This is a research-based qualification requiring advanced studies on behalf of the student in any module/s related to the specific field of study. Students are required to undertake research under the guidance of a supervisor.

## **6. ASSESSMENT RULES**

The method of assessment for each module/module is indicated in the indicative content (see section 8).

See also General Rules G12 to G16

## **7. RE-REGISTRATION RULES**

See Rule EC11

## **8. INDICATIVE CONTENT**

### **NOTE:**

1. Except where otherwise stated all modules have a required sub-minima of 40% of the overall semester mark and 40% of the examination mark respectively.
2. The allocation of periods for each module is based on a contact time of 50 minutes with classes commencing at 60 minute intervals.

### **ADJUSTMENT OF ERRORS III (AERR301) (082506003)**

Theory: 4 periods per week

Tutorial: 2 periods per week

Semester Mark: Three tests - each 13.33%

Examination: One three-hour paper - 60%

### **SYLLABUS**

1. Propagation of errors

2. Introduction to least squares
3. Network adjustment

**BASIC ENGINEERING MANAGEMENT 2A (BEMN201) (8 Credits)**

Theory: 2 periods per week

Continuous Assessment : Three Tests:

Test 1	-	25%
Test 2	-	30%
Control-Test	-	45%

**SYLLABUS**

1. Introduction to Management
2. Construction Organisation and Management
3. The Project Team
4. Financial Management
5. Contract Management

**CAD CIVIL ENGINEERING DRAWINGS 3A (CCED301) (12 Credits)**

Theory: 3 periods per week

Tutorial: 1 period per week

Semester Mark: Two tests - 20% each of final mark

Assignment – 20% of final mark

Control Test – 40% of final mark

Examination: No examination

**SYLLABUS**

1. Structural Engineering drawing applications
2. Civil Engineering drawing applications
3. Computer drawing application where applicable

**CADASTRAL SURVEYING 3A (CDSV301) (12 Credits)**

Theory: 3 periods per week

Practical: 1 period per week

Semester Mark: Two Tests - 12% each

One Project – 16%

Examination: One three hour paper - 60%

**SYLLABUS**

1. Ownership
2. Subdivision and Consolidation of land
3. A study of the acts relating to the survey of land
4. Sectional Titles

**CIVIL ENGINEERING DOCUMENTATION 3A (CEDC301)**

(12

credits)

Theory: 4 periods per week

Semester Mark: Two tests – 10% each

One assignment – 20%

Examination: One Three hour paper – 60%

**Graduate Attribute (GA) assessed: - GA 6 Professional and Technical Communication.**

### **SYLLABUS**

1. Civil Engineering Estimation
2. Extracting quantities for Roads, Earthworks, Concrete and Steel structures.
3. Compiling of a Schedule of quantities using SABS 1200
4. Clause by Clause examination on the General Conditions of Contract 2015

### **CIVIL ENGINEERING MATERIALS 2A (CMTL201) (12 Credits)**

Theory: 3 periods per week

Practical: 1 period per week

Semester Mark: Two tests – 14% each

Practicals – 12%

Examination: One three hour paper – 60%

### **SYLLABUS**

1. Geology
2. Soils
3. Concrete
4. Bitumen
5. Laboratory practicals

### **CIVIL ENGINEERING METHODS IB (CVMT101) (12 Credits)**

Theory: 3 periods per week

Semester Mark: Two tests - 20% each

Examination: One three-hour paper - 60%

### **SYLLABUS**

1. Earthworks
2. Structures
3. Road Engineering
4. Dams
5. Bridges
6. Tunnels
7. Harbours
8. Railways
9. Airports
10. Drainage
11. Safety
12. Labour Enhanced Construction

### **CIVIL MECHANICS IA (CVMC101) (8 Credits)**

Theory: 2 periods per week

Tutorial: 1 period per week

Practical: 2 periods per week

Continuous Assessment:

Tutorial Assignment – will contribute 20% of final mark

Tests – will contribute 65% of final mark

Practicals – will contribute 15% of final mark

Examination: No examination

### **SYLLABUS**

1. Weights and pressure.
2. Statics of determinate beams & frames.
3. Internal member forces in determinate pin jointed frames
4. Centroid and centre of gravity

### **COMPUTER APPLICATIONS III (CAPP302) (060102203)**

Theory: 2 periods per week

Semester Mark: Three projects - 33,33% each

Examination: No examination

### **SYLLABUS**

1. Engineering Road Design using appropriate software
2. Program development: Writing programs in a high level language and the utilization of an application package
3. Applications: Use of applications software for certain tasks
4. Database management systems: The Design and implementation of a database

### **COMPUTER APPLICATIONS 3A (CPTA301) (12 Credits)**

Theory: 4 periods per week

Semester Mark: Two projects - 25% each

One Test - 50%

Examination: No examination

### **SYLLABUS**

1. File formats
2. Engineering Road design
3. Engineering Platform design
4. Data Traverse and Cadastral layout
5. Database Management Systems

### **CONSTRUCTION MANAGEMENT 3A (CNMN301) (12 Credits)**

Theory: 3 periods per week

Semester Mark: Test 1 - 20%

Test 2 - 20 % (sub-minimum 50%)

Examination: One three hour paper - 60%

### **SYLLABUS**

1. Contract Documentation and Specifications
2. Estimating
3. Pre/post – tender procedures, planning, tender adjudication
4. Project management, quality management, disputes

### **CONSTRUCTION MATERIALS TECHNOLOGY IV MODULE I THEORY (CMTT411) (0806107060)**

Theory: 4 periods per week

Semester Mark: Two tests - 20 % each



Examination: One three-hour paper - 60%

### **SYLLABUS**

1. Concrete technology
2. Asphalt & Bitumen technology
3. Other materials
4. Testing

### **CONSTRUCTION MATERIALS TECHNOLOGY IV MODULE 2 PROJECT (CMTT421) (0806107060)**

Project: 1 period per week

Semester Mark: One industry based project - 100%

### **SYLLABUS**

Students will be required to investigate and produce an appropriate industry related design project.

### **CONTROL SURVEYING 2A (CTS201) (20 credits)**

Theory: 4 periods per week

Practical: 6 periods per week

Semester Mark: Two Tests - 12% each

One Project – 16%

Examination: One three hour paper - 60%

### **SYLLABUS**

1. Introduction
2. Reconnaissance
3. Triangulation
4. Resections
5. Trilateration
6. Satellite Positioning/GPS
7. Electronic Distance Measurement
8. Traversing
9. Trigonometrical Levelling

### **CONTRACT MANAGEMENT (CIVIL) IV MODULE 1 THEORY (CNTM411) (20426707)**

Theory: 4 periods per week

Semester Mark: Two tests - 20 % each

Examination: One four-hour paper - 60% (restricted open book)

### **SYLLABUS**

- |                                     |                                   |
|-------------------------------------|-----------------------------------|
| 1. Contract Documentation           | 7. Measurement and Payment        |
| 2. Contract Specifications          | 8. Subcontract Work               |
| 3. Pre-Tender Procedures            | 9. Contractual Dispute Management |
| 4. Tender Preparation               | 10. Cost Control and Productivity |
| 5. Tender Award                     | 11. Quality Management            |
| 6. Commencement of Contract/Project |                                   |

### **CONTRACT MANAGEMENT (CIVIL) IV MODULE 2 PROJECT (CNTM421) (20426707)**

Project: 1 period per week

Semester Mark: One industry based project - 100%

## **SYLLABUS**

Students will be required to investigate and produce an appropriate industry related design project.

### **CORNERSTONE 101 (CSTN101)** (12 Credits) (serviced module)

Theory: 2 periods per week

Tutorials: 2 periods per week

Semester Mark:

Weekly reflections written by each student - 10%

Small group class attendance - 10%

(forfeited if student attends less than 80% of tutorials)

A major research project - 36%

Oral presentation - 40%

Information Literacy - 4%

Examination: No Examination

## **SYLLABUS**

1. The Common Set of Values
2. Introduction to journeys: our journeys and those of others
3. Diversity, social groups
4. Diversity, the Constitution and the Bill of Rights
5. Gender diversity
6. Gender and gender-based violence
7. HIV/AIDS and society

### **DESIGN PROJECT (DSNP301)** (20 Credits)

Theory: 5 periods per week

Tutorials: 2 periods per week

Semester mark: Project Submission = 100% of the final mark.

Sub-minima: You must obtain at least 50% in the project to pass.

**Graduate Attribute (GA) assessed: -**

**GA 3 –Engineering Design:**

**GA 8 – Individual and Teamwork**

**GA 9 – Independent learning.**

**GA10 – Engineering professionalism**

Examination: No examination

## **SYLLABUS**

1. Design project – Design of a structure.  
Urban design

### **DIGITAL PHOTOGRAMMETRY AND REMOTE SENSING 2B (DPRS201)**

(12 Credits)

Theory: 3 periods per week

Practical: 2 periods per week

Semester Mark: Two tests - 10% each

One project - 20% each

Examination: One three-hour paper - 60%

## **SYLLABUS**

1. Introduction
2. Theory of electromagnetic radiation
3. Remote sensing systems
4. Multispectral scanners
5. Radar instruments
6. Image acquisition, processing and interpretation
7. Photogrammetric image system calibration
8. Data reduction, and error analysis
9. Stereoscopic instrumentation
10. Object space control
11. Mission planning

## **DIGITAL PHOTOGRAMMETRY IV (DPHT401) (0825073060)**

Theory: 5 periods per week

Semester Mark: Two tests - 12% each

One Project - 16%

Examination: One three-hour paper - 60%

## **SYLLABUS**

1. Cameras and sensors
2. Mapping: the exact solution
3. Differential rectification
4. Close-range photogrammetry

## **DRAWINGS IA – DRNS101 / DRWN101 (12 Credits)**

Theory: 6 periods per week – 2 of which are in the computer room.

Continuous assessment:

Assessment 1 – 20% of final mark

Assessment 2 – 30% of final mark

Assessment 3 – 20% of final mark

Assessment 4 – 30% of final mark

Examination: No examination

## **SYLLABUS**

1. Drawing Standards as per SABS0111-I
2. Blending of Lines
3. Perspective Drawings
4. Isometric Drawings
5. Sectioning
6. Orthographic Drawings
7. House Plans (Autocad)
8. Basic Road Design
9. Road Intersections

## **ENGINEERING MANAGEMENT 2A (ENMG201) (8 Credits)**

Theory: 2 periods per week

Tutorial: 1 period per week

Semester Mark: Test 1 – 15%

Test 2 – 20%

Assignment – 5%

Test 3 - 60%

Examination: No Examination

### **SYLLABUS**

1. Contract planning
2. Planning techniques
3. Financial planning and control

### **ENGINEERING MATHEMATICS IA – EMTA101** (12 Credits) (served module)

Theory: 4 periods per week

Tutorial: 1 period per week

Continuous Assessment:

Two Major Tests – 40% each

Two Minor Tests – 10% each

Examination: No examination

### **SYLLABUS**

1. Algebra
2. Logarithms and Exponents
3. Trigonometry
4. Functions and Graphs
5. Complex Numbers
6. Calculus
7. Calculus – Differentiation
8. Calculus - Integration

### **ENGINEERING MATHEMATICS IB – EMTB101** (12 Credits) (served module)

Theory: 4 periods per week

Tutorial: 1 period per week

Continuous Assessment:

Two Major Tests – 40% each

Two Minor Tests – 10% each

Examination: No examination

### **SYLLABUS**

1. Linear Algebra
2. Series
3. Trigonometry
4. Advanced Calculus – Differentiation
5. Advanced Calculus – Integration
6. Differential Equations
7. Vectors

### **ENGINEERING MATHEMATICS 2A – EMTA201** (12 Credits) (served module)

Theory: 4 periods per week

Tutorial: 1 period per week

Continuous Assessment:

Two Major Tests – 40% each  
Two Minor Tests – 10% each  
Examination: No examination

### **SYLLABUS**

1. Laplace Transforms
2. Differential Equations
3. Partial Differential Equations
4. Fourier Series

### **ENGINEERING MATHEMATICS 2B – EMTB201** (12 Credits) (serviced module)

Theory: 4 periods per week  
Tutorial: 1 period per week  
Continuous Assessment:  
Two Major Tests – 40% each  
Two Minor Tests – 10% each  
Examination: No examination

### **SYLLABUS**

1. Multivariable Calculus and Vector Analysis
2. Linear Algebra
3. Complex Analysis
4. Transforms

### **ENGINEERING PRACTICE: CIVIL II - MODULE 1 (EXCV201)**

At least 25 weeks of experiential learning under the supervision of a qualified member in four or more of the following categories of Civil Engineering work:

### **SYLLABUS**

- |                   |                      |
|-------------------|----------------------|
| 1. Administration | 5. Contracts         |
| 2. Drawing        | 6. Construction      |
| 3. Surveying      | 7. Materials testing |
| 4. Design         |                      |

And the submission of a technical report on the experience gained.

### **ENGINEERING: PRACTICE: CIVIL II —MODULE 2 (EXCV301)**

At least 25 weeks of experiential learning under the supervision of a qualified member in four or more of the following categories of Civil Engineering work:

### **SYLLABUS**

- |                   |                      |
|-------------------|----------------------|
| 1. Administration | 5. Contracts         |
| 2. Drawing        | 6. Construction      |
| 3. Surveying      | 7. Materials testing |
| 4. Design         |                      |

And the completion of industry based engineering investigation which will be orally assessed. Obtaining a Learners Drivers Licence (Students with a valid learners or drivers licence will be exempted from this component.)

### **ENGINEERING PHYSICS IA (EPHA 101)** (12 Credits) (serviced module)

Theory : 2 periods per week

Tutorial : 2 periods per week

Practical : 2 periods per week

Semester mark :

Two tests (15% each) will be written based on lectures, self-studies and tutorials.

A written practical test (10%) will be done based on applied principles in the laboratory.

Examination : One three-hour paper – 60%

## **SYLLABUS**

1. Introduction, Measurement, Estimating
2. Motion in One Dimension
3. Kinematics in two dimensions; Vectors
4. Dynamics: Newton's Laws of Motion
5. Circular Motion; Gravitation
6. Work and Energy
7. Linear Momentum
8. Rotational Motion
9. Static Equilibrium; Elasticity and Fracture
10. Fluids
11. Oscillations and Waves
12. Sound

## **ENGINEERING PHYSICS IB (EPHB 101) (12 Credits) (serviced module)**

Theory : 2 periods per week

Tutorial : 2 periods per week

Practical : 2 periods per week

Semester mark :

Two tests (15% each) will be written based on lectures, self-studies and tutorials.

A written practical test (10%) will be done based on applied principles in the laboratory.

Examination : One three-hour paper – 60%

## **SYLLABUS**

1. Temperature and Kinetic Theory
2. Heat
3. The Laws of Thermodynamics
4. Electric Charge and Electric Field
5. Electric Potential
6. Electric Currents
7. DC Circuits
8. Magnetism
9. Electromagnetic Induction and Faraday's Law
10. Electromagnetic Waves
11. Light: Geometric Optics
12. The Wave Nature of Light
13. Early Quantum Theory and Models of the Atom
14. Quantum Mechanics of Atoms
15. Nuclear Physics and Radioactivity

## **ENGINEERING SURVEYING 2B (ENSV201) (24 credits)**

Theory: 4 periods per week

Practical: 6 periods per week

Semester Mark: Two Tests – 10% each

Three projects (2 x 8% & 1x 4%) - 20%

Examination: One three hour paper – 60%

### **SYLLABUS**

1. Basic principles of Engineering Surveying
2. Interpretation of engineering drawings
3. Geometric design: including principles and practice of road alignment
4. Design control and criteria
5. Principles of precise setting out
6. Deformation surveys
7. Setting out of engineering works
8. Areas and volumes

### **ENVIRONMENTAL SCIENCE IB (EVSCI01) (12 Credits)**

Theory: 3 periods per week

Semester Mark: Two tests - 15% each

Project - 10%

Examination: One three-hour paper - 60%

### **SYLLABUS**

1. Climatology
2. Human settlements
3. Oceanography
4. Properties of the Earth
5. Geomorphology
6. Astronomical Geography
7. Geographical Maps
8. Geographical properties of South Africa

### **FOUNDATION ENGINEERING IV MODULE 1 THEORY (FNDE411) (0806110060)**

Theory: 4 periods per week

Semester Mark: Two tests - 20%

Examination: One three-hour paper - 60%

### **SYLLABUS**

1. Shallow & deep foundation design
2. Lateral earth support

### **FOUNDATION ENGINEERING IV MODULE 2 PROJECT (FNDE421) (0806110060)**

Project: 1 period per week

Semester Mark: One industry based project - 100%

### **SYLLABUS**

Students will be required to investigate and produce an appropriate industry related design project.

### **GEODESY 3A (GDSY301) (16 credits)**

Theory: 4 periods per week

Semester Mark: Two Tests - 10% each

One Project – 20%

Examination: One three hour paper - 60%

#### **SYLLABUS**

1. Introduction to Geodesy
2. Gravimetry
3. Theory of the Gravity Field of the Earth.
4. Satellite Geodesy.
5. Geodetic control networks

### **GEODESY IV (GEOD402) (0825077060)**

Theory: 5 periods per week

Semester Mark: Six assignments - 10% each

Two tests – 20%

Examination: No examination

#### **SYLLABUS**

1. Co-ordinate systems in two dimensions
2. Co-ordinate systems in three dimensions
3. Co-ordinate systems for the earth
4. Geodetic surveying

### **GEOGRAPHIC INFORMATION SYSTEM 2A (GISS201) (12 Credits)**

Theory: 3 periods per week

Practical: 2 periods per week

Continuous Assessment - Two tests - 20% each

Practical - 25%

Control Test - 35%

Examination: No examination

#### **SYLLABUS**

1. Introduction and Fundamentals of Geographic Information System.
2. Spatial Concepts
3. Spatial Data types
4. Geo-referencing and Geo-coding
5. GIS Hardware and Software
6. Data input and output
7. Data analysis

### **GEOGRAPHICAL INFORMATION SYSTEMS III (GEIS301) (060599903)**

Theory: 2 periods per week

Practical: 2 periods per week

Semester Mark: One test - 20%

Two Assignments - 20% and 25% each

One Control Test - 35%

Examination: No examination module continuously assessed



## **SYLLABUS**

1. Fundamentals of GI
2. Spatial Concepts
3. Spatial Data
4. GIS Hardware and Software
5. GIS Data Analysis
6. GIS Output
7. Practical Output of GIS

## **GEOGRAPHIC INFORMATION SYSTEM (GIS) 3A (GISS301) (12 Credits)**

Theory: 3 periods per week

Practical: 2 periods per week

Continuous Assessment : Two tests - 20% each

Practical - 25%

Control Test - 35%

Examination: No examination

## **SYLLABUS**

1. Raster and vector GIS & its Capabilities
2. Representing Reality, Sampling, Data sources, standards & accuracy
3. Spatial Objects & Database Models
4. Spatial Analysis
5. Graphic Output Design
6. Generating Complex Products.

## **GEOGRAPHIC INFORMATION SYSTEMS IV (GISY402) (0605019060)**

Theory: 5 periods per week

Semester Mark: Two tests - 20% each

Two projects - 20% each

One Control Test - 20%

Examination: No examination

## **SYLLABUS**

1. Nature of Geo-referenced information
2. Data capture
3. Data analysis
4. Presentation of information

## **GEOMATICS IA (GMTA101) (16 Credits)**

Theory: 4 periods per week

Practical: 2 periods per week

Semester Mark: Two tests - 12% each

Practical - 16% (Sub-minimum of 8% i.e. 50% of 16% for practical component)

Examination: One three-hour paper - 60%

## **SYLLABUS**

1. Basic principles of Surveying
2. Introduction to Map projections and co-ordinates systems.
3. Various methodologies involved in the determining of heights, (including levelling of control points, Long sections and Cross sections).

4. Co-ordinates calculations
5. Detail Survey & vertical sections (gradients)
6. Area and volumes

### **GEOMATICS IB (GMTBI01) (16 Credits)**

Theory: 4 periods per week

Practical: 3 periods per week

Semester Mark: Two tests - 12% each

Practical - 16% (Sub-minimum of 8% i.e. 50% of 16% for practical component)

Examination: One three-hour paper - 60%

### **SYLLABUS**

1. Introduction to Geomatics and Surveying
2. Errors and Standards
3. Map Projection and Co-ordinate systems
4. Co-ordinate calculations (Triangulation)
5. Trigonometric systems and Survey Datums
6. Introduction to Global navigation satellite systems (GNSS & GPS)
7. Total station and Instrument adjustments
8. Trigonometrical levelling
9. Electronic Distance Measurements (EDM)
10. Traversing
11. Engineering & Construction surveying
12. Cadastral surveying

### **GEOMETRIC DESIGN IV MODULE 1 THEORY (GMDS411) (0806111060)**

Theory: 4 periods per week

Semester Mark: Two tests - 20% each

Examination: One four-hour paper - 60% (restricted open book)

### **SYLLABUS**

- |  |                                      |
|--|--------------------------------------|
| 1. Principles & practice of Road Alignment | 5. Intersection & interchange design |
| 2. Environmental impact control            | 6. Drainage design                   |
| 3. Design control and criteria             | 7. Earthworks design                 |
| 4. Elements of design (Geometrics, Safety) |                                      |

### **GEOMETRIC DESIGN IV MODULE 2 PROJECT (GMDS421) (0806111060)**

Project: 1 period per week

Semester Mark: One industry based project - 100%

### **SYLLABUS**

Students will be required to investigate and produce an appropriate industry related design project.

### **GEOTECHNICAL ENGINEERING 2B (GEOT201) (12 Credits)**

Theory: 3 periods per week

Practical: 2 periods per week

Semester Mark: Two tests – 14% each

Three practicals (4% each) – 12%

Examination: One three hour paper

## **SYLLABUS**

1. Properties of soils
2. Flow of water through soils
3. Effective stresses
4. Shear strength of soils
5. Consolidation
6. Shallow foundations
7. Site investigations
8. Laboratory practicals

## **HYDRAULICS IV MODULE 1 THEORY (HYDR412) (0806112060)**

Theory: 4 periods per week

Semester Mark: Two tests - 20% each

Examination: One three-hour paper - 60%

## **SYLLABUS**

1. Hydrodynamics
2. Hydraulic machinery (Pumps, Turbines, etc.)
3. Hydraulic models
4. Open channel hydraulics
5. Fluvial hydraulics
6. Wave hydraulics

## **HYDRAULICS IV MODULE 2 PROJECT (HYDR422) (0806112060)**

Project: 1 period per week

Semester Mark: One industry based project - 100%

## **SYLLABUS**

Students will be required to investigate and produce an appropriate industry related design project.

## **HYDROLOGY IV MODULE 1 THEORY (HLGY411) (0806113060)**

Theory: 4 periods per week

Semester Mark: Two tests - 20% each

Examination: One three-hour paper - 60%

## **SYLLABUS**

1. Introduction to meteorology
2. Groundwater
3. Surface water
4. Flood analysis
5. Water resources analysis
6. South African hydrology

## **HYDROLOGY IV MODULE 2 PROJECT (HLGY421) (0806113060)**

Project: 1 period per week

Semester Mark: One industry based project - 100%

## **SYLLABUS**

Students will be required to investigate and produce an appropriate industry related design project.

## **INDUSTRIAL RELATIONS & NEGOTIATIONS II MODULE 1 THEORY (IRNG211) (0411062220)**

Theory: 4 periods per week

Semester Mark: Two tests - 20% each (restricted open book)

Examination: One three-hour paper - 60% (restricted open book)

## **SYLLABUS**

1. Industrial relations

2. Negotiations and dispute handling in:
  - Contractor/Client & Contractor/Sub-contractor relations
  - Contractor/Professional team relations
  - Contractor/Supplier relations
  - Management/Personnel relations
  - Project Manager/Other Parties relations
3. Strike management

## **INDUSTRIAL RELATIONS & NEGOTIATIONS II MODULE 2 PROJECT (IRNG221) (0411062220)**

Project: 1 period per week

Semester Mark: One industry based project - 100%

### **SYLLABUS**

Students will be required to investigate and produce an appropriate industry related design project.

## **LAW FOR LIFE (LWLF101) (8 Credits) (serviced module)**

Theory: 2 periods per week

Tutorial; 1 period per week

Semester Mark: One formal test – 60%

Student to complete 2 of 3 assessments below – 40%

A group assignment worth 20% of final mark

A group poster presentation worth 20% of final mark

Draft a Will worth 20% of the final mark

No Examination; 100% course mark

### **SYLLABUS**

1. Introduction to Law
2. Civil and Criminal Law
3. Law of Insurance
4. Road Accident Fund
5. Law of Contract
6. Marriage
7. Succession

## **LEGAL PRINCIPLES 2B (LPPL201) (12 Credits)**

Theory: 3 periods per week

Semester Mark: Two tests - 20% each

Examination: One three-hour paper - 60%

### **SYLLABUS**

1. An introduction to South African Law
2. Legislation as a source of law
3. The Constitution
4. The Law of property
5. The Law of things
6. The Law of contract
7. An introduction to Land reform in South Africa
8. Land Legislation applicable in South Africa
9. Legislation for Surveying students

## **MANAGEMENT PRINCIPLES & PRACTICE IV MODULE 1 THEORY (MTPP411) (0409226060)**

Theory: 4 periods per week

Semester Mark: 2 tests - 20% each

Examination: One three-hour paper - 60%

### **SYLLABUS**

1. Management approaches
2. The business environment
3. The functions of management
4. Decision making & problem solving
5. Strategic management
6. Management by objectives
7. Corporate communications
8. Small business management
9. International management
10. Politics, ethics and social responsibility
11. Case studies

## **MANAGEMENT PRINCIPLES & PRACTICE IV MODULE 2 PROJECT (MTPP421) (0409226060)**

Project: 1 period per week

Semester Mark: One industry based project - 100%

### **SYLLABUS**

Students will be required to investigate and produce an appropriate industry related design project.

## **MAP PROJECTIONS AND COORDINATE SYSTEMS 2B (MPSC201) (12 Credits)**

Theory: 3 periods per week

Practical: 2 periods per week

Semester Mark: Two tests - 10% each

One project - 20% each

Examination: One three-hour paper - 60%

### **SYLLABUS**

1. Two- and three-dimensional coordinate systems
2. Grid reference systems, shape of the Earth
3. Mathematical representations of the Earth, (including reference ellipsoids)
4. Geographical coordinates, different types of map projections, Including mathematical models and projection properties)
5. Reference datums and common ellipsoids
6. SA Survey co-ordinate system and UTM system
7. Projection-to-projection transformations

## **PAVEMENT TECHNOLOGY IV MODULE 1 THEORY (PVTC411) (0806114060)**

Theory: 4 periods per week

Semester Mark: Two tests - 20% each

Examination: One four-hour paper - 60% (open book)

### **SYLLABUS**

1. Pavement design (Factors, gravel, flexible, rigid)
2. Pavement construction (Gravel, flexible, rigid)
3. Pavement evaluation & rehabilitation
4. Pavement management

## **PAVEMENT TECHNOLOGY IV MODULE 2 PROJECT (PVTC421) (0806114060)**

Project: 1 period per week

Semester Mark: One industry based project - 100%

### **SYLLABUS**

Students will be required to investigate and produce an appropriate industry related design project.

## **PHOTOGRAMMETRY 2A (PHGR201) (12 Credits)**

Theory: 3 periods per week

Practical: 2 periods per week

Semester Mark: Two tests - 10% each

Two projects - 10% each

Examination: One three-hour paper - 60%

### **SYLLABUS**

1. Geometry of sensors and sensor systems (airborne, space borne and terrestrial)
2. Camera calibration, acquisition of images (including flight planning)
3. Image media and formats incl. image compression
4. Principles of analogue and digital photography, Ortho-rectification, mosaicing and geo-referencing

## **PHOTOGRAMMETRYIII (PHTG302)**

Theory: 3 periods per week

Practical: 2 periods per week

Course Mark: Two tests - 13.33% each

Practical - 13.33%

Examination: One three-hour paper - 60%

### **SYLLABUS**

1. The photograph
2. Mapping: exact solution
3. Computer applications in photogrammetry

## **PHOTOGRAMMETRY IV (PHTG401) (0825075060)**

Theory: 5 periods per week

Semester Mark: Method of assessment to be decided

Examination: One three-hour paper - 60%

### **SYLLABUS**

1. Photogrammetry project design
2. Graphic output
3. Image interpretation
4. Photogrammetric office organisation
5. Image processing

## **PRACTICE MANAGEMENT IV (PRMT401) (0409258060)**

Theory: 5 periods per week

Semester Mark: Two tests - 13,33% each

One assignment - 13,33%

Examination: One three-hour open book paper- 60%

### **SYLLABUS**

1. Human relations in organisations
2. Principles & practice of management
3. Project management

### **PRESTRESSED CONCRETE DESIGN IV MODULE 1 THEORY (PCDS411) (0806115060)**

Theory: 4 periods per week

Semester Mark: Two tests - 20%

Examination: One four-hour paper - 60% (open book)

### **SYLLABUS**

1. Design of pre-stressed concrete structures
2. Working details & drawings

### **PRESTRESSED CONCRETE DESIGN IV MODULE 2 PROJECT (PCDS421) (0806115060)**

Project: 1 period per week

Semester Mark: One industry based project - 100%

### **SYLLABUS**

Students will be required to investigate and produce an appropriate industry related design project.

### **PRINCIPLES OF MANAGEMENT ECONOMICS III MODULE 1 THEORY (PMCV311) (2202006030)**

Theory: 4 periods per week

Semester Mark: Two test - 20% each

Examination: One three-hour paper - 60%

### **SYLLABUS**

1. Introduction to micro economics
2. The market
3. Elasticity
4. Market forms
5. A practical macro-economic framework
6. Economic policy

### **PRINCIPLES OF MANAGEMENT ECONOMICS III MODULE 2 PROJECT (PMCV321) (2202006030)**

Project: 1 period per week

Semester Mark: One industry based project - 100%

### **SYLLABUS**

Students will be required to investigate and produce an appropriate industry related design project.

### **PROJECT MANAGEMENT (PMAN301) (8 Credits)**

Theory: 4 periods per week

Semester Mark: Two Tests - 20% each

Examination: One three hour paper – 60%

### **SYLLABUS**

1. Project Management within Context
2. Modern Project planning methods, tool, analysis and computer applications

3. Oral and written communication of project planning
4. Project Implementation Support of the operational systems

### **PROJECT MANAGEMENT IV (CIVIL) MODULE 1 THEORY (PRJM412) (0204027060)**

Theory: 4 periods per week

Semester Mark: Two tests - 20% each

Examination: One three-hour paper - 60%

#### **SYLLABUS**

1. Planning of projects (Civil & Building)
2. Management of projects
3. Quality and time management
4. Management systems
5. Computer applications

### **PROJECT MANAGEMENT IV (CIVIL) MODULE 2 PROJECT (PRJM422) (0204027060)**

Project: 1 period per week

Semester Mark: One industry based project - 100%

#### **SYLLABUS**

Students will be required to investigate and produce an appropriate industry related design project.

### **REINFORCED CONCRETE DESIGN IV MODULE 1 THEORY (RCDE412) (0806118060)**

Theory: 4 periods per week

Semester Mark: Two tests - 20%

Examination: One four-hour paper - 60% (restricted open book)

#### **SYLLABUS**

1. Design of reinforced concrete structures
2. Computer applications
3. Working details and drawings

### **REINFORCED CONCRETE DESIGN IV MODULE 2 PROJECT (RCDE422) (0806118060)**

Project: 1 period per week

Semester Mark: One industry based project - 100%

#### **SYLLABUS**

Students will be required to investigate and produce an appropriate industry related design project.

### **REINFORCED CONCRETE DESIGN 3A (RFCD301) (12 Credits)**

Theory: 3 periods per week

Tutorial: 1 period per week

Semester Mark: One test - 15%

One test – 20%

Computer assignment – 5%

Examination: One three-hour paper - 60% (restricted open book)

**Graduate Attribute (GA) assessed: GA 2 application of scientific and engineering knowledge**



## **SYLLABUS**

1. Loading & Analysis
2. Element Design & Detailing
3. Computer application

### **RETICULATION DESIGN & MANAGEMENT IV MODULE 1 THEORY (RDMT411) (0806119060)**

Theory: 4 periods per week

Semester Mark: Two tests - 20% each

Examination: One three-hour paper - 60%

## **SYLLABUS**

1. Hydraulic principles
2. Design parameters
3. Ancillary works
4. Pumping installations
5. System operation
6. Water management
7. Waste management
8. Environmental aspects

### **RETICULATION DESIGN & MANAGEMENT IV MODULE 2 PROJECT (RDMT421) (0806119060)**

Project: 1 period per week

Semester Mark: One industry based project - 100%

## **SYLLABUS**

Students will be required to investigate and produce an appropriate industry related design project.

### **SETTLEMENT HISTORY 101 (STHS102) (8 Credits)**

Theory: 2 periods per week

Semester Mark: Two tests - 15% each

One project - 20%

Examination: One three-hour paper - 50%

## **SYLLABUS**

**SECTION I:** deals with the Classical Period. In this section the principles and practise in the Classical Period is outlined. Classical developments are the foundations of Western civilization. The concepts, methods, principles and examples are conveyed in the following time frames:

- Pre-history and Early Cities
- Greek period
- Roman Empire period
- Medieval period

**SECTION II:** deals with Contemporary Cities and the Evolution of the South African City. This section puts in perspective the attitudes, events, policy and regulations which have shaped the South African city and society.

The sub-sections are as follows;

- Pre-colonial societies, space and settlement patterns in South Africa
- The Renaissance City
- The Industrial City and the Garden City response
- Early 20<sup>th</sup> Century developments, The New Town Movement
- African Cities

## **SOCIOLOGY OF WORK 101 (SCLW101) (8 Credits) (Serviced)**

Theory: 2 periods per week

Semester Mark:

The approach will be one of continuous assessment.

The assessment will be made up as follows:

This is how will outcomes be assessed.

Tutorial attendance - 15%

Submission of all tutorials - 20%

Blackboard (online) Exercises - 15%

Group Project - 20%

Submission of a 4-5page written assignment - 30%

Examination: No Examination

### **SYLLABUS**

1. What is Work?
2. Industrialisation and post industrialisation
3. The capitalist workplace
4. Trade unionism
5. Women and Work
6. Precarious Labour

## **SOLID WASTE MANAGEMENT IV MODULE 1 THEORY (SWMT411) (0806120060)**

Theory: 4 periods per week

Semester Mark: Two tests - 20% each

Examination: One three-hour paper - 60%

### **SYLLABUS**

1. Characteristics of waste
2. Solid waste disposal methods
3. Design, operation & management of landfill sites
4. Operation & management of solid waste removal systems
5. Third World applications
6. Waste recycling
7. Emergency waste management
8. Legal aspects

## **SOLID WASTE MANAGEMENT IV MODULE 2 PROJECT (SWMT421) (0806120060)**

Project: 1 period per week

Semester Mark: One industry based project - 100%

### **SYLLABUS**

Students will be required to investigate and produce an appropriate industry related design project.

## **STATISTICS 2B (STST201) (12 credits)**

Theory: 3 periods per week

Semester Mark: Three Tests – 13.33% each

Examination: One three hour paper - 60%

### **SYLLABUS**

1. The nature of observations and data acquisition,
2. Types of errors,
3. Means, norms ,accuracy, precision,
4. Reliability, probability, confidence intervals,
5. Distributions and probability density functions
6. Auto- and cross-correlation,
7. Hypothesis testing

### **STRUCTURAL ANALYSIS 2B (STAN201) (12 Credits)**

Theory: 3 periods per week

Tutorial: 1 period per week

Computer module: 1 period week

Semester Mark: Two tests - 17.5% each

Computer application test – 5%

Examination: One three-hour paper - 60%

### **SYLLABUS**

1. Analysis of statically indeterminate structures

### **STRUCTURAL ANALYSIS IV MODULE 1 THEORY (SANA411) (0806121060)**

Theory: 4 periods per week

Semester Mark: Two tests - 20% each

Examination: One three-hour paper - 60%

### **SYLLABUS**

1. Advanced structural analysis methods
2. Applicable computer applications

### **STRUCTURAL ANALYSIS IV MODULE 2 PROJECT (SANA421) (0806121060)**

Project: 1 period per week

Semester Mark: One industry based project - 100%

### **SYLLABUS**

Students will be required to investigate and produce an appropriate industry related design project.

### **STRUCTURAL DESIGN THEORY INTRO 2B (SDTI201) (16 Credits)**

Theory: 3 periods per week

Tutorial: 1 period per week

Semester Mark: Two tests - 20% each

Examination: One three-hour paper - 60% (restricted open book)

### **SYLLABUS**

1. Loading and Limit State Design Philosophy
2. Structural Steel Ties, Struts and Beams
3. Reinforced Concrete Beams

### **STRUCTURAL MECHANICS IB - MODULE 1 (STMCI01) (12 Credits)**

Theory: 3 periods per week  
Semester Mark: Two tests - 15% each  
                    Practical - 10%  
Examination: One three-hour paper - 60%

### **SYLLABUS**

1. Section Properties
2. Shear Centroids
3. Stress and Strains
4. Impact Loads
5. Mohrs Circle

### **STRUCTURAL MECHANICS 2A - MODULE I (STMC201) (12 Credits)**

Theory: 3 periods per week  
Semester Mark: Two tests - 15% each  
                    Practical - 10%  
Examination: One three-hour paper - 60%

### **SYLLABUS**

1. Shear Forces, Bending Moments and Deflection of Statically Determinate Structures
2. Combined Stresses
3. Moment Area Method
4. Shear Centroids
5. Torsion

### **STRUCTURAL STEEL DESIGN 3B - (STSD301) (12 Credits)**

Theory: 4 periods per week  
Computer module: 1 period per week  
Continuous Assessment:  
Test One – 40%  
Test Two – 20% (open book, 2 parts, computer based, sub-minimum 60%)  
Test Three – 40% (restricted to students who met the pass requirement of Test 2)  
Examination: No examination

The computer based assessment will be carried out in a computer venue with appropriate software. Student will have to demonstrate that he/she has achieved the following outcomes;  
A student must be able to derive the appropriate loading, analysis and design a given steel structure using prescribed structural software.

***Graduate Attribute (GA) assessed: GA 5 Engineering methods, skills, tools, including information technology.***

### **SYLLABUS**

1. Structural loading and analysis
2. Structural steel design

### **STRUCTURAL MASONRY DESIGN IV MODULE I THEORY (SMDE411) (0806123060)**

Theory: 4 periods per week

Semester Mark: Two tests - 20% each

Examination: One four-hour paper - 60% (restricted open book)

### **SYLLABUS**

1. Design of unreinforced masonry structures
2. Design of reinforced masonry elements
3. Computer applications
4. Working details & drawings

### **STRUCTURAL MASONRY DESIGN IV MODULE 2 PROJECT (SMDE421) (0806123060)**

Project: 1 period per week

Semester Mark: One industry based project- 100%

### **SYLLABUS**

Students will be required to investigate and produce an appropriate industry related design project.

### **STRUCTURAL STEEL DESIGN IV MODULE 1 THEORY (SSDE411) (0806124060)**

Theory: 4 periods per week

Semester Mark: Two tests - 20% each

Examination: One four-hour paper - 60% (restricted open book)

### **SYLLABUS**

1. Design of structural steel structures
2. Computer applications
3. Working details & drawings

### **STRUCTURAL STEEL DESIGN IV MODULE 2 PROJECT (SSDE421) (0806124060)**

Project: 1 period per week

Semester Mark: One industry based project - 100%

### **SYLLABUS**

Students will be required to investigate and produce an appropriate industry related design project.

### **STRUCTURAL TIMBER DESIGN IV MODULE 1 THEORY (STDE411) (0806125060)**

Theory: 4 periods per week

Semester Mark: Two tests - 20% each

Examination: One four-hour paper - 60% (restricted open book)

### **SYLLABUS**

1. Design of timber structures
2. Computer applications
3. Working details & drawings

### **STRUCTURAL TIMBER DESIGN IV MODULE 2 PROJECT (STDE421) (0806125060)**

Project: 1 period per week

Semester Mark: One industry based project- 100%

### **SYLLABUS**

Students will be required to investigate and produce an appropriate industry related design project

### **SURVEYING III (SURV302) (082508103)**

Theory: 4 periods per week

Tutorial: 1 period per week

Practical: 6 periods per week

Semester Mark: Two tests - 12,50% each

Practical projects - 25% (sub-minimum of 12,50%, i.e. 50% of 25%, for practical component)

Examination: One three-hour paper - 50%

### **SYLLABUS**

- |                               |                           |
|-------------------------------|---------------------------|
| 1. Precise surveying          | 5. Construction Surveying |
| 2. Co-ordinate transformation | 6. Instruments            |
| 3. Vertical Alignment         | 7. Projects               |
| 4. Horizontal Alignment       |                           |

### **SURVEYING IV (SURV403) (0825078060)**

Theory: 5 periods per week

Semester Mark: Two tests - 10% each

Two projects - 10% each

Examination: One three-hour paper - 60%

### **SYLLABUS**

1. Instrumentation for precise surveying
2. Observation methods of precise surveying
3. Calculation methods of precise surveying

### **SURVEYING FOR CIVIL ENGINEERING IB (SRCV101) (16 Credits)**

Theory: 4 periods per week

Practical: 3 periods per week

Semester Mark:

Two tests - 15% each

Four Practical projects – 40%

One Control Test – 30%

Examination: No examination

### **SYLLABUS**

1. Basic principles of Surveying
2. Map Projections
3. Various methodologies involved in the determining of heights (including levelling of control points, Long sections and Cross sections).
4. Various methodologies involved in the determining of horizontal positions (including traversing, double polar and GPS works).
5. Detail Survey and vertical sections (gradients)
6. Setting out civil engineering structures
7. Areas and volumes

### **SURVEY DRAWING IB (SVDRI01) (12 Credits)**

Theory: 3 periods per week

Semester Mark: Two CAD projects - 25% each

One Control Test - 50%

Examination: No examination

## **SYLLABUS**

1. Introduction to basic CAD
2. Survey symbols
3. Survey Calculations
4. Digital terrain models (DTM) and Contouring
5. Hatching
6. Definition of CAD layers
7. Identification and manipulation of CAD elements
8. Survey Diagrams
9. General Plans
10. Detail Plan

## **SURVEY PROJECT IV (SVPR401)**

Theory: 5 periods per week

Semester Mark: Continuous assessment by means of industry related projects

Examination: No examination

## **SYLLABUS**

A number of industry orientated tasks must be completed by the student.

Based on a sound investigation a comprehensive report discussing the analysis and solution or completion of the task must be submitted.

## **SURVEY PRACTICE II -(EXSV201)**

Evaluation: Continuous evaluation by the University in collaboration with the supervisory officer

## **SYLLABUS**

At least one year of experiential training under the supervision of a qualified mentor in the following categories of Surveying work:

- |                              |                             |
|------------------------------|-----------------------------|
| 1. Levelling                 | 5. Computer data processing |
| 2. Traverse                  | 6. Detail surveying         |
| 3. Triangulation             | 7. Construction surveying   |
| 4. Trigonometrical levelling |                             |

Obtain a Code 8 Drivers License or higher

## **SURVEY PROJECT 3B (SVPJ301) (32 credits)**

Theory: 4 periods per week

Semester Mark : Continuous Assessment

5 Assignments - 11% each

1 Mini Dissertation – 40%

Skills Test – 5% (sub-minimum of 70% is required to pass)

Examination: No examination

## **SYLLABUS**

1. Introduction
2. Research Methodology
3. Computing for geomatics
4. Survey Drawing
5. Control Surveying
6. Engineering Survey

7. Cadastral Surveying
8. GIS

### **TECHNICAL LITERACY TCLT101 (8 Credits)**

Theory: 2 periods per week

Semester Mark: Test one – 30 %

Test two – 20 %

Report one – 30 %

Report two – 20 %

Examination: No examination

### **SYLLABUS**

1. Understanding the differences between language used in academic, technical and common environments
2. Experimental/Scientific method and design methods in technical report writing
3. Planning and documenting technical reports for experiments
4. Writing a Technical Report
5. Referencing practice using the Harvard method
6. Utilising spreadsheets and word processors for graphical presentation of information

### **THE GLOBAL ENVIRONMENT (GENV101) (8 credits)**

Theory: 2 periods per week

Semester Mark : Continuous Assessment

Two assignments – 30% each

One assignment – 40%

Examination : No examination

### **SYLLABUS**

1. Environmental Pollution (Air, water and soil)
2. Population growth vs. natural resources
3. Climate change and global warming
4. Sustainable development

### **THEORY OF ERRORS AND NETWORK ADJUSTMENT 3A (TENA301)**

(20 Credits)

Theory: 4 periods per week

Semester Mark: Two tests - 20% each

Examination: One three-hour paper - 60%

### **SYLLABUS**

1. Least squares theory
2. Simple and multiple regression
3. Distribution functions
4. Law of error propagation
5. Least squares adjustments of survey observations
6. Network adjustment

### **THEORY OF STRUCTURES IV MODULE I THEORY (TSTR412) (0806132060)**



Theory: 4 periods per week  
Semester Mark: Two tests - 20% each  
Examination: One three-hour paper - 60%

### **SYLLABUS**

1. Advanced structural theory & analysis
2. Applicable computer applications

### **THEORY OF STRUCTURES IV MODULE 2 PROJECT (TSTR422) (0806132060)**

Project: 1 period per week  
Semester Mark: One industry based project - 100%

### **SYLLABUS**

Students will be required to investigate and produce an appropriate industry related design project.

### **TOWN & REGIONAL PLANNING: LAYOUT & DESIGN 3A (TRLD301)**

(12 credits)

Theory: 3 periods per week  
Semester Mark: Two Tests - 12% each  
One Project – 16%  
Examination: One three hour paper - 60%

### **SYLLABUS**

1. An introduction to the nature of Town Planning.
2. Understanding of the sizes of lots for different types of residential development.
3. Locational distribution of different land use types.
4. A differentiated road hierarchy and appropriate road reserve cross-section.
5. Underlying Concepts and Principles.

### **TOWN PLANNING IV (TNPL401) (0211013060)**

Theory: 5 periods per week  
Semester Mark: Two tests - 12% each  
One project - 16%  
Examination: One three-hour paper - 60%

### **SYLLABUS**

1. Introduction
2. Land use
3. Township design
4. Planning law & procedures

### **TRAFFIC ENGINEERING IV MODULE I THEORY (TENG411) (0806126060)**

Theory: 4 periods per week  
Semester Mark: Two tests - 20% each  
Examination: One three-hour paper - 60%

### **SYLLABUS**

1. Traffic surveys
2. Traffic characteristics & flow theory
3. Traffic design

4. Traffic management & urban works
5. Traffic safety
6. Statistical methods
7. Parking studies, system & structures
8. TSM, TDM traffic impact studies
9. Traffic control & forms of signing
10. Interchange & intersection capacities

### **TRAFFIC ENGINEERING IV MODULE 2 PROJECT (TENG421) (0806126060)**

Project: 1 period per week

Semester Mark: One industry based project - 100%

#### **SYLLABUS**

Students will be required to investigate and produce an appropriate industry related design project.

### **TRANSPORT TECHNOLOGY 2A - (TRTA201) (12 Credits)**

Theory: 4 periods per week – 1 of which is in the computer room

Semester Mark: Two tests - 15% each

One assessment (software) – 10%

Examination: One three hour paper – 60%

#### **SYLLABUS**

1. Basic Traffic Engineering
2. Route Location
3. Design Considerations
4. Basic Rail Design
5. Earthworks Design
6. Computer Application

### **TRANSPORT TECHNOLOGY 2B (TRTB201) (12 Credits)**

Theory: 3 periods per week

Practical: 1 period per week

Semester Mark: 2 Tests – 15% each

Lab Practicals - 10 %

Examination: One three hour paper - 60%

#### **SYLLABUS**

1. Pavement materials and design
2. Compaction and Stabilization
3. Seal design
4. Pavement rehabilitation

### **TRANSPORT TECHNOLOGY 3A (TRTA301) (16 Credits)**

Theory: 4 periods per week

Semester Mark: 2 Tests – 20% each Test 2 (50% subminimum)

Examination: One three hour paper - 60%

***Graduate Attribute (GA) assessed in Test 2 : - GA 4 Investigations, Experiments & Data Analysis***

## **SYLLABUS**

1. Transport Planning
2. Transport Systems
3. Traffic Engineering

### **TRANSPORT TECHNOLOGY 3B - (TRTB301)** (12 Credits)

Theory: 3 periods per week

Semester Mark: Two tests - 20% each (Test 2 – 50% sub-minimum)

Examination: One three-hour paper - 60%

*Graduate Attribute (GA) assessed in Test 2: GA 1 Problem solving*

## **SYLLABUS**

1. Road Design Drainage
2. Route Location
3. Basic Design Considerations
4. Horizontal Alignment
5. Vertical Alignment
6. Cross Sectional Elements
7. Intersection Design
8. Interchange Design

### **TRANSPORTATION PLANNING IV MODULE 1 THEORY (TPLN411)** **(0806127060)**

Theory: 4 periods per week

Semester Mark: Two tests - 20% each

Examination: One three-hour paper - 60%

## **SYLLABUS**

- |  |                                  |
|--|----------------------------------|
| 1. Planning theory & techniques        | 6. Development control           |
| 2. Transport models                    | 7. Operation studies             |
| 3. Data collection                     | 8. Environmental route selection |
| 4. Evaluation                          | 9. Traffic impact assessment     |
| 5. Land use planning & characteristics |                                  |

### **TRANSPORTATION PLANNING IV MODULE 2 PROJECT (TPLN421)** **(0806127060)**

Project: 1 period per week

Semester Mark: One industry based project - 100%

## **SYLLABUS**

Students will be required to investigate and produce an appropriate industry related design project.

### **TRANSPORTATION TECHNOLOGY IV MODULE 1 THEORY (TPTE411)** **(0806128060)**

Theory: 4 periods per week

Semester Mark: Two tests - 20% each

Examination: One three-hour paper - 60%

## **SYLLABUS**

1. Transport policies
2. Transportation systems
3. Terminals
4. Public transport
5. Private transport
6. Freight transport
7. Vehicle & driver characteristics

## **TRANSPORTATION TECHNOLOGY IV MODULE 2 PROJECT (TPTE421) (0806128060)**

Project: 1 period per week

Semester Mark: One industry based project - 100%

## **SYLLABUS**

Students will be required to investigate and produce an appropriate industry related design project.

## **URBAN PLANNING & DESIGN IV MODULE 1 THEORY (UPDS411) (0211012060)**

Theory: 4 periods per week

Semester Mark: Two tests - 20% each

Examination: One three-hour paper - 60%

## **SYLLABUS**

1. Planning
  - 1.1 Historical perspective
  - 1.2 Modern trends
  - 1.3 Land use
  - 1.4 Legal procedure
  - 1.5 Urban infrastructure management, maintenance & finance
2. Design
  - 2.1 Structure
  - 2.2 Residential layouts
  - 2.3 Informal settlements
  - 2.4 Design project with emphasis on the engineering aspects of urban planning & design
3. Terminals
4. Public transport
5. Private transport
6. Freight transport
7. Vehicle & driver characteristics

## **URBAN PLANNING & DESIGN IV MODULE 2 PROJECT (UPDS421) (0211012060)**

Project: 1 period per week

Semester Mark: One industry based project - 100%

## **SYLLABUS**

Students will be required to investigate and produce an appropriate industry related design project.

## **WASTE WATER TREATMENT TECHNOLOGY IV MODULE 1 THEORY (WWTT412) (0806129060)**

Theory: 4 periods per week

Semester Mark: Two tests - 20% each

Examination: One three-hour paper - 60%

## **SYLLABUS**

1. Waste water properties
2. Treatment processes
3. Treatment plant design
4. Environmental aspects
5. Plant operation

## **WASTE WATER TREATMENT TECHNOLOGY IV MODULE 2 PROJECT (WWTT422) (0806129060)**

Project: 1 period per week

Semester Mark: One industry based project - 100%

## **SYLLABUS**

Students will be required to investigate and produce an appropriate industry related design project.

## **WATER/HYDRAULICS 2A (WHYD201) (12 Credits)**

Theory : 3 periods per week

Practical : 2 periods per week

Semester Mark : Two tests – 10% each;

Lab report / Assignment - 20%

Examination : One three-hour paper – 60%

## **SYLLABUS**

1. Introduction and Basic Concepts
2. Properties of Fluids
3. Hydrostatic principles
4. Hydrodynamic principles
5. Internal Flow (Pipe Flow)
6. Open channel flow
7. Flow Rate and Velocity Measurement

## **WATER/HYDROLOGY 2B (WHDL201) (12 Credits)**

Theory: 3 periods per week

Semester Mark: Two tests – 10% each

One Assignment/Report – 20%

Examination: One three-hour paper – 60%

## **SYLLABUS**

1. Hydrology principles and Hydrologic cycle
2. Statistics of Hydrological data
3. Precipitation
4. Abstractions from Precipitation
5. Infiltration
6. Surface Runoff
7. Hydrograph Analysis

## **WATER RETICULATION DESIGN 3A (WRTD301) (12 Credits)**

Theory: 3 periods per week

Semester Mark: One Test – 20%

One assignment – 20%

Examination: One three hour paper – 60%

### **SYLLABUS**

1. Hydraulic principles such as flow, water hammer, networks, Hardy- Cross and pipes not flowing full.
2. Design Principles such as the requirement for air valves, valves, pressure and flow regulation, manholes, overflows access points and scour valves.
3. Design storm water and foul water reticulation networks.
4. Ancillary works including anchors and ties, trust blocks, cathodic protection.
5. Calculate quantities and produce water reticulation network drawings

### **WATER TREATMENT TECHNOLOGY 3B (WTRM301)** (12 Credits)

Theory: 3 periods per week

Semester Mark: Two tests – 15% each

One Assignment/Report – 10%

Examination: One three-hour paper – 60%

**Graduate Attribute (GA) assessed: GA 7 Impact of Engineering Activity.**

### **SYLLABUS**

1. Physical, chemical and biological quality of water
2. Drinking water standards
3. Overview of water quality standards in South Africa
4. General overview of water treatment basic techniques: coagulation, flocculation, sedimentation, filtration and disinfection
5. Wastewater characteristics and standards

### **WATER TREATMENT TECHNOLOGY IV MODULE 1 THEORY (WTTC411)** **(0806130060)**

Theory: 4 periods per week

Semester Mark: Two tests - 20% each

Examination: One three-hour paper - 60%

### **SYLLABUS**

1. Water properties
2. Treatment processes
3. Treatment plant design
4. Water recycling, re-use, recovery & conservation
5. Environmental aspects
6. Plant operation & management

### **WATER TREATMENT TECHNOLOGY IV MODULE 2 PROJECT (WTTC421)** **(0806130060)**

Project: 1 period per week

Semester Mark: One industry based project - 100%

### **SYLLABUS**

Students will be required to investigate and produce an appropriate industry related design project.

Updated 31 October 2019 @ 13h30