

**FACULTIES OF THE  
UNIVERSITY OF PRETORIA**

HUMANITIES  
NATURAL AND AGRICULTURAL SCIENCES  
LAW  
THEOLOGY  
ECONOMIC AND MANAGEMENT SCIENCES  
VETERINARY SCIENCE  
EDUCATION  
HEALTH SCIENCES  
ENGINEERING, BUILT ENVIRONMENT AND INFORMATION TECHNOLOGY

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**FACULTY OF ENGINEERING, BUILT ENVIRONMENT  
AND INFORMATION TECHNOLOGY**

**PART I  
(this publication)**

**SCHOOL OF ENGINEERING**

- Industrial and Systems Engineering
- Chemical Engineering
- Electrical, Electronic and Computer Engineering
- Mechanical and Aeronautical Engineering
- Materials Science and Metallurgical Engineering
- Mining Engineering
- Civil Engineering

**GRADUATE SCHOOL OF TECHNOLOGY MANAGEMENT**

- Engineering and Technology Management

**PART II  
(separate publication)**

**SCHOOL FOR THE BUILT ENVIRONMENT**

- Architecture and Landscape Architecture
- Construction Economy
- Town and Regional Planning

**SCHOOL OF INFORMATION TECHNOLOGY**

- Informatics
- Information Science
- Computer Science



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<b>PERSONNEL OF THE SCHOOL OF ENGINEERING AS AT 31 AUGUST 2009</b>
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**General**

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Jones, E .....	Head: Student Administration
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**GENERAL INFORMATION**

*The information regarding degree programmes here published is subject to change and may be amended prior to the commencement of the academic year in 2010.*

**Admission**

Any person who wishes to register at the University for the first time, or after an interruption of studies, should apply or reapply for admission. Application for admission to all programmes closes on 30 September.

**Selection**

A selection procedure takes place prior to admission to any programme in the School of Engineering. Restrictions may be placed on the number of students admitted to the School and/or its departments. Postgraduate selection takes place as stipulated in the respective departmental rules.

**Statement of symbols**

When registering at this University for the first time, an undergraduate candidate must submit a statement of symbols obtained for subjects in the Grade 12 examination.

**National Senior Certificate**

All undergraduate candidates who enroll at the University of Pretoria for the first time, must show their original National Senior Certificate at the Student Administration of their faculty before the end of the first semester.

**Medium of instruction**

In conducting its business, the University uses two official languages, namely Afrikaans and English.

In formal education, the medium of instruction is either Afrikaans or English, or both of these languages, provided that there is a demand and that it is academically and economically justifiable. However, it remains the student's responsibility to ascertain on an annual basis in which language a module and any further level of that module is presented. In respect of administrative and other services, a student has the right to choose whether the University should communicate with him or her in Afrikaans or English.

**Bursaries and loans**

Particulars about bursaries and loans are available on request.

**Accommodation**

Applications for accommodation in university residences for a particular year may be submitted as from 1 March of the preceding year. Applications will be considered while vacancies exist, and prospective students are advised to apply well in advance. Please note that admission to the University does not automatically mean that lodging will also be available.

**Welcoming day and academic orientation week**

Details of the welcoming day to which all parents are cordially invited, and the subsequent orientation week during which all new first-year students **must** be present, are obtainable from the Dean of Students, University of Pretoria, Pretoria 0002.

### Prescribed books

Lists of prescribed books are not available. The lecturers will supply information regarding prescribed books to students at the commencement of lectures.

### Amendment of regulations and fees

The University retains the right to amend the regulations and to change tuition fees without prior notification.

NB The fees advertised and thus levied in respect of a module or study programme presentation represents a combination of the costs associated with the formal services rendered (for example lectures, practicals, access to laboratories, consumables used in laboratories, etc.) as well as associated overheads such as the provision of library and recreation facilities, security and cleaning services, electricity and water supply, etc. Therefore the fees in respect of a module or study programme presentation cannot simply be reconciled with the visible services that are rendered in respect of such module or study programme.

## SYSTEM OF TUITION

In 2001, the School of Engineering commenced with phasing in a new system of tuition, which corresponds with the required guidelines of SAQA (the South African Qualifications Authority) and the NQF (National Qualifications Framework), as well as with the accreditation requirements of ECSA (Engineering Council of South Africa). In this system, programmes are offered which are outcomes-based, student-centred and market-orientated. More information on this matter is given in the Glossary of Terms below, as well as in Regulation Eng. 13.

## GLOSSARY OF TERMS

**academic year:** The duration of the academic year which is determined by the University Council.

**admission regulation:** A regulation compiled by the dean concerning the admission of students to a specific School, which includes a provision regarding the selection process.

**credit** (or **credit value**): A value unit linked to learning activities, calculated in accordance with the SAQA norm of 1 **credit = 10 notional hours (learning hours)**. Credits are linked to modules and qualifications. In the School of Engineering modules normally carry credit values of 8 or 16 each, and typically a total of 640 credits is required for the Bachelor of Engineering degree.

**curriculum:** A series of modules which form a programme, grouped together over a specified period of time and in a certain sequence according to the regulations.

**ECSA:** Engineering Council of South Africa. This is a statutory council which is inter alia responsible for the registration of professional engineers and for the accreditation of the academic programmes for engineers at South African universities.

**examination mark:** The mark a student obtains for an examination in a module, including practical examinations where applicable.

**extended study programme:** A study programme for a degree or diploma that is completed over a longer period than the minimum duration of the particular degree or diploma.

**final mark:** The mark calculated on the basis of the semester/year mark and the examination mark a student obtains in a particular module according to a formula which is determined from time to time in the regulations for each module with the proviso that

should no semester/year mark be required in a module, the examination mark serves as the final mark.

**GS:** A combined (final) mark (semester/year mark and examination mark) of 40% - 49%.

**learning outcome:** The end product of a specified learning process, i.e. the learning result (specific skills) that one intends to achieve at the end of the learning process.

**level of a module:** The academic level (year) of a module which is indicated in the module code, which gives an indication of the complexity of the module.

**module:** An independent, defined learning unit, designed to result in a specific set of learning outcomes, and which is a component of a programme.

**module code:** Consists of an equal number of letters and digits, which indicate the name of the module, the year of study, the period of study and the level of the module.

**notional hours (learning hours):** The estimated number of hours students should spend to master the learning content of a particular module or programme. The total number of learning hours for a module consists of the time needed for lectures, tutorials and practicals (contact hours), as well as for self-study, examination preparation and any other activity required by the study programme. (**notional hours = credits x10**)

**NQF:** National Qualifications Framework. This is a national framework in which all SAQA-registered qualifications are listed, arranged on eight levels in accordance with the complexity of the qualification.

**programme:** This is a comprehensively planned, structured and coherent set of teaching and learning units (modules), designed to satisfy a specific set of outcomes at exit-level, which culminates in a student being awarded a particular qualification (diploma, degree).

**promotion:** Promotion means that for certain modules a student may be exempted from the final examination, provided that a student's semester or year mark for the module exceeds a certain predetermined minimum percentage (e.g. 75%).

**qualification:** In outcomes-based education, a qualification is a diploma or a degree which is obtained after attaining the learning outcomes as specified in a coherent learning programme, expressed as an accumulation of credits at specific levels.

**SAQA:** South African Qualifications Authority. This body has been established by law and has as its purpose the registration of qualifications, programmes and unit standards, in order to ensure that specific national and international criteria are achieved.

**semester/year mark:** The mark a student obtains during the course of a semester or a year for tests, class-work, practical work or any other work in a particular module as approved by regulation.

**student-centred learning:** Teaching and learning methodology which facilitates the student's own responsibility for the learning process. A prerequisite is that lectures, tutorials and practicals be adapted so that active participation by students is always achieved.

**syllabus:** Summary of the contents of a module.

**weighted average:** The weighted average is composed of the marks of the various modules, weighted with the credits of each module as a fraction of the total number of credits for the semester or year.

**DEGREES CONFERRED IN THE SCHOOL OF ENGINEERING AND GRADUATE  
SCHOOL OF TECHNOLOGY MANAGEMENT**

The following degree is awarded in the School of Engineering (minimum duration in brackets):

- (a) **Bachelor's degree:**  
(i) Bachelor of Engineering – [BEng] (four years)

The following degrees are awarded in the School of Engineering and the Graduate School of Technology Management (minimum duration in brackets):

- (a) **Honours degrees:** (one year)  
(i) Bachelor of Engineering Honours – [BEngHons]  
(ii) Bachelor of Science Honours – [BScHons]
- (b) **Master's degrees:** (one year)  
(i) Master of Engineering – [MEng]  
(ii) Master of Science – [MSc]
- (c) **Doctorates:** (one year)  
(i) Doctor of Philosophy– [PhD]  
(ii) Doctor of Philosophy in Engineering – [PhD (Engineering)]  
(iii) Doctor of Engineering – [DEng]

**Regulations for the degree: Bachelor of Engineering [BEng]**

**Eng. 1**

**Admission to degree study**

General Regulations G.1 to G.15 are applicable to all bachelor's degrees. Where the General Regulations have vested authority in the Faculty to determine its own provisions, these provisions appear in this publication.

**General**

To register for a first bachelor's degree at the University, a candidate must, in addition to the required National Senior Certificate with admission for degree purposes, comply with the specific admission requirements for particular programmes and fields of study as prescribed in the admission regulations and the regulations of the departments. Applicants are notified in writing of provisional admission. Admission to the School of Engineering is based on the final grade 12 examination results.

- (a) The following persons may also be considered for admission:
- (i) A candidate who is in possession of a certificate which is deemed by the University to be equivalent to the required National Senior Certificate with admission for degree purposes.
  - (ii) A candidate who is a graduate from another tertiary institution or has been granted the status of a graduate of such an institution.
  - (iii) A candidate who passes an entrance examination, which is prescribed by the University from time to time.

Abovementioned candidates are requested to contact the faculty for more information regarding admission requirements.

**Note:** A conditional exemption certificate does not grant admission to bachelor's study. However, in certain circumstances some of the faculties do accept a



conditional exemption on the basis of mature age and prior knowledge. Candidates are advised to contact the specific faculty administration in this regard.

- (b) The Senate may limit the number of students allowed to register for a programme, in which case the Dean concerned may, at his discretion, select from the students who qualify for admission those who may be admitted.
- (c) Subject to faculty regulations and the stipulations of General Regulations G.1.3 and G.62, a candidate will only be admitted to postgraduate studies, if he or she is already in possession of a recognised bachelor's degree.

### Academic literacy

It is expected of all new undergraduate students who wish to study at the University to sit for an academic literacy test. Certain modules which address shortcomings in this respect, are included in the undergraduate curriculum, as indicated in Eng. 15.1 and 15.2. In addition, modules which have the purpose of developing specific language and communication skills in the context of the requirements of the engineering profession are also included in the curriculum.

### Computer and information literacy

The first-year engineering programme includes Information technology modules comprising basic computer and information literacy which are compulsory for all students. Students who are of the opinion that they already have these skills, may take an exemption test for CIL 111.

### Admission requirements for candidates with a National Senior Certificate (NSC)

To be able to gain access to the faculty and specific programmes prospective students require the appropriate combinations of recognised NSC subjects as well as certain levels of achievement in the said subjects. In this regard the determination of an admission point score (APS) is explained and a summary of the faculty specific requirements, i.e. the APS per programme and the specific subjects required per programme is provided.

### Determination of an Admission Point Score (APS)

The calculation is simple and based on a candidate's achievement in six 20-credit recognised subjects by using the NSC ratings, that is the "1 to 7 scale of achievement". Thus, the highest APS that can be achieved is 42.

**Life Orientation** is excluded from the calculation determining the APS required for admission.

Rating code	Rating	Marks %
7	Outstanding achievement	80-100%
6	Meritorious achievement	70-79%
5	Substantial achievement	60-69%
4	Adequate achievement	50-59%
3	Moderate achievement	40-49%
2	Elementary achievement	30-39%
1	Not achieved	0-29%

Preliminary admission is based on the results obtained in the final Grade 11 examination. Final admission is based on Grade 12 results. Please note: The final Grade 12 results will be the determining factor with regard to admission.

### Alternative admission channels:

Candidates with an APS lower than required could be considered for admission to the

faculty if they meet the additional assessment criteria specified by the faculty from time to time. Preference will, however, be given to students who comply with the regular admission requirements of the faculty.

### Specific requirements for the Faculty of Engineering, Built Environment and Information Technology

1. A valid National Senior Certificate with admission for degree purposes.
2. Minimum subject and level requirements

School of Engineering – minimum requirements						
Degree	APS	Group A			Group B	
		Two Languages	Mathematics	Life Orientation	Physical Science	2 Other subjects
Engineering (4-year programme)	30	Comply with NSC minimum requirements; ADDITIONALLY one of these languages must be Afrikaans OR English at level 5 (60-69%).	6 (70-79%)	4 (50-59%) (Excluded when calculating the APS)	5 (60-69%)	Any two subjects
Engineering (5-year programme) Compulsory Admissions Test	24	Comply with NSC minimum requirements; ADDITIONALLY one of these languages must be Afrikaans OR English at level 4 (50-59%).	5 (60-69%)	4 (50-59%) (Excluded when calculating the APS)	4 (50-59%)	Any two subjects

### Eng. 2

#### (a) Registration for a specific year

A student registers for all the modules he or she intends taking in that specific year (first and second-semester modules and year modules) at the beginning of an academic year. Changes to a curriculum at the beginning of the second semester may be made only with the approval of the Dean.

#### (b) Module credits for unregistered students

There are students who attend lectures, write tests and examinations and in this manner earn "marks", but have neither registered for modules nor registered as students. These marks will not be communicated to any student before he/she has provided proof of enrolment. A student cannot obtain any credits in a specific academic year for a module "passed" in this manner during a previous academic year and for which he/she was not registered. This arrangement applies even where the student is prepared to pay the tuition fees.

**Eng. 3****Examinations****(a) Examinations and projects**

- (i) An examination in a module may be written and/or oral. Projects are prepared and examined as stipulated in the study guide of the module, in accordance with the regulations and procedures as described in (c) below.
- (ii) The examinations for modules of the first semester are held in May/June, while all other examinations (second-semester modules and year modules) are held in October/November.

**(b) Examination admission**

A student must obtain a minimum semester/year mark of at least 40% to gain examination admission to a module, with the exception of first-year modules at first-semester level where at least 30% is required. In addition, all other examination requirements as applicable to the specific module, must be satisfied.

**(c) Pass requirements**

Refer also to General Regulations G.11.1(a) and G.12.2.2

- (i) In order to pass a module a student must obtain an examination mark of at least 40% and a final mark of at least 50%. A student passes a module with distinction if a final mark of at least 75% is obtained. The final mark is compiled from the semester/year mark and the examination mark. Border cases (e.g. a mark of 49% or 74%) must be reconsidered by both the internal and external examiners, for determination of the possible merit of an upward adjustment of the mark. Marks may not be adjusted downwards, except when obvious marking and adding errors were detected. The pass mark is a minimum final mark of 50% and a student fails the module if a lower mark (e.g. 49%) was obtained.
- (ii) Calculation of the final mark: The semester/year mark must account for no less than 40% and no more than 60% of the final mark, with the exception of modules like design and research projects and essays, as well as in modules where the development of general skills is the primary learning activity, where appropriate alternative norms are determined by individual schools or departments. The specific details and/or formula for the calculation of the final mark are given in the study guide of each module. Also, a schedule listing this information for all the modules presented in each school will be compiled, for approval by the Dean.
- (iii) Calculation of the semester/year mark. The semester/year mark is compiled from formative assessment of learning activities such as assignments, presentations, practicals and group projects, as well as from class tests and semester tests. For each module the specific formula for the calculation of the semester/year mark is determined by the lecturer(s) responsible for the presentation of the module and the details are given in the study guide of the module. Also, a schedule listing this information for all the modules presented in each school will be compiled, for approval by the Dean. Refer also to General Regulation G.11.1(b).
- (iv) In some modules specific requirements in respect of certain components of the semester/year mark may be set, in order for a student to pass the module (for example that satisfactory performance in and attendance of practical classes are required). Thus, even if a pass mark is obtained in the module, a pass is not granted unless these requirements are met. For such modules these specific requirements are given in the study guide of the

- module. Also, a schedule listing this information for all such modules presented in each school will be compiled, for approval by the Dean.
- (v) A student must comply with the subminimum requirements in subdivisions of certain modules. For such modules these specific requirements are given in the study guide of the module. Also, a schedule listing this information for all such modules presented in each school will be compiled, for approval by the Dean.
  - (vi) General Regulation G.10.3 is normally not applied by the School of Engineering and no promotion (exemption from the examination) is allowed in any module, except in special cases where permission of the Dean is required.
- (d) **Ancillary examinations**  
Refer to General Regulation G.12.3
- (e) **Supplementary examinations**  
Refer to General Regulation G.12.3  
In the School of Engineering a supplementary examination is only granted in instances where:
- (i) A final mark of between 45% and 49% was achieved;
  - (ii) A final mark of between 40% and 44% was achieved and where the candidate also achieved either a semester mark or an examination mark of 50% or higher;
  - (iii) A pass mark has been obtained, but the required subminimum in the examination section of the module or divisions thereof has not been obtained.
  - (iv) A final mark of between 40% and 49% has been obtained in first-year modules on 100 level.
- Calculation of the final supplementary examination mark:
- (1) The semester mark is retained and the final mark is calculated as the weighted average of the supplementary examination mark and the semester mark, in accordance with the formula as published in the study manual of the specific module, with the proviso that the maximum final mark awarded may be no more than 50%. The only exception to this rule is in the case of first-year modules on first-semester level, where the semester mark is not considered, and where the supplementary examination mark is taken as the final mark, with the proviso that the maximum final mark awarded may be no more than 50%.
  - (2) All other pass requirements, as published in the study manual of each specific module, remain so and are applicable during the determination of the final result of a supplementary examination in the module.
- Special supplementary examinations will not be arranged for students who were not able to write the supplementary examinations during scheduled times, as given in the examinations timetable.
- (f) **Special examinations (including the aegrotat)**  
Refer to General Regulation G.12.5
- (g) **Other special examinations**  
Refer also to General Regulation G.12.6
- (i) The Dean may, at the recommendation of the Head of the Department concerned, grant a special examination in a module to a student who wrote the examination and failed that module in the final year of study, and consequently does not comply with degree requirements. A student may be

- granted at most two such special examinations. No other special examinations are granted in the School of Engineering.
- (ii) A student should apply in writing to the Dean to be considered for such special examination(s). The Head of the Department decides when a special examination will take place and may prescribe work to be completed satisfactorily before a student may sit for such an examination.
  - (iii) During calculation of the final mark the semester mark is retained and the final mark is calculated as the weighted average of the special examination mark and the semester mark, in accordance with the formula as published in the study manual of the specific module, with the proviso that the maximum final mark awarded may be no more than 50%.
- (h) **Re-marking of examination scripts**  
Refer to General Regulation G.14
- (i) **Duration of examinations in undergraduate modules**  
The duration of an examination in an 8-credit module will not exceed 90 minutes and in a 16-credit module will not exceed 180 minutes, except where special approval is granted by the Dean to exceed these limits.  
The duration of a supplementary examination or a special examination in all undergraduate modules will not exceed 90 minutes, except where special approval is granted by the Dean to exceed this limit. In the event of an aegrotat, the duration of the examination can be extended to a maximum period of 180 minutes, depending on an arrangement made between the lecturer and the student.

**Eng. 4****Renewal of registration**

Should a student who is repeating a year of study, with the exception of first-year students, fail to obtain sufficient credits to be promoted to the subsequent year of study at the end of the year of repetition, he or she will forfeit his or her right to readmission. Students who forfeit the right to readmission, may apply in writing to the Admissions Committee for readmission to the Faculty. Provisions regarding promotion, including provisions for first-year students, appear in the regulations of the relevant fields of study.

**Eng. 5**

*Regulation no longer in use.*

**Eng. 6****Modules from other faculties**

A student who follows a module presented by another school or faculty must familiarise himself or herself with the admission requirements of the specific module, the subminima in examination papers, time of supplementary examinations, etc.

**Eng. 7****Change of field of study**

Transfer from one field of study to another may only take place with the Dean's approval, after consultation with the relevant head of department.

**Eng. 8****Minimum study period**

The minimum period of study for the degree is four years of full-time study.

### Eng. 9

#### First-aid certificate

As from 2004 the First-aid certificate is no longer a requirement for the BEng degree.

### Eng. 10

#### Exposure to the practice of engineering

Engineering students are exposed in three ways to the practice of engineering during the course of their studies:

- (a) Workshop practice – a module comprising a period at the end of the first year of study during which students are trained in workshop practice. Students in electrical, electronic and computer engineering attend the measurement techniques and computer modelling module.
- (b) Practical training – specific periods of work at firms during which experience is gained in the practice of engineering. Students may deviate from this stipulation only with the permission of the Dean.
- (c) Excursions – study excursions arranged for students to visit various engineering firms and installations in order to obtain insight into the industry. This training is compulsory. Details of the modules regarding these aspects of training are explained in the sections of this publication which deal with the curricula and syllabi of the various programmes.

### Eng. 11

#### Registration of modules

- (a) Final cut-off dates are set for the change of modules (removing or adding) for each academic year. These dates are available from the Student Administration offices.
- (b) **A student may not register for a module of a subsequent year if a timetable clash occurs with a module of a previous year which has not yet been passed and which is prescribed for his or her field of study, unless exemption is obtained from class attendance in the module of the previous year.**
- (c) Should a student register for modules of the second semester at the beginning of a year of study, and it becomes evident at the end of the first semester, that he or she does not comply with the prerequisites of the second-semester modules, the registration of such modules will be cancelled. It is also the student's responsibility to ensure at the beginning of the second semester that the cancellation has been brought about.

### Eng. 12

#### 12.1 Degree classification

##### (a) **Pass with distinction:**

A student graduates with distinction if:

- (i) no module of the third or fourth year of study was repeated and a weighted average of at least 75% was obtained in one year in all the modules of the final year of study; and
- (ii) the degree programme was completed within the prescribed four years.

##### (b) **\*First-class pass**

A student obtains a first-class pass if no modules of the fourth year were repeated and a weighted average of at least 60% was obtained in one year in all the modules of the fourth year.

##### (c) **\*Second-class pass**

A student obtains a second-class pass if no modules of the fourth year were repeated.

**(d) \*Third-class pass**

A student obtains a third-class pass if some modules of the fourth year of study had to be repeated.

**(e) Exceptions**

Exceptional cases to any of these classifications will be considered by the Dean.

\* Instituted in order to comply with standards set by various international accreditation bodies. *Pass with Distinction* and *First-Class Pass* are indicated on the degree certificate. Degree classifications are also indicated on the candidate's academic record on request.

**12.2 Dean's Merit List**

The Dean's Merit List will be published annually on the website of the Faculty and will contain the names of the students whose academic performance over the year has been excellent and deserves recognition. Letters of commendation will be sent to students who qualify for inclusion on the Dean's Merit List.

To be eligible for inclusion in the Dean's Merit List, a student must pass all the modules as prescribed in the curriculum of a specific year of study as published in the Regulations, Part I, University of Pretoria, 2010. A student registered for the first, second or third year of the four-year programme must obtain a minimum weighted average of 75% and a student registered on the first, second, third or fourth year of the five year programme must obtain a minimum weighted average of 75%.

**Curricula for the BEng programmes**
**Eng. 13****Fields of study, learning outcomes and learning contents**

The Bachelor of Engineering degree may be obtained in the following fields of study:

- (a) Chemical Engineering (12130021)
- (b) Civil Engineering (12130081)
- (c) Computer Engineering (12130101)
- (d) Electrical Engineering (12130031)
- (e) Electronic Engineering (12130091)
- (f) Industrial Engineering (12130011)
- (g) Mechanical Engineering (12130051)
- (h) Metallurgical Engineering (12130061)
- (i) Mining Engineering (12130071)

All aforementioned fields of study of the BEng degree have been accredited by the **Engineering Council of South Africa** (ECSA), and comply with the academic requirements for registration as a professional engineer. All the undergraduate programmes were recently restructured and the new programme for the first year of study was phased in in 2008 and the second year has been phased in since 2009. The new third year will be phased in from 2010. The new programmes are designed in accordance with the outcomes-based model as required by the **South African Qualifications Authority** (SAQA). The learning outcomes and contents of the programmes have been compiled in accordance with the latest accreditation standards (PE-60 and PE-61) of ECSA, which also comply with the SAQA requirements, and which are summarised as follows:

*Learning outcomes* of the BEng degree:

A graduate in engineering should be able to apply the following skills on an advanced level:

- (a) Engineering problem solving.
- (b) Application of specialist and fundamental knowledge, with specific reference to mathematics, basic sciences and engineering sciences.
- (c) Engineering design and synthesis.
- (d) Investigation, experimentation and data analysis.
- (e) Engineering methods, skills, tools and information technology.
- (f) Professional and general communication.
- (g) Awareness and knowledge of the impact of engineering activity on society and the physical environment.
- (h) Work in teams and in multidisciplinary environments.
- (i) An awareness and ability for lifelong learning.
- (j) An awareness and knowledge of principles of professional ethics and practice.

*Learning contents* of the BEng programmes:

Six essential knowledge areas are included in the syllabi of the programmes. The **typical** representation of each knowledge area as a percentage of the total contents of an undergraduate programme is given in brackets ( ) in the list below. This percentage varies for the different study directions, but conforms in all instances to the minimum knowledge area content as stipulated by ECSA.

Knowledge areas:

- (a) Mathematics, including numerical methods and statistics (13%)
- (b) Basic sciences: the natural sciences essential to the programme (15%)
- (c) Engineering sciences (40%)
- (d) Engineering design and synthesis (16%)
- (e) Computing and information technology (5%)
- (f) Complementary studies: communication, economy, management, innovation, environmental impact, ethics, engineering practice (11%).

**Eng. 14**

**Module information**

With a few exceptions, most modules offered at the School of Engineering are **semester modules** having credit values of either 8 or 16.

A student may be permitted by the Dean, on recommendation of the relevant head of the department, to register for an equivalent module in an alternate semester, although the module is normally offered to the student's group in another semester, and providing that no timetable clashes occur.

The curriculum of each programme is given in Regulations Eng. 15.1 and 15.2 in this publication, in which the information of **each module** is given, as per the following example:

<b>Module</b>	<b>Credits</b>	<b>Prerequisites</b>
XYZ 163    Mathematics 163	16	XYZ 151
<p>(a) <b>XYZ 163 :</b>    Module code  <b>XYZ :</b>            A letter code of which the first letter identifies the department/  division which offers the relevant module(s), as indicated in the  table below:</p>		



Letter	Department
B	School of Engineering: Industrial and Systems Engineering
C	Chemical Engineering
E	Electrical, Electronic and Computer Engineering
M	Mechanical and Aeronautical Engineering
N	Materials Science and Metallurgical Engineering
P	Mining Engineering
S	Civil Engineering
I	Graduate School of Technology Management: Engineering and Technology Management

**163** : Numerical code of which the first digit indicates the level of the module (year of study during which the module is normally presented).

- (b) **Mathematics 163** : Name of the module, as well as three digits which are similar to the numeric part of the module code.
- (c) **16** : Number of credits allocated to the module. This is the value or the "weight" of the module, as estimated in accordance with the SAQA norm of **1 credit = 10 notional hours**. For example, for a module with a credit value of 16 the average student should devote approximately 160 hours (10 hours per week) in order to be able to achieve the set learning outcomes of the module (contact time, own study time and examination preparation time are all included). Lecturers are obliged to ensure that this is a fair time estimate when setting the workload of the module.
- (d) **XYZ 151** : Prerequisite. Before a student is admitted to a module (XYZ 163), he or she must pass the prerequisite module(s) (XYZ 151), unless one of the following indications is used:

		Minimum requirement
( )	Code in brackets: (XYZ 151)	Examination admission
<b>GS</b>	Code followed by GS: XYZ 151 GS	Average of 40% - 49%
<b>#</b>	Code followed by #: XYZ 151#	Concurrent registration

Deviations from these requirements may be permitted only with the approval of the Dean, after consultation with the relevant head(s) of department(s).

## Eng. 15 Curricula

### Eng. 15.1 Four-year Programmes

#### Please note:

The requirements for promotion from the one year of study to the next are given in **Eng. 16**, **Eng. 17** and **Eng. 18**.

#### Faculty requirement

Module		Credits	Prerequisites
JCP 203	Community-based project 203	8	

#### Notes

Students who register for the first year from 2005 will be required to successfully complete the above module as part of the requirements for the BEng degree. A student may register for the module during any of the years of study of the programme, but preferably not during the first or the final year of study.

**(a) Chemical Engineering****First year of study****First semester**

<b>Module</b>		<b>Credits</b>	<b>Prerequisites</b>
MGC 110	Graphical communication 110	16	
WTW 158	Calculus 158	16	
FSK 116	Physics 116	16	
CHM 171	General chemistry 171	16	
CIR 113	Chemical engineering 113	8	
CIL 111	Computer literacy 111	4	
SNV 111	Innovation 111	4	
	<b>Total</b>	<b>80</b>	

**Second semester**

WTW 168	Calculus 168	8	WTW 158 GS
WTW 161	Linear algebra 161	8	
EBN 122	Electricity and electronics 122	16	
SWK 122	Mechanics 122	16	WTW 158
CHM 181	General chemistry 181	16	CHM 171
CIR 123	Chemical engineering 123	8	CHM 171, CIR113
CIL 121	Information literacy 121	4	
SNV 121	Innovation 121	4	SNV 111
	<b>Total</b>	<b>80</b>	

**Recess training**

WWP 121	Workshop practice 121	6	
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**Notes**

- (i) Students may be promoted in Graphical communication 110, if a semester test mark and a practicum mark of at least 65% each is obtained.
- (ii) Students who failed the Academic Literacy Test must register for the module **JNV 100 (Innovation 100)**, which must be taken instead of the modules SNV 111 and SNV 121 (Innovation 111 and 121).

**Second year of study****First semester**

<b>Module</b>		<b>Credits</b>	<b>Prerequisites</b>
WTW 258	Calculus 258	8	WTW 158,168
WTW 256	Differential equations 256	8	WTW 158, WTW 161,168
CHM 215	Chemistry 215	16	CHM 171/172, 181
SWK 210	Strength of materials 210	16	SWK 122, WTW 168#
CIR 211	Chemical engineering 211	8	CIR 123, WTW 256#
MPR 212	Programming and data processing 212	16	CIL 111, 121
JSQ 216	Communication skills 216	8	
JCP 203	Community-based project 203	8	
	<b>Total</b>	<b>88</b>	

**Second semester**

WTW 238	Mathematics 238	16	WTW 258GS, 256
WTW 263	Numerical methods 263	8	WTW 161,168
CHM 226	Chemistry 226	8	CHM 171/172, 181
EIR 221	Electrical engineering 221	16	EBN 111/122, WTW 161
CTD 223	Thermodynamics 223	16	(CIR 211), MPR 212
BES 220	Engineering statistics 220	8	
	<b>Total</b>	<b>72</b>	

**Third year of study****First semester**

<b>Module</b>		<b>Credits</b>	<b>Prerequisites</b>
BIE 310	Engineering economics 310	8	
COP 311	Transfer processes 311	16	CIO 310#
CIO 310	Chemical engineering design 310	16	(CTD 223)
CBI 311	Biotechnology 311	16	(CHM 215), (CIR 211)
CIR 310	Chemical engineering 310	16	(CTD 223)
	<b>Total</b>	<b>72</b>	

**Second semester**

IPB 320	Project management 320	8	
CPN 321	Process dynamics 321	16	(CTD 223), (MPR 212)
CKN 321	Kinetics 321	16	(CTD 223)
CLB 321	Laboratory 321	16	JSQ 216, CPN 321#, CKN 321#, CMO320#, (CIO 310)
CMO 320	Mass transfer 320	16	(CIR 310)
	<b>Total</b>	<b>72</b>	

**Recess training**

CPY 311	Practical training 311	16	(JSQ 216), (CIR 211)
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**Fourth year of study****First semester**

<b>Module</b>		<b>Credits</b>	<b>Prerequisites</b>
CIR 412	Chemical engineering 412	16	(COP 311)
CPS 410	Process synthesis 410	16	CLB 321
CPB 410	Process control 410	16	(CPD 320)
CRO 410	Reactor design 410	16	(CKN 320)
CSC 411	Research project 411	16	CLB 321, CPB 410#, CRO 410#
	<b>Total</b>	<b>80</b>	

**Second semester**

CPJ 421	Design project 421	32	(CPB 410), (CRO 410); CPR 420#
CPR 420	Practice 420	16	
CSC 421	Research project 421	16	(CSC 411)
CSS 420	Specialisation 420	16	
	<b>Total</b>	<b>80</b>	

**Recess training**

CPY 411	Practical training 411	16	(CIO 310); CPY 311
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**(b) Civil Engineering****First year of study****First semester**

<b>Module</b>		<b>Credits</b>	<b>Prerequisites</b>
MGC 110	Graphical communication 110	16	
WTW 158	Calculus 158	16	
NMC 113	Materials science 113	16	
CHM 171	General chemistry 171	16	
CIL 111	Computer literacy 111	4	
SNV 111	Innovation 111	4	
	<b>Total</b>	<b>72</b>	

**Second semester**

WTW 168	Calculus 168	8	WTW 158 GS
WTW 161	Linear algebra 161	8	
FSK 176	Physics 176	16	
EBN 122	Electricity and electronics 122	16	
SWK 122	Mechanics 122	16	WTW 158
CIL 121	Information literacy 121	4	
SNV 121	Innovation 121	4	SNV 111
	<b>Total</b>	<b>72</b>	

**Recess training**

SWP 121	Workshop practice 121	6	
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**Notes**

- (i) Students may be promoted in Graphical communication 110, if a semester test mark and a practicum mark of at least 65% each is obtained.
- (ii) Students who failed the Academic Literacy Test must register for the module **JNV 100 (Innovation 100)**, which must be taken instead of the modules SNV 111 and SNV 121 (Innovation 111 and 121).

**Second year of study****First semester**

<b>Module</b>		<b>Credits</b>	<b>Prerequisites</b>
WTW 258	Calculus 258	8	WTW 158,168
WTW 256	Differential equations 256	8	WTW 158, WTW 161,168
SWK 210	Strength of materials 210	16	SWK 122, WTW 168#
SGM 210	Geomaterials and processes 210	16	
SUR 210	Surveying 210	16	
JSQ 216	Communication skills 216	8	
JCP 203	Community-based project 203	8	
	<b>Total</b>	<b>80</b>	

**Second semester**

WTW 238	Mathematics 238	16	WTW 258GS, 256
WTW 263	Numerical methods 263	8	WTW 161,168
BES 220	Engineering statistics 220	8	
SIN 223	Structural analysis 223	16	WTW 161,168, SWK 210
SGM 221	Pavement materials and design 221	16	SGM 210 GS
SBZ 221	Civil engineering measurement techniques 221	8	
	<b>Total</b>	<b>72</b>	

**Third year of study****First semester**

<b>Module</b>		<b>Credits</b>	<b>Prerequisites</b>
BIE 310	Engineering economics 310	8	
SHC 310	Hydraulics 310	16	
SIB 310	Timber design 310	8	SIN 223GS
SIN 311	Structural analysis 311	8	SIN 223
SGM 311	Soil mechanics 311	16	
MPR 212	Programming and data processing 212	16	CIL 111, 121
	<b>Total</b>	<b>72</b>	

**Second semester**

SHC 321	Hydraulics 321	16	(SHC 310)
SGM 323	Geotechnical engineering 323	16	(SGM 311)
SIN 323	Steel design 323	8	SIN 311GS
SIN 324	Reinforced concrete design 324	8	SIN 311GS
SVC 323	Transportation engineering 323	16	
SBM 321	Civil building materials 321	16	
	<b>Total</b>	<b>80</b>	

**Fourth year of study****First semester**

<b>Module</b>		<b>Credits</b>	<b>Prerequisites</b>
SHC 410	Hydraulics 410	16	SHC 310, 320
SSC 411	Research project 411	32	Finalists only
SIN 411	Steel design 411	8	SIN 323
SIN 413	Reinforced concrete design 413	8	SIN 324
SVC 411	Transportation planning 411	8	TRP 311
BPE 451	Professional ethics and practice 451	8	
	<b>Total</b>	<b>80</b>	

**Second semester**

SEV 421	Environmental geotechnology 421	16	
SBZ 420	Civil engineering construction management 420	16	(SHC 410), (SIN 411), (SIN 413), (SGM 323), (SVC 411)
SDC 420	Design concept 420	8	(SHC 410), (SIN 411), (SIN 413), (SGM 323), (SVC 411)

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SDO 420	Detailed design 420	24	(SHC 410), (SIN 411), (SIN 413), (SGM 323), (SVC 411)
SPV 420	Public presentation 420	8	(SHC 410), (SIN 411), (SIN 413), (SGM 323), (SVC 411)
	<b>Total</b>	<b>72</b>	
<b>Recess training</b>			
SPY 410	Practical training 410	16	

### (c) Computer Engineering

#### First year of study

##### First semester

Module		Credits	Prerequisites
WST 111	Mathematical statistics 111	16	
WTW 158	Calculus 158	16	
EBN 111	Electricity and electronics 111	16	
COS 131	Introduction to programming 131	16	
CIL 111	Computer literacy 111	4	
SNV 111	Innovation 111	4	
	<b>Total</b>	<b>72</b>	

##### Second semester

WTW 168	Calculus 168	8	WTW 158 GS
WTW 161	Linear algebra 161	8	
FSK 176	Physics 176	16	
ERA 284	Computer architecture 284	16	COS 130GS/COS 131GS/COS 132GS
COS 110	Program design: Introduction 110	16	COS 130GS/COS 131GS/COS 132GS
CIL 121	Information literacy 121	4	
SNV 121	Innovation 121	4	SNV 111
	<b>Total</b>	<b>72</b>	

##### Recess training

EMR 100	Measurement technique and computer modelling 100	4	(CIL 111), (EBN 111)
EIW 121	Information technology practice 121	8	

#### Note

Students who failed the Academic Literacy Test must register for the module **JNV 100 (Innovation 100)**, which must be taken instead of the modules SNV 111 and SNV 121 (Innovation 111 and 121).

**Second year of study****First semester**

<b>Module</b>		<b>Credits</b>	<b>Prerequisites</b>
WTW 258	Calculus 258	8	WTW 158,168
WTW 256	Differential equations 256	8	WTW 158, WTW 161,168
COS 212	Data structures and algorithms 212	16	COS 131/COS 110
EIR 211	Electrical engineering 211	16	EBN 111/122, WTW 161 COS 131/COS 110
COS 216	Netcentric computer systems 216	16	
JSQ 216	Communication skills 216	8	
JCP 203	Community-based project 203	8	
<b>Total</b>		<b>80</b>	

**Second semester**

WTW 238	Mathematics 238	16	WTW 258GS, 256
WTW 263	Numerical methods 263	8	WTW 161,168
ELI 220	Linear systems 220	16	EIR 211
ERS 220	Digital systems 220	16	
COS 222	Operating systems 222	16	COS 130/COS 131/COS 132
<b>Total</b>		<b>72</b>	

**Recess training**

EIW 221	Information technology practice 221	8	
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**Third year of study****First semester**

<b>Module</b>		<b>Credits</b>	<b>Prerequisites</b>
BIE 310	Engineering economics 310	8	
EME 310	Electromagnetic compatibility 310	16	
EMK 310	Microprocessors 310	16	ERS 220GS
ENE 310	Analogue electronics 310	16	EIR 211/221GS
EDC 310	Digital communication 310	16	ELI 220GS
<b>Total</b>		<b>72</b>	

**Second semester**

IPB 320	Project management 320	8	
ERD 320	Computer engineering design 320	16	EMK 310GS
EBB 320	Control systems 320	16	ELI 220GS
EAI 320	Intelligent systems 320	16	WTW 258
EPE 321	Software engineering 321	16	COS 212
<b>Total</b>		<b>72</b>	

**Recess training**

EIW 320	Information technology practice 320	8	EIW 221
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**Fourth year of study****First semester**

<b>Module</b>		<b>Credits</b>	<b>Prerequisites</b>
EPR 402	Project 402	16	All prescribed 3 <sup>rd</sup> year modules passed

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BPE 451	Professional ethics and practice 451	8	
ESP 411	DSP: programming and application 411	16	ESC 320GS or ESF 320GS EMK 310GS
EAS 410	Computer engineering: architecture and systems 410	16	
EHN 410	E-business and network security 410	16	ERN 310 GS
	<b>Total</b>	72	
<b>Second semester</b>			
EPR 402	Project 402	48	All prescribed 3 <sup>rd</sup> year modules passed
EES 421	Specialisation for computer engineers 421	16	
BIE 320	Engineering economics 320	8	
COM 420	Environmental management 420	8	
	<b>Total</b>	80	
<b>Recess training</b>			
EPY 421	Practical training 421	12	

### (d) Electrical Engineering

#### First year of study

##### First semester

Module		Credits	Prerequisites
NMC 113	Materials science 113	16	
CHM 171	General chemistry 171	16	
WTW 158	Calculus 158	16	
MGC 110	Graphical communication 110	16	
CIL 111	Computer literacy 111	4	
SNV 111	Innovation 111	4	
	<b>Total</b>	72	

##### Second semester

WTW 168	Calculus 168	8	WTW 158 GS
WTW 161	Linear algebra 161	8	
FSK 176	Physics 176	16	
SWK 122	Mechanics 122	16	WTW 158
EBN 122	Electricity and electronics 122	16	
CIL 121	Information literacy 121	4	
SNV 121	Innovation 121	4	SNV 111
	<b>Total</b>	72	

##### Recess training

EMR 100	Measurement technique and computer modelling 100	4	(CIL 111), (EBN 111)
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##### Notes

- (i) Students may be promoted in Graphical communication 110, if a semester test mark and a practicum mark of at least 65% each is obtained.



- (ii) Students who failed the Academic Literacy Test must register for the module **JNV 100 (Innovation 100)**, which must be taken instead of the modules SNV 111 and SNV 121 (Innovation 111 and 121).

### Second year of study

#### First semester

Module		Credits	Prerequisites
WTW 258	Calculus 258	8	WTW 158,168
WTW 256	Differential equations 256	8	WTW 158, WTW 161,168
MSD 210	Dynamics 210	16	SWK 122, FSK 116/176, WTW 256#
EIR 211	Electrical engineering 211	16	EBN 111/122, WTW 161
COS 131	Introduction to programming 131	16	
JSQ 216	Communication skills 216	8	
JCP 203	Community-based project 203	8	
	<b>Total</b>	<b>80</b>	

#### Second semester

WTW 238	Mathematics 238	16	WTW 258GS, 256
WTW 263	Numerical methods 263	8	WTW 161,168
BES 220	Engineering statistics 220	8	
ELI 220	Linear systems 220	16	EIR 211
ERS 220	Digital systems 220	16	
	<b>Total</b>	<b>64</b>	

#### Recess training

EPW 200	Practical wiring 200	4	
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### Third year of study

#### First semester

Module		Credits	Prerequisites
BIE 310	Engineering economics 310	8	
EMK 310	Microprocessors 310	16	ERS 220GS
ENE 310	Analogue electronics 310	16	EIR 211/221GS
ELX 311	Electrical machines 311	16	EIR 211
EMZ 310	Electromagnetism 310	16	WTW 256, 258
	<b>Total</b>	<b>72</b>	

#### Second semester

IPB 320	Project management 320	8	
EWE 320	Electrical engineering design 320	16	EMK 310GS
EBB 320	Control systems 320	16	ELI 220GS
EDF 320	Power electronics 320	16	ELX 311, ELI 220GS
EKK 320	Power system components 320	16	EIR 211
	<b>Total</b>	<b>72</b>	

#### Recess training

ESP 300	DSP programming 300	4	EPW 200
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**Fourth year of study****First semester**

<b>Module</b>		<b>Credits</b>	<b>Prerequisites</b>
EPR 400	Project 400	16	All prescribed 3 <sup>rd</sup> year modules passed
BPE 451	Professional ethics and practice 451	8	
EEM 410	Energy systems 410	8	EKK 310 GS
EHB 410	High voltage control and protection 410	8	EKK 310 GS
EAD 410	Electrical drives 410	16	ELX 311 GS, EDF 320 GS
EBT 410	Automation 410	16	EBB 320 GS
	<b>Total</b>	<b>72</b>	

**Second semester**

EPR 400	Project 400	48	All prescribed 3 <sup>rd</sup> year modules passed
EES 422	Specialisation for electrical engineers 422	16	
BIE 320	Engineering economics 320	8	
COM 420	Environmental management 420	8	
	<b>Total</b>	<b>80</b>	

**Recess training**

EPY 422	Practical training 422	12	
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**(e) Electronic Engineering****First year of study****First semester**

<b>Module</b>		<b>Credits</b>	<b>Prerequisites</b>
MGC 110	Graphical communication 110	16	
WTW 158	Calculus 158	16	
NMC 113	Materials science 113	16	
CHM 171	General chemistry 171	16	
CIL 111	Computer literacy 111	4	
SNV 111	Innovation 111	4	
	<b>Total</b>	<b>72</b>	

**Second semester**

WTW 168	Calculus 168	8	WTW 158 GS
WTW 161	Linear algebra 161	8	
EBN 122	Electricity and electronics 122	16	
FSK 176	Physics 176	16	
SWK 122	Mechanics 122	16	WTW 158
CHM 172	General chemistry 172	16	
CIL 121	Information literacy 121	4	
SNV 121	Innovation 121	4	SNV 111
	<b>Total</b>	<b>72</b>	

**Recess training**

EMR 100	Measurement technique and computer modelling 100	4	(CIL 111), (EBN 111)
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**Note**

- (i) Students may be promoted in Graphical communication 110, if a semester test mark and a practicum mark of at least 65% each is obtained.
- (ii) Students who failed the Academic Literacy Test must register for the module **JNV 100 (Innovation 100)**, which must be taken instead of the modules SNV 111 and SNV 121 (Innovation 111 and 121).

**Second year of study****First semester**

Module		Credits	Prerequisites
WTW 258	Calculus 258	8	WTW 158,168
WTW 256	Differential equations 256	8	WTW 158, WTW 161,168
MSD 210	Dynamics 210	16	SWK 122, FSK 116/176, WTW 256#
EIR 211	Electrical engineering 211	16	EBN 111/122, WTW 161
COS 131	Introduction to programming 131	16	
JSQ 216	Communication skills 216	8	
JCP 203	Community-based project 203	8	
	<b>Total</b>	<b>80</b>	

**Second semester**

WTW 238	Mathematics 238	16	WTW 258GS, 256
WTW 263	Numerical methods 263	8	WTW 161,168
BES 220	Engineering statistics 220	8	
ELI 220	Linear systems 220	16	EIR 211
ERS 220	Digital systems 220	16	
	<b>Total</b>	<b>64</b>	

**Third year of study****First semester**

Module		Credits	Prerequisites
BIE 310	Engineering economics 310	8	
EMK 310	Microprocessors 310	16	ERS 220GS
EMZ 310	Electromagnetism 310	16	WTW 256, 258
ENE 310	Analogue electronics 310	16	EIR 211/221GS
EMS 310	Modulation systems 310	16	ELI 220
	<b>Total</b>	<b>72</b>	

**Second semester**

IPB 320	Project management 320	8	
ELO 320	Electronic engineering design 320	16	EMK 310GS
EMZ 320	Microwaves and antennas 320	16	EMZ 310
EBB 320	Control systems 320	16	ELI 220GS
ESC 320	Stochastic communication systems 320	16	EMS 310, WTW 258, 256, 238
	<b>Total</b>	<b>72</b>	

**Fourth year of study****First semester**

<b>Module</b>		<b>Credits</b>	<b>Prerequisites</b>
EPR 400	Project 400	16	All prescribed 3 <sup>rd</sup> year modules passed
BPE 451	Professional ethics and practice 451	8	
ESP 411	DSP: programming and application 411	16	ESC 320GS or ESF 320GS
ENE 410	Advanced electronics 410	16	ENE 310 GS
EBT 410	Automation 410	16	EBB 320 GS
	<b>Total</b>	<b>72</b>	

**Second semester**

EPR 400	Project 400	48	All prescribed 3 <sup>rd</sup> year modules passed
EES 423	Specialisation for electronic engineers 423	16	
BIE 320	Engineering economics 320	8	
COM 420	Environmental management 420	8	
	<b>Total</b>	<b>80</b>	

**Recess training**

EPY 422	Practical training 422	12	
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**(f) Industrial Engineering****First year of study****First semester**

<b>Module</b>		<b>Credits</b>	<b>Prerequisites</b>
MGC 110	Graphical communication 110	16	
WTW 158	Calculus 158	16	
FSK 116	Physics 116	16	
EBN 111	Electricity and electronics 111	16	
CIL 111	Computer literacy 111	4	
SNV 111	Innovation 111	4	
	<b>Total</b>	<b>72</b>	

**Second semester**

WTW 168	Calculus 168	8	WTW 158 GS
WTW 161	Linear algebra 161	8	
SWK 122	Mechanics 122	16	WTW 158
CHM 172	General chemistry 172	16	
NMC 123	Materials science 123	16	
CIL 121	Information literacy 121	4	
SNV 121	Innovation 121	4	SNV 111
	<b>Total</b>	<b>72</b>	

**Recess training**

WWP 121	Workshop practice 121	6	
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**Notes**

- (i) Students may be promoted in Graphical communication 110, if a semester test mark and a practicum mark of at least 65% each is obtained.
- (ii) Students who failed the Academic Literacy Test must register for the module **JNV 100 (Innovation 100)**, which must be taken instead of the modules SNV 111 and SNV 121 (Innovation 111 and 121).

**Second year of study****First semester**

Module		Credits	Prerequisites
WTW 258	Calculus 258	8	WTW 158,168
WTW 256	Differential equations 256	8	WTW 158, WTW 161,168
MSD 210	Dynamics 210	16	SWK 122, FSK 116/176, WTW 256#
MOW 217	Manufacturing and design 217	16	MGC 110, SWK 122
MPR 212	Programming and data processing 212	16	CIL 111, 121
JSQ 216	Communication skills 216	8	
JCP 203	Community-based project 203	8	
	<b>Total</b>	<b>80</b>	

**Second semester**

WTW 238	Mathematics 238	16	WTW 258GS, 256
WTW 263	Numerical methods 263	8	WTW 161,168
BES 220	Engineering statistics 220	8	
MTX 221	Thermodynamics 221	16	FSK 116/176
BPZ 220	Productivity 220	16	
	<b>Total</b>	<b>64</b>	

**Third year of study****First semester**

Module		Credits	Prerequisites
BAN 313	Industrial analysis 313	8	
MVS 311	Manufacturing systems 311	16	
BOB 310	Operational management 310	16	
BOZ 312	Operations research 312	16	(BES 220)
FBS 110	Financial management 110	10	
BER 310	Business law 310	8	
	<b>Total</b>	<b>74</b>	

**Second semester**

IPB 320	Project management 320	8	
BLK 320	Industrial logistics 320	16	(BOB 310)
BID 320	Information systems design 320	16	
BUY 321	Simulation modelling 321	16	(BAN 313)
BIE 320	Engineering economics 320	8	
BFB 320	Facilities planning 320	8	
	<b>Total</b>	<b>72</b>	

**Recess training**

BPY 310	Practical training 310	16	
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**Fourth year of study****First semester**

<b>Module</b>		<b>Credits</b>	<b>Prerequisites</b>
BCC 410	Computer control 410	16	(BRV 320)
BON 410	Operations research 410	16	
BGC 410	Quality assurance 410	16	
BSR 410	Management accounting 410	16	(FBS 110)
BPJ 410	Project 410	8	Finalists only
BPE 451	Professional ethics and practice 451	8	
	<b>Total</b>	<b>80</b>	

**Second semester**

BPJ 420	Project 420	32	(BPJ 410)
BPZ 421	Business engineering 421	16	Finalists only
ABV 320	Labour relations 320	8	BER 310
*BEN 420	Elective 420	16	Finalists only
COM 420	Environmental management 420	8	
	<b>Total</b>	<b>80</b>	

\* An elective chosen from an approved shortlist.

**Recess training**

BPY 410	Practical training 410	16	
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**(g) Mechanical Engineering****First year of study****First semester**

<b>Module</b>		<b>Credits</b>	<b>Prerequisites</b>
MGC 110	Graphical communication 110	16	
WTW 158	Calculus 158	16	
EBN 111	Electricity and electronics 111	16	
FSK 116	Physics 116	16	
CIL 111	Computer literacy 111	4	
SNV 111	Innovation 111	4	
	<b>Total</b>	<b>72</b>	

**Second semester**

WTW 168	Calculus 168	8	WTW 158 GS
WTW 161	Linear algebra 161	8	
CHM 172	General chemistry 172	16	
SWK 122	Mechanics 122	16	WTW 158
NMC 123	Materials science 123	16	
CIL 121	Information literacy 121	4	
SNV 121	Innovation 121	4	SNV 111
	<b>Total</b>	<b>72</b>	

**Recess training**

WWP 121	Workshop practice 121	6	
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**Notes**

- (i) Students may be promoted in Graphical communication 110, if a semester test mark and a practicum mark of at least 65% each is obtained.
- (ii) Students who failed the Academic Literacy Test must register for the module **JNV 100 (Innovation 100)**, which must be taken instead of the modules SNV 111 and SNV 121 (Innovation 111 and 121).

**Second year of study****First semester**

<b>Module</b>		<b>Credits</b>	<b>Prerequisites</b>
WTW 258	Calculus 258	8	WTW 158,168
WTW 256	Differential equations 256	8	WTW 158, WTW 161,168
MSD 210	Dynamics 210	16	FSK 116/176, SWK 122, WTW 256#
MPR 212	Programming and data processing 212	16	CIL 111, 121
MOW 217	Manufacturing and design 217	16	MGC 110, SWK 122
JSQ 216	Communication skills 216	8	
JCP 203	Community-based project 203	8	
	<b>Total</b>	<b>80</b>	

**Second semester**

WTW 238	Mathematics 238	16	WTW 258GS, 256
WTW 263	Numerical methods 263	8	WTW 161,168
BES 220	Engineering statistics 220	8	
MOW 227	Machine design 227	16	MOW 217
MTX 221	Thermodynamics 221	16	FSK 116/176
	<b>Total</b>	<b>64</b>	

**Third year of study****First semester**

<b>Module</b>		<b>Credits</b>	<b>Prerequisites</b>
BIE 310	Engineering economics 310	8	
MOW 312	Machine design 312	16	MOW 227
MTX 311	Thermodynamics 311	16	MTX 221
MSY 310	Structural mechanics 310	16	MOW 217, WTW 238 or 263
MTV 310	Thermofluids 310	16	
	<b>Total</b>	<b>72</b>	

**Second semester**

IPB 320	Project management 320	8	
MOW 323	Machine design 323	16	(MOW 312)
EIR 221	Electrical engineering 221	16	EBN 111/122, WTW 161
MVR 320	Vibrations and noise 320	16	(MSD 210)
MKM 320	Continuum mechanics 320	16	MSY 310, MTV 310
	<b>Total</b>	<b>72</b>	

**Recess training**

MPY 315	Practical training 315	16	
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**Fourth year of study****First semester****Option – Mechanical and Aeronautical**

<b>Module</b>		<b>Credits</b>	<b>Prerequisites</b>
MSY 411	Computer-aided structural mechanics 411	16	MSY 310 GS
MWX 410	Heat transfer 410	16	MSX 310 GS, MTX 321 GS
MBB 410	Control systems 410	16	MVR 320 GS
MOX 410	Design 410	16	MOW 312, 323
MSC 400	Project 400	8	Finalists only
BPE 451	Professional ethics and practice 451	8	
	<b>Total</b>	<b>80</b>	

**Note:** For the Aeronautical Option, the themes of both the Design and the Project must be aeronautical-related.

**Second semester****Option – Mechanical**

MSC 400	Project 400	16	Finalists only
ETN 420	Electrotechnics 420	16	
MTV 420	Thermal and fluid machines 420	16	MSX 310 GS, MTX 321 GS
COM 420	Environmental management 420	8	
	<b>One elective from the following:</b>		
MVE 420	Vehicle engineering 420	16	
MLV 420	Aeronautics 420	16	MSX 310
MII 420	Maintenance engineering 420	16	
MKI 420	Nuclear engineering 420	16	
	Offering of electives depends on the availability of resources and industry support.		
	<b>Total</b>	<b>72</b>	

or

**Option – Aeronautical**

MSC 400	Project 400	16	Finalists only
ETN 420	Electrotechnics 420	16	
MLV 420	Aeronautics 420	16	MSX 310
MTV 420	Thermal and fluid machines 420	16	MSX 310 GS, MTX 321 GS
COM 420	Environmental management 420	8	
	<b>Total</b>	<b>72</b>	

**Recess Training**

MPY 415	Practical training 415	16	
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**(h) Metallurgical Engineering****First year of study****First semester**

<b>Module</b>		<b>Credits</b>	<b>Prerequisites</b>
MGC 110	Graphical communication 110	16	
WTW 158	Calculus 158	16	
CHM 171	General chemistry 171	16	
NMC 113	Materials science 113	16	
CIL 111	Computer literacy 111	4	
SNV 111	Innovation 111	4	
	<b>Total</b>	<b>72</b>	

**Second semester**

WTW 168	Calculus 168	8	WTW 158 GS
WTW 161	Linear algebra 161	8	
FSK 176	Physics 176	16	
SWK 122	Mechanics 122	16	WTW 158
EBN 122	Electricity and electronics 122	16	
CIL 121	Information literacy 121	4	
SNV 121	Innovation 121	4	SNV 111
	<b>Total</b>	<b>72</b>	

**Recess training**

WWP 121	Workshop practice 121	6	
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**Notes**

- (i) Students may be promoted in Graphical communication 110, if a semester test mark and a practicum mark of at least 65% each is obtained.
- (ii) Students who failed the Academic Literacy Test must register for the module **JNV 100 (Innovation 100)**, which must be taken instead of the modules SNV 111 and SNV 121 (Innovation 111 and 121).

**Second year of study****First semester**

<b>Module</b>		<b>Credits</b>	<b>Prerequisites</b>
WTW 258	Calculus 258	8	WTW 158,168
WTW 256	Differential equations 256	8	WTW 158, WTW 161,168
MSD 210	Dynamics 210	16	FSK 116/176, SWK 122, WTW 256#
MPR 212	Programming and data processing 212	16	CIL 111, 121
GMI 210	Mineralogy 210	16	
JSQ 216	Communication skills 216	8	
JCP 203	Community-based project 203	8	
	<b>Total</b>	<b>80</b>	

**Second semester**

WTW 238	Mathematics 238	16	WTW 258GS, 256
WTW 263	Numerical methods 263	8	WTW 161,168
BES 220	Engineering statistics 220	8	

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NMC 223	Materials science 223	16	NMC 113/123
NPT 220	Process thermodynamics 220	16	(CHM 171/172)
EIR 221	Electrical engineering 221	16	EBN 111/122, WTW 161

**Total** 80

### Third year of study

#### First semester

Module		Credits	Prerequisites
BIE 310	Engineering economics 310	8	
MTV 310	Thermofluids 310	16	
NMC 313	Materials science 313	16	(NMC 223)
NMP 310	Minerals processing 310	16	
NEC 310	Electrochemistry 310	16	
	<b>Total</b>	<b>72</b>	

#### Second semester

IPB 320	Project management 320	8	
NMM 320	Mechanical metallurgy 320	16	(NMC 223)
NPM 321	Pyrometallurgy 321	16	(NPT 220)
NHM 322	Hydrometallurgy 322	16	(NPT 220), (NEC 310)
NVM 321	Refractory materials 321	8	(NPT 220), NPM 321#
NEX 320	Excursions 320	8	(NMP 310)
	<b>Total</b>	<b>72</b>	

#### Recess training

NPY 316	Practical training 316	16	
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### Fourth year of study

#### First semester

Module		Credits	Prerequisites
NKR 411	Corrosion 411	8	(NMM 320)
NPB 411	Process metallurgy and control 411	16	(NPM 321), (CHO 321)
NSC 411	Project 411	8	
BPE 451	Professional ethics and practice 451	8	
NHM 411	Hydrometallurgy 411	8	(NHM 321)
NPW 410	Metals processing and welding 410	16	(NMC 312), (NMM 320)
NMP 411	Minerals processing 411	16	(NMP 323)
	<b>Total</b>	<b>80</b>	

#### Second semester

NSC 421	Project 421	44	NSC 411
NOP 420	Process design 420	28	(NMP 411)
COM 420	Environmental management 420	8	
	<b>Total</b>	<b>80</b>	

#### Recess training

NPY 416	Practical training 416	16	
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**(i) Mining Engineering****First year of study****First semester**

<b>Module</b>		<b>Credits</b>	<b>Prerequisites</b>
MGC 110	Graphical communication 110	16	
WTW 158	Calculus 158	16	
CHM 171	General chemistry 171	16	
NMC 113	Materials science 113	16	
CIL 111	Computer literacy 111	4	
SNV 111	Innovation 111	4	
	<b>Total</b>	<b>72</b>	

**Second semester**

WTW 168	Calculus 168	8	WTW 158 GS
WTW 161	Linear algebra 161	8	
FSK 176	Physics 176	16	
EBN 122	Electricity and electronics 122	16	
SWK 122	Mechanics 122	16	WTW 158
CIL 121	Information literacy 121	4	
SNV 121	Innovation 121	4	SNV 111
	<b>Total</b>	<b>72</b>	

**Recess training**

PWP 121	Workshop practice 121	8	
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**Notes**

- (i) Students may be promoted in Graphical communication 110, if a semester test mark and a practicum mark of at least 65% each is obtained.
- (ii) Students who failed the Academic Literacy Test must register for the module **JNV 100 (Innovation 100)**, which must be taken instead of the modules SNV 111 and SNV 121 (Innovation 111 and 121).

**Second year of study****First semester**

<b>Module</b>		<b>Credits</b>	<b>Prerequisites</b>
WTW 258	Calculus 258	8	WTW 158,168
WTW 256	Differential equations 256	8	WTW 158, WTW 161,168
MSD 210	Dynamics 210	16	FSK 116/176, SWK 122, WTW 256#
MPR 212	Programming and data processing 212	16	CIL 111, 121
SWK 210	Strength of materials 210	16	SWK 122, WTW 168#
JSQ 216	Communication skills 216	8	
JCP 203	Community-based project 203	8	
	<b>Total</b>	<b>80</b>	

**Second semester**

WTW 238	Mathematics 238	16	WTW 258GS, 256
WTW 263	Numerical methods 263	8	WTW 161,168
BES 220	Engineering statistics 220	8	

## Engineering 2010

MTX 221	Thermodynamics 221	16	FSK 116/176
SUR 220	Surveying 220	16	
	<b>Total</b>	64	

### Recess training

PPY 220	Experiential training 220	16	
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### Third year of study

#### First semester

Module		Credits	Prerequisites
BIE 310	Engineering economics 310	8	
MTV 310	Thermofluids 310	16	
GLY 151	Introductory geology 151	8	
GLY 152	Physical geology 152	8	GLY 151GS
NMP 310	Minerals processing 310	16	
PMY 311	Surface mining and geotechnics 311	16	
	<b>Total</b>	72	

#### Second semester

IPB 320	Project management 320	8	
PMY 320	Mining 320	16	PMY 311
PME 320	Mineral economics 320	16	
PSC 321	Introduction to project 321	8	
PNB 300	Industrial excursions 300	8	
PRX 321	Explosives engineering 321	8	MTX 221
GLY 161	Historical geology 161	8	GLY 151GS, 152GS
	<b>Total</b>	72	

### Recess training

PPY 320	Experiential training 320	16	
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### Fourth year of study

#### First semester

Module		Credits	Prerequisites
PEE 410	Mine environmental control engineering 410	16	PEE 320
PSZ 410	Strata control 410	16	PSZ 311
PSC 410	Project 410	8	PSC 321
BPE 451	Professional ethics and practice 451	8	
GLY 254	Structural geology 254	12	GLY 152
PNB 400	Industrial excursions 400	8	
PMY 410	Mining 410	16	PDY 311, PMY 210
	<b>Total</b>	84	

#### Second semester

PMZ 421	Mine design 421	40	Finalists only PNB 300 PNB 400
GLY 361	Ore deposits 361	18	
PMY 422	Mining 422	8	
COM 420	Environmental management 420	8	
	<b>Total</b>	74	

**Recess training**

PPY 418

Practical training 418

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**Eng. 15.2 Engineering Augmented Degree Programme (ENGAGE)****Please note:**

The Engineering Augmented Degree Programme (ENGAGE) is an extended degree programme with a five-year curriculum. It is designed to enable students who show academic potential but who do not meet the normal entry requirements for the four-year degree programme, to obtain an Engineering degree. ENGAGE students spend the first three years of the programme covering the content of the first two years of the four-year degree programme. They also take compulsory augmented modules in each of the Level 1 subjects. These augmented modules provide students with background knowledge and skills needed to succeed in an engineering degree. The curriculum for years four and five of the ENGAGE programme are identical to the curriculum for years 3 and 4 of the 4-year programme, respectively. Students may apply directly for admission to the programme.

- Students must register for the entire programme, not components of it. The curriculum is fixed; there are no electives.
  - Attendance at all components of years 1 to 3 of the programme is compulsory. Non-attendance will only be condoned in the case of illness (sick note required) or family crisis (e.g. a death in the family), in which case students must inform the programme administration immediately.
  - Students who fail to meet the attendance requirement for any module in any semester of years 1 to 3 of the programme will be excluded from the programme.
  - No augmented module may be repeated more than once.
  - Selection into the programme will be based on a combination of performance in the National Senior Certificate examinations or equivalent and other selection tests approved by the faculty.
  - A student who fails a mainstream module (e.g. Chemistry) but passes the associated augmented module (e.g. Additional chemistry) does not need to repeat the augmented module.
  - A student who fails an augmented module (e.g. Additional chemistry) but passes the associated mainstream module (e.g. Chemistry) does not need to repeat the mainstream module.
  - A student must obtain a semester mark of at least 40% in a module in order to obtain admission to the examination in that module. In the first semester of Year 1 the minimum semester mark is 30%. This concession is only applicable if the student has fulfilled the attendance requirement. Admission to the examination will not be granted to a student who does not meet the attendance requirement.
- i) The requirements for admission from the one year of study to the next are given in **Eng. 16, Eng. 17 and Eng. 18.**
  - (ii) Only the curricula of the first, second and third years of study are given here. The curricula of the fourth and the fifth years of study are identical to those of the third and the fourth years of the four-year programmes and are given in **Eng. 15.1.**
  - (iii) A student who failed the Academic Literacy Test, but who is registered for and also passes in the modules JPO 110/120, will be exempted from the module JNV 100. If such a student should fail in the language component of JPO 120, it is required that the student registers for the module JNV 100 in the next year and passes in this module, after which credit for JPO 120 will be granted.

**Faculty requirement**

<b>Module</b>		<b>Credits</b>	<b>Prerequisites</b>
JCP 203	Community-based project 203	8	

**Notes**

Students who register for the first year from 2005 will be required to successfully complete the above module as part of the requirements for the BEng degree. A student may register for the module during any of the years of study of the programme, but preferably not during the first or the final year of study.

**(a) Chemical Engineering****First year of study****First semester**

<b>Module</b>		<b>Credits</b>	<b>Prerequisites</b>
WTW 158	Calculus 158	16	
CHM 171	General chemistry 171	16	
JPO 110	Professional orientation 110	8	
JPO 116	Additional mathematics 116	8	
JPO 111	Additional chemistry 111	8	
	<b>Total</b>	<b>56</b>	

**Second semester**

WTW 161	Linear algebra 161	8	
WTW 168	Calculus 168	8	WTW 158 GS
FSK 176	Physics 176	16	
JPO 120	Professional orientation 120	8	JPO 110
JPO 126	Additional mathematics 127	8	
JPO 122	Additional physics 122	8	
	<b>Total</b>	<b>56</b>	

**Recess training**

WWP 121	Workshop practice 121	6	
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**Second year of study (Will be phased in in 2011)****First semester**

<b>Module</b>		<b>Credits</b>	<b>Prerequisites</b>
CIL 111	Computer literacy 111	4	
CIR 113	Chemical engineering 113	8	
EBN 111	Electricity and electronics 111	16	
MGC 110	Graphical communication 110	16	
JCP 203	Community-based project 203	8	
WTW 256	Differential equations 256	8	WTW 158, 161, 168
JPO 112	Additional electricity and electronics 112	8	
JPO 113	Additional graphical communication 113	8	
	<b>Total</b>	<b>76</b>	

**Second semester**

CHM 181	Chemistry 181	16	CHM171
CIL 121	Information literacy 121	4	
CIR 123	Chemical engineering 123	8	CHM171, CIR113
SWK 122	Mechanics 122	16	WTW158
WTW 263	Numerical methods 263	8	WTW161, 168
JPO 121	Additional chemistry 121	8	
JPO 125	Additional mechanics 125	8	
	<b>Total</b>	<b>68</b>	

**Note**

Students may be promoted in Graphical communication 110, if a semester test mark and a practicum mark of at least 65% each is obtained.

**Third year of study (Will be phased in in 2012)****First semester**

<b>Module</b>		<b>Credits</b>	<b>Prerequisites</b>
CIR 211	Chemical engineering 211	8	CIR123, WTW256#
CHM 215	Chemistry 215	16	CHM171/172, 181
JSQ 216	Communication skills 216	8	
MPR 212	Programming and data processing 212	16	CIL111, 121
SWK 210	Strength of materials 210	16	SWK122, WTW168#
WTW 258	Calculus 258	8	WTW158, 168
	<b>Total</b>	<b>72</b>	

**Second semester**

BES 220	Engineering statistics 220	8	
CHM 226	Chemistry 226	8	CHM171/172, 181
CTD 223	Thermodynamics 223	16	(CIR211), MPR212
EIR 221	Electrical engineering 221	16	EBN111/122, WTW161
WTW 238	Mathematics 238	16	WTW258GS, 256
	<b>Total</b>	<b>64</b>	

**STUDENTS WHO REGISTERED IN 2009****Second year of study****First semester**

<b>Module</b>		<b>Credits</b>	<b>Prerequisites</b>
CIL 111	Computer literacy 111	4	
CIR 113	Chemical engineering 113	8	
EBN 111	Electricity and electronics 111	16	
JCP 203	Community-based project 203	8	
WTW 256	Differential equations 256	8	WTW 158, 161, 168
WTW 258	Calculus 258	8	WTW158, 168
JPO 112	Additional electricity and electronics 112	8	
	<b>Total</b>	<b>60</b>	

## Engineering 2010

### Second semester

CIL 121	Information literacy 121	4	
CIR 123	Chemical engineering 123	8	CHM171, CIR113
SWK 122	Mechanics 122	16	WTW158
WTW 238	Mathematics 238	16	WTW258GS, 256
JPO 125	Additional mechanics 125	8	
	<b>Total</b>	<b>52</b>	

### Third year of study

#### First semester

Module		Credits	Prerequisites
CIR 211	Chemical engineering 211	8	CIR123, WTW256#
CHM 215	Chemistry 215	16	CHM171/172, 181
JSQ 216	Communication skills 216	8	
MPR 212	Programming and data processing 212	16	CIL111, 121
SWK 210	Strength of materials 210	16	SWK122, WTW168#
	<b>Total</b>	<b>64</b>	

#### Second semester

BES 220	Engineering statistics 220	8	
CHM 226	Chemistry 226	8	CHM171/172, 181
CTD 223	Thermodynamics 223	16	(CIR211), MPR212
EIR 221	Electrical engineering 221	16	EBN111/122, WTW161
WTW 263	Numerical methods 263	8	WTW161, 168
	<b>Total</b>	<b>56</b>	

## STUDENTS WHO REGISTERED IN 2008

### Third year of study

#### First semester

Module		Credits	Prerequisites
CIR 211	Chemical engineering 211	8	CIR123, WTW256†
CHM 215	Chemistry 215	16	CHM171/172, 181
JCP 203	Community-based project 203	8	
JSQ 216	Communication skills 216	8	
MPR 212	Programming and data processing 212	16	CIL111, 121
	<b>Total</b>	<b>56</b>	

#### Second semester

BES 220	Engineering statistics 220	8	
CHM 226	Chemistry 226	8	CHM171/172, 181
CTD 223	Thermodynamics 223	16	(CIR211), MPR212
EIR 221	Electrical engineering 221	16	EBN111/122, WTW161
	<b>Total</b>	<b>48</b>	



**(b) Civil Engineering****First year of study****First semester**

<b>Module</b>		<b>Credits</b>	<b>Prerequisites</b>
WTW 158	Calculus 158	16	
CHM 171	General chemistry 171	16	
JPO 110	Professional orientation 110	8	
JPO 116	Additional mathematics 116	8	
JPO 111	Additional chemistry 111	8	
	<b>Total</b>	<b>56</b>	

**Second semester**

WTW 161	Linear algebra 161	8	
WTW 168	Calculus 168	8	WTW 158 GS
FSK 176	Physics 176	16	
JPO 120	Professional orientation 120	8	JPO 110
JPO 126	Additional mathematics 126	8	
JPO 122	Additional physics 122	8	
	<b>Total</b>	<b>56</b>	

**Recess training**

SWP 121	Workshop practice 121	6	
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**Second year of study (Will be phased in in 2011)****First semester**

<b>Module</b>		<b>Credits</b>	<b>Prerequisites</b>
CIL 111	Computer literacy 111	4	
EBN 111	Electricity and electronics 111	16	
MGC 110	Graphical communication 110	16	
JCP 203	Community-based project 203	8	
WTW 256	Differential equations 256	8	WTW 158, 161, 168
JPO 112	Additional electricity and electronics 112	8	
JPO 113	Additional graphical communication 113	8	
	<b>Total</b>	<b>68</b>	

**Second semester**

CIL 121	Information literacy 121	4	
NMC 123	Materials science 123	16	
SWK 122	Mechanics 122	16	WTW158
WTW 263	Numerical methods 263	8	WTW161, 168
JPO 123	Additional materials science 123	8	
JPO 125	Additional mechanics 125	8	
	<b>Total</b>	<b>60</b>	

**Note**

Students may be promoted in Graphical communication 110, if a semester test mark and a practicum mark of at least 65% each is obtained.

**Third year of study (Will be phased in in 2012)****First semester**

<b>Module</b>		<b>Credits</b>	<b>Prerequisites</b>
JSQ 216	Communication skills 216	8	
SGM 210	Geomaterials and processes 210	16	
SUR 210	Surveying 210	16	
SWK 210	Strength of materials 210	16	SWK122, WTW168#
WTW 258	Calculus 258	8	WTW158, 168
	<b>Total</b>	<b>64</b>	

**Second semester**

BES 220	Engineering statistics 220	8	
SBZ 221	Civil engineering measurement techniques 221	8	
SGM 221	Pavement materials and design 221	16	SGM210 GS
SIN 223	Structural analysis 223	16	WTW161, 168, SWK210
WTW 238	Mathematics 238	16	WTW258GS, 256
	<b>Total</b>	<b>64</b>	

**STUDENTS WHO REGISTERED IN 2009****Second year of study****First semester**

<b>Module</b>		<b>Credits</b>	<b>Prerequisites</b>
CIL 111	Computer literacy 111	4	
EBN 111	Electricity and electronics 111	16	
JCP 203	Community-based project 203	8	
WTW 258	Calculus 258	8	WTW158, 168
WTW 256	Differential equations 256	8	WTW 158, 161, 168
JPO 112	Additional electricity and electronics 112	8	
	<b>Total</b>	<b>52</b>	

**Second semester**

CIL 121	Information literacy 121	4	
SWK 122	Mechanics 122	16	WTW158
WTW 238	Mathematics 238	16	WTW258GS, 256
JPO 125	Additional mechanics 125	8	
	<b>Total</b>	<b>44</b>	

**Third year of study****First semester**

<b>Module</b>		<b>Credits</b>	<b>Prerequisites</b>
JSQ 216	Communication skills 216	8	
SGM 210	Geomaterials and processes 210	16	
SUR 210	Surveying 210	16	
SWK 210	Strength of materials 210	16	SWK122, WTW168#
	<b>Total</b>	<b>56</b>	

**Second semester**

BES 220	Engineering statistics 220	8	
SBZ 221	Civil engineering measurement techniques 221	8	
SGM 221	Pavement materials and design 221	16	SGM210 GS
SIN 223	Structural analysis 223	16	WTW161, 168, SWK210
WTW 263	Numerical methods 263	8	WTW161, 168
	<b>Total</b>	<b>56</b>	

**STUDENTS WHO REGISTERED IN 2008****Third year of study****First semester**

<b>Module</b>		<b>Credits</b>	<b>Prerequisites</b>
JCP 203	Community-based project 203	8	
JSQ 216	Communication skills 216	8	
SUR 210	Surveying 210	16	
SWK 210	Strength of materials 210	16	SWK122, WTW168#
	<b>Total</b>	<b>48</b>	

**Second semester**

BES 220	Engineering statistics 220	8	
SBZ 221	Civil engineering measurement techniques 221	8	
SIN 223	Structural analysis 223	16	WTW161, 168, SWK210
SGM 221	Pavement materials and design 221	16	SGM 210 GS
	<b>Total</b>	<b>48</b>	

**(c) Computer Engineering****First year of study****First semester**

<b>Module</b>		<b>Credits</b>	<b>Prerequisites</b>
WTW 158	Calculus 158	16	
CIL 111	Computer literacy 111	4	
COS 131	Introduction to programming 131	16	
JPO 110	Professional orientation 110	8	
JPO 116	Additional mathematics 116	8	
JPO 114	Additional computing 114	8	
	<b>Total</b>	<b>60</b>	

**Second semester**

WTW 161	Linear algebra 161	8	
WTW 168	Calculus 168	8	WTW 158 GS
FSK 176	Physics 176	16	
JPO 120	Professional orientation 120	8	JPO 110
JPO 126	Additional mathematics 126	8	

## Engineering 2010

JPO 122	Additional physics 122	8	
	<b>Total</b>	<b>56</b>	

### Recess training

EIW 121	Information technology practice 121	8	
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### Second year of study (Will be phased in in 2011)

#### First semester

Module		Credits	Prerequisites
EBN 111	Electricity and electronics 111	16	
JCP 203	Community-based project 203	8	
WTW 256	Differential equations 256	8	WTW 158, 161, 168
WST 111	Mathematical statistics 111	16	
COS 135	Introduction to programming (continued) 135	8	
JPO 112	Additional electricity and electronics 112	8	
JPO 115	Additional statistics 115	8	
	<b>Total</b>	<b>72</b>	

#### Second semester

CIL 121	Information literacy 121	4	
COS 121	Software modelling 121	16	COS131GS
ERA 284	Computer architecture 284	16	COS 130GS/COS 131GS/COS 132GS
WTW 263	Numerical methods 263	8	WTW161, 168
JPO 124	Additional computing 124	8	
JPO 127	Additional computers 127	8	
	<b>Total</b>	<b>60</b>	

### Recess training

EMR 100	Measurement technique and computer modelling 100	4	(CIL 111), (EBN 111)
EIW 221	Information technology practice 221	8	

### Third year of study (Will be phased in in 2012)

#### First semester

Module		Credits	Prerequisites
JSQ 216	Communication skills 216	8	
COS 216	Netcentric computer systems 216	16	COS 131/COS 110
COS 212	Data structures and algorithms 212	16	COS 131/COS 110
EIR 211	Electrical engineering 211	16	EBN111/122, WTW161
WTW 258	Calculus 258	8	WTW158, 168
	<b>Total</b>	<b>64</b>	

#### Second semester

COS 222	Operating systems 222	16	COS 130/COS 131/COS 132
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ELI 220	Linear systems 220	16	EIR211
ERS 220	Digital systems 220	16	
WTW 238	Mathematics 238	16	WTW258GS, 256
	<b>Total</b>	<b>64</b>	

## STUDENTS WHO REGISTERED IN 2009

### Second year of study

#### First semester

Module		Credits	Prerequisites
CIL 111	Computer literacy 111	4	
EBN 111	Electricity and electronics 111	16	
JCP 203	Community-based project 203	8	
WTW 258	Calculus 258	8	WTW158, 168
WTW 256	Differential equations 256	8	WTW 158, 161, 168
JPO 112	Additional electricity and electronics 112	8	
	<b>Total</b>	<b>52</b>	

#### Second semester

CIL 121	Information literacy 121	4	
FSK 176	Physics 176	16	
WTW 238	Mathematics 238	16	WTW258GS, 256
JPO 122	Additional physics 122	8	
	<b>Total</b>	<b>44</b>	

#### Recess training

EMR 100	Measurement technique and computer modelling 100	4	(CIL 111), (EBN 111)
EIW 221	Information technology practice 221	8	

### Third year of study

#### First semester

Module		Credits	Prerequisites
JSQ 216	Communication skills 216	8	
COS 216	Netcentric computer systems 216	16	COS 131/COS 110
COS 212	Data structures and algorithms 212	16	COS 131/COS 110
EIR 211	Electrical engineering 211	16	EBN111/122, WTW161
	<b>Total</b>	<b>56</b>	

#### Second semester

COS 222	Operating systems 222	16	COS 130/COS 131/COS 132
ELI 220	Linear systems 220	16	EIR211
ERS 220	Digital systems 220	16	
WTW 263	Numerical methods 263	8	WTW161, 168
	<b>Total</b>	<b>56</b>	

**STUDENTS WHO REGISTERED IN 2008****Third year of study****First semester**

<b>Module</b>		<b>Credits</b>	<b>Prerequisites</b>
JSQ 216	Communication skills 216	8	
COS 212	Data structures and algorithms 212	16	COS 131/COS 110
JCP 203	Community-based project 203	8	
EIR 211	Electrical engineering 211	16	EBN111/122, WTW161
<b>Total</b>		<b>48</b>	

**Second semester**

COS 222	Operating systems 222	16	COS 130/COS 131/COS 132
ELI 220	Linear systems 220	16	EIR211
ERS 220	Digital systems 220	16	
<b>Total</b>		<b>48</b>	

**(d) Electrical Engineering****First year of study****First semester**

<b>Module</b>		<b>Credits</b>	<b>Prerequisites</b>
WTW 158	Calculus 158	16	
CHM 171	General chemistry 171	16	
JPO 110	Professional orientation 110	8	
JPO 116	Additional mathematics 116	8	
JPO 111	Additional chemistry 111	8	
<b>Total</b>		<b>56</b>	

**Second semester**

WTW 161	Linear algebra 161	8	
WTW 168	Calculus 168	8	WTW 158 GS
FSK 176	Physics 176	16	
JPO 120	Professional orientation 120	8	JPO 110
JPO 126	Additional mathematics 126	8	
JPO 122	Additional physics 122	8	
<b>Total</b>		<b>56</b>	

**Second year of study (Will be phased in in 2011)****First semester**

<b>Module</b>		<b>Credits</b>	<b>Prerequisites</b>
CIL 111	Computer literacy 111	4	
EBN 111	Electricity and electronics 111	16	
MGC 110	Graphical communication 110	16	
JCP 203	Community-based project 203	8	
WTW 256	Differential equations 256	8	WTW 158, 161, 168

JPO 112	Additional electricity and electronics 112	8	
JPO 113	Additional graphical communication 113	8	
	<b>Total</b>	<b>68</b>	

**Second semester**

CIL 121	Information literacy 121	4	
NMC 123	Materials science 123	16	
SWK 122	Mechanics 122	16	WTW158
WTW 263	Numerical methods 263	8	WTW161, 168
JPO 123	Additional materials science 123	8	
JPO 125	Additional mechanics 125	8	
	<b>Total</b>	<b>60</b>	

**Recess training**

EMR 100	Measurement technique and computer modelling 100	4	(CIL 111), (EBN 111)
EPW 200	Practical wiring 200	4	

**Note**

Students may be promoted in Graphical communication 110, if a semester test mark and a practicum mark of at least 65% each is obtained.

**Third year of study (Will be phased in in 2012)****First semester**

Module		Credits	Prerequisites
JSQ 216	Communication skills 216	8	
COS 131	Introduction to programming 131	16	
EIR 211	Electrical engineering 211	16	EBN111/122, WTW161
MSD 210	Dynamics 210	16	SWK122, FSK116/176, WTW256#
WTW 258	Calculus 258	8	WTW158, 168
	<b>Total</b>	<b>64</b>	

**Second semester**

BES 220	Engineering statistics 220	8	
ELI 220	Linear systems 220	16	EIR211
ERS 220	Digital systems 220	16	
WTW 238	Mathematics 238	16	WTW258GS, 256
	<b>Total</b>	<b>56</b>	

**STUDENTS WHO REGISTERED IN 2009****Second year of study****First semester**

Module		Credits	Prerequisites
CIL 111	Computer literacy 111	4	
EBN 111	Electricity and electronics 111	16	

## Engineering 2010

JCP 203	Community-based project 203	8	
WTW 258	Calculus 258	8	WTW158, 168
WTW 256	Differential equations 256	8	WTW 158, 161, 168
JPO 112	Additional electricity and electronics 112	8	
	<b>Total</b>	<b>52</b>	

### Second semester

CIL 121	Information literacy 121	4	
SWK 122	Mechanics 122	16	WTW158
WTW 238	Mathematics 238	16	WTW258GS, 256
JPO 125	Additional mechanics 125	8	
	<b>Total</b>	<b>44</b>	

### Recess training

EMR 100	Measurement technique and computer modelling 100	4	(CIL 111), (EBN 111)
EPW 200	Practical wiring 200	4	

### Third year of study

#### First semester

Module		Credits	Prerequisites
JSQ 216	Communication skills 216	8	
COS 131	Introduction to programming 131	16	
EIR 211	Electrical engineering 211	16	EBN111/122, WTW161
MSD 210	Dynamics 210	16	SWK122, FSK116/176, WTW256#
	<b>Total</b>	<b>56</b>	

#### Second semester

BES 220	Engineering statistics 220	8	
ELI 220	Linear systems 220	16	EIR211
ERS 220	Digital systems 220	16	
IPB 320	Project management 320	8	
WTW 263	Numerical methods 263	8	WTW161, 168
	<b>Total</b>	<b>56</b>	

## STUDENTS WHO REGISTERED IN 2008

### Third year of study

#### First semester

Module		Credits	Prerequisites
JSQ 216	Communication skills 216	8	
JCP 203	Community-based project 203	8	
EIR 211	Electrical engineering 211	16	EBN111/122, WTW161



MSD 210	Dynamics 210	16	SWK122, FSK116/176, WTW256#
	<b>Total</b>	<b>48</b>	

**Second semester**

BES 220	Engineering statistics 220	8	
ELI 220	Linear systems 220	16	EIR211
ERS 220	Digital systems 220	16	
IPB 320	Project management 320	8	
	<b>Total</b>	<b>48</b>	

**(e) Electronic Engineering****First year of study****First semester**

<b>Module</b>		<b>Credits</b>	<b>Prerequisites</b>
WTW 158	Calculus 158	16	
CHM 171	General chemistry 171	16	
JPO 110	Professional orientation 110	8	
JPO 116	Additional mathematics 116	8	
JPO 111	Additional chemistry 111	8	
	<b>Total</b>	<b>56</b>	

**Second semester**

WTW 161	Linear algebra 161	8	
WTW 168	Calculus 168	8	WTW 158 GS
FSK 176	Physics 176	16	
JPO 120	Professional orientation 120	8	JPO 110
JPO 126	Additional mathematics 126	8	
JPO 122	Additional physics 122	8	
	<b>Total</b>	<b>56</b>	

**Second year of study (Will be phased in in 2011)****First semester**

<b>Module</b>		<b>Credits</b>	<b>Prerequisites</b>
CIL 111	Computer literacy 111	4	
EBN 111	Electricity and electronics 111	16	
MGC 110	Graphical communication 110	16	
JCP 203	Community-based project 203	8	
WTW 256	Differential equations 256	8	WTW 158, 161, 168
JPO 112	Additional electricity and electronics 112	8	
JPO 113	Additional graphical communication 113	8	
	<b>Total</b>	<b>68</b>	

## Engineering 2010

### Second semester

CIL 121	Information literacy 121	4	
NMC 123	Materials science 123	16	
SWK 122	Mechanics 122	16	WTW158
WTW 263	Numerical methods 263	8	WTW161, 168
JPO 123	Additional materials science 123	8	
JPO 125	Additional mechanics 125	8	
	<b>Total</b>	<b>60</b>	

### Recess training

EMR 100	Measurement technique and computer modelling 100	4	(CIL 111), (EBN 111)
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### Note

Students may be promoted in Graphical communication 110, if a semester test mark and a practicum mark of at least 65% each is obtained.

### Third year of study (Will be phased in in 2012)

#### First semester

Module		Credits	Prerequisites
JSQ 216	Communication skills 216	8	
COS 131	Introduction to programming 131	16	
EIR 211	Electrical engineering 211	16	EBN111/122, WTW161
MSD 210	Dynamics 210	16	SWK122, FSK116/176, WTW256#
WTW 258	Calculus 258	8	WTW158, 168
	<b>Total</b>	<b>64</b>	

#### Second semester

BES 220	Engineering statistics 220	8	
ELI 220	Linear systems 220	16	EIR211
ERS 220	Digital systems 220	16	
WTW 238	Mathematics 238	16	WTW258GS, 256
	<b>Total</b>	<b>56</b>	

### STUDENTS WHO REGISTERED IN 2009

#### Second year of study

##### First semester

Module		Credits	Prerequisites
CIL 111	Computer literacy 111	4	
EBN 111	Electricity and electronics 111	16	
JCP 203	Community-based project 203	8	
WTW 258	Calculus 258	8	WTW158, 168
WTW 256	Differential equations 256	8	WTW 158, 161, 168
JPO 112	Additional electricity and electronics 112	8	
	<b>Total</b>	<b>52</b>	

**Second semester**

CIL 121	Information literacy 121	4	
SWK 122	Mechanics 122	16	WTW158
WTW 238	Mathematics 238	16	WTW258GS, 256
JPO 125	Additional mechanics 125	8	
	<b>Total</b>	<b>44</b>	

**Recess training**

EMR 100	Measurement technique and computer modelling 100	4	(CIL 111), (EBN 111)
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**Third year of study****First semester**

<b>Module</b>		<b>Credits</b>	<b>Prerequisites</b>
JSQ 216	Communication skills 216	8	
COS 131	Introduction to programming 131	16	
EIR 211	Electrical engineering 211	16	EBN111/122, WTW161
MSD 210	Dynamics 210	16	SWK122, FSK116/176, WTW256#
	<b>Total</b>	<b>56</b>	

**Second semester**

BES 220	Engineering statistics 220	8	
ELI 220	Linear systems 220	16	EIR211
ERS 220	Digital systems 220	16	
WTW 263	Numerical methods 263	8	WTW161, 168
IPB 320	Project management 320	8	
	<b>Total</b>	<b>56</b>	

**STUDENTS WHO REGISTERED IN 2008****Third year of study****First semester**

<b>Module</b>		<b>Credits</b>	<b>Prerequisites</b>
JSQ 216	Communication skills 216	8	
JCP 203	Community-based project 203	8	
EIR 211	Electrical engineering 211	16	EBN111/122, WTW161
MSD 210	Dynamics 210	16	SWK122, FSK116/176, WTW256#
	<b>Total</b>	<b>48</b>	

**Second semester**

BES 220	Engineering statistics 220	8	
ELI 220	Linear systems 220	16	EIR211
ERS 220	Digital systems 220	16	
IPB 320	Project management 320	8	
	<b>Total</b>	<b>48</b>	

**(f) Industrial Engineering****First year of study****First semester**

<b>Module</b>		<b>Credits</b>	<b>Prerequisites</b>
WTW 158	Calculus 158	16	
CHM 171	General chemistry 171	16	
JPO 110	Professional orientation 110	8	
JPO 116	Additional mathematics 116	8	
JPO 111	Additional chemistry 111	8	
	<b>Total</b>	<b>56</b>	

**Second semester**

WTW 161	Linear algebra 161	8	
WTW 168	Calculus 168	8	WTW 158 GS
FSK 176	Physics 176	16	
JPO 120	Professional orientation 120	8	JPO 110
JPO 126	Additional mathematics 126	8	
JPO 122	Additional physics 122	8	
	<b>Total</b>	<b>56</b>	

**Recess training**

WWP 121	Workshop practice 121	6	
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**Second year of study (Will be phased in in 2011)****First semester**

<b>Module</b>		<b>Credits</b>	<b>Prerequisites</b>
CIL 111	Computer literacy 111	4	
EBN 111	Electricity and electronics 111	16	
MGC 110	Graphical communication 110	16	
JCP 203	Community-based project 203	8	
WTW 256	Differential equations 256	8	WTW 158, 161, 168
JPO 112	Additional electricity and electronics 112	8	
JPO 113	Additional graphical communication 113	8	
	<b>Total</b>	<b>68</b>	

**Second semester**

CIL 121	Information literacy 121	4	
NMC 123	Materials science 123	16	
SWK 122	Mechanics 122	16	WTW158
WTW 263	Numerical methods 263	8	WTW161, 168
JPO 123	Additional materials science 123	8	
JPO 125	Additional mechanics 125	8	
	<b>Total</b>	<b>60</b>	

**Note**

Students may be promoted in Graphical communication 110, if a semester test mark and a practicum mark of at least 65% each is obtained.

**Third year of study (Will be phased in in 2012)****First semester**

<b>Module</b>		<b>Credits</b>	<b>Prerequisites</b>
JSQ 216	Communication skills 216	8	
MOW 217	Manufacturing and design 217	16	MGC110, SWK122
MSD 210	Dynamics 210	16	SWK122, FSK116/176, WTW256#
MPR 212	Programming and data processing 212	16	CIL111, 121
WTW 258	Calculus 258	8	WTW158, 168
	<b>Total</b>	<b>64</b>	

**Second semester**

BES 220	Engineering statistics 220	8	
BPZ 220	Productivity 220	16	
MTX 221	Thermodynamics 221	16	FSK 116/176
WTW 238	Mathematics 238	16	WTW258GS, 256
	<b>Total</b>	<b>56</b>	

**STUDENTS WHO REGISTERED IN 2009****Second year of study****First semester**

<b>Module</b>		<b>Credits</b>	<b>Prerequisites</b>
CIL 111	Computer literacy 111	4	
EBN 111	Electricity and electronics 111	16	
JCP 203	Community-based project 203	8	
WTW 256	Differential equations 256	8	WTW 158, 161, 168
WTW 258	Calculus 258	8	WTW158, 168
JPO 112	Additional electricity and electronics 112	8	
	<b>Total</b>	<b>52</b>	

**Second semester**

CIL 121	Information literacy 121	4	
SWK 122	Mechanics 122	16	WTW158
WTW 238	Mathematics 238	16	WTW258GS, 256
JPO 125	Additional mechanics 125	8	
	<b>Total</b>	<b>44</b>	

**Third year of study****First semester**

<b>Module</b>		<b>Credits</b>	<b>Prerequisites</b>
JSQ 216	Communication skills 216	8	
MOW 217	Manufacturing and design 217	16	MGC110, SWK122
MSD 210	Dynamics 210	16	SWK122, FSK116/176, WTW256#

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MPR 212	Programming and data processing 212	16	CIL111, 121
	<b>Total</b>	<b>56</b>	
<b>Second semester</b>			
BES 220	Engineering statistics 220	8	
BPZ 220	Productivity 220	16	
IPB 320	Project management 320	8	
MTX 221	Thermodynamics 221	16	FSK 116/176
WTW 263	Numerical methods 263	8	WTW161, 168
	<b>Total</b>	<b>56</b>	

## STUDENTS WHO REGISTERED IN 2008

### Third year of study

#### First semester

Module		Credits	Prerequisites
JSQ 216	Communication skills 216	8	
JCP 203	Community-based project 203	8	
MSD 210	Dynamics 210	16	SWK122, FSK116/176, WTW256#
MPR 212	Programming and data processing 212	16	CIL111, 121
	<b>Total</b>	<b>48</b>	

#### Second semester

BES 220	Engineering statistics 220	8	
BPZ 220	Productivity 220	16	
MTX 221	Thermodynamics 221	16	FSK 116/176
IPB 320	Project management 320	8	
	<b>Total</b>	<b>48</b>	

## (g) Mechanical Engineering

### First year of study

#### First semester

Module		Credits	Prerequisites
WTW 158	Calculus 158	16	
CHM 171	General chemistry 171	16	
JPO 110	Professional orientation 110	8	
JPO 116	Additional mathematics 116	8	
JPO 111	Additional chemistry 111	8	
	<b>Total</b>	<b>56</b>	

#### Second semester

WTW 161	Linear algebra 161	8	
WTW 168	Calculus 168	8	WTW 158 GS
FSK 176	Physics 176	16	
JPO 120	Professional orientation 120	8	JPO 110

JPO 126	Additional mathematics 126	8
JPO 122	Additional physics 122	8
	<b>Total</b>	<b>56</b>

**Recess training**

WWP 121	Workshop practice 121	6
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**Second year of study (Will be phased in in 2011)****First semester**

<b>Module</b>		<b>Credits</b>	<b>Prerequisites</b>
CIL 111	Computer literacy 111	4	
EBN 111	Electricity and electronics 111	16	
MGC 110	Graphical communication 110	16	
JCP 203	Community-based project 203	8	
WTW 256	Differential equations 256	8	WTW 158, 161, 168
JPO 112	Additional electricity and electronics 112	8	
JPO 113	Additional graphical communication 113	8	
	<b>Total</b>	<b>68</b>	

**Second semester**

CIL 121	Information literacy 121	4	
NMC 123	Materials science 123	16	
SWK 122	Mechanics 122	16	WTW158
WTW 263	Numerical methods 263	8	WTW161, 168
JPO 123	Additional materials science 123	8	
JPO 125	Additional mechanics 125	8	
	<b>Total</b>	<b>60</b>	

**Note**

Students may be promoted in Graphical communication 110, if a semester test mark and a practicum mark of at least 65% each is obtained.

**Third year of study (Will be phased in in 2012)****First semester**

<b>Module</b>		<b>Credits</b>	<b>Prerequisites</b>
JSQ 216	Communication skills 216	8	
MOW 217	Manufacturing and design 217	16	MGC110, SWK122
MSD 210	Dynamics 210	16	SWK122, FSK116/176, WTW256#
MPR 212	Programming and data processing 212	16	CIL111, 121
WTW 258	Calculus 258	8	WTW158, 168
	<b>Total</b>	<b>64</b>	

**Second semester**

BES 220	Engineering statistics 220	8	
MOW 227	Machine design 227	16	MOW217

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MTX 221	Thermodynamics 221	16	FSK 116/176
WTW 238	Mathematics 238	16	WTW258GS, 256
	<b>Total</b>	<b>56</b>	

## STUDENTS WHO REGISTERED IN 2009

### Second year of study

#### First semester

Module		Credits	Prerequisites
CIL 111	Computer literacy 111	4	
EBN 111	Electricity and electronics 111	16	
JCP 203	Community-based project 203	8	
WTW 256	Differential equations 256	8	WTW 158, 161, 168
WTW 258	Calculus 258	8	WTW158, 168
JPO 112	Additional electricity and electronics 112	8	
	<b>Total</b>	<b>52</b>	

#### Second semester

CIL 121	Information literacy 121	4	
SWK 122	Mechanics 122	16	WTW158
WTW 238	Mathematics 238	16	WTW258GS, 256
JPO 125	Additional mechanics 125	8	
	<b>Total</b>	<b>44</b>	

### Third year of study

#### First semester

Module		Credits	Prerequisites
JSQ 216	Communication skills 216	8	
MOW 217	Manufacturing and design 217	16	MGC110, SWK122
MSD 210	Dynamics 210	16	SWK122, FSK116/176, WTW256#
MPR 212	Programming and data processing 212	16	CIL111, 121
	<b>Total</b>	<b>56</b>	

#### Second semester

BES 220	Engineering statistics 220	8	
IPB 320	Project management 320	8	
MOW 227	Machine design 227	16	MOW217
WTW 263	Numerical methods 263	8	WTW161, 168
MTX 221	Thermodynamics 221	16	FSK 116/176
	<b>Total</b>	<b>56</b>	



**STUDENTS WHO REGISTERED IN 2008****Third year of study****First semester**

<b>Module</b>		<b>Credits</b>	<b>Prerequisites</b>
JCP 203	Community-based project 203	8	
JSQ 216	Communication skills 216	8	
MSD 210	Dynamics 210	16	SWK122, FSK116/176, WTW256#
MPR 212	Programming and data processing 212	16	CIL111, 121
	<b>Total</b>	<b>48</b>	

**Second semester**

BES 220	Engineering statistics 220	8	
IPB 320	Project management 320	8	
MOW 227	Machine design 227	16	MOW217
MTX 221	Thermodynamics 221	16	FSK 116/176
	<b>Total</b>	<b>48</b>	

**(h) Metallurgical Engineering****First year of study****First semester**

<b>Module</b>		<b>Credits</b>	<b>Prerequisites</b>
WTW 158	Calculus 158	16	
CHM 171	General chemistry 171	16	
JPO 110	Professional orientation 110	8	
JPO 116	Additional mathematics 116	8	
JPO 111	Additional chemistry 111	8	
	<b>Total</b>	<b>56</b>	

**Second semester**

WTW 161	Linear algebra 161	8	
WTW 168	Calculus 168	8	WTW 158 GS
FSK 176	Physics 176	16	
JPO 120	Professional orientation 120	8	JPO 110
JPO 126	Additional mathematics 126	8	
JPO 122	Additional physics 122	8	
	<b>Total</b>	<b>56</b>	

**Recess training**

WWP 121	Workshop practice 121	6	
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**Second year of study (Will be phased in in 2011)****First semester**

<b>Module</b>		<b>Credits</b>	<b>Prerequisites</b>
CIL 111	Computer literacy 111	4	
EBN 111	Electricity and electronics 111	16	

## Engineering 2010

MGC 110	Graphical communication 110	16	
JCP 203	Community-based project 203	8	
WTW 256	Differential equations 256	8	WTW 158, 161, 168
JPO 112	Additional electricity and electronics 112	8	
JPO 113	Additional graphical communication 113	8	
	<b>Total</b>	<b>68</b>	

### Second semester

CIL 121	Information literacy 121	4	
NMC 123	Materials science 123	16	
SWK 122	Mechanics 122	16	WTW158
WTW 263	Numerical methods 263	8	WTW161, 168
JPO 123	Additional materials science 123	8	
JPO 125	Additional mechanics 125	8	
	<b>Total</b>	<b>60</b>	

### Note

Students may be promoted in Graphical communication 110, if a semester test mark and a practicum mark of at least 65% each is obtained.

### Third year of study (Will be phased in in 2012)

#### First semester

Module		Credits	Prerequisites
JSQ 216	Communication skills 216	8	
GMI 210	Mineralogy 210	16	
MSD 210	Dynamics 210	16	SWK122, FSK116/176, WTW256#
MPR 212	Programming and data processing 212	16	CIL111, 121
WTW 258	Calculus 258	8	WTW158, 168
	<b>Total</b>	<b>64</b>	

#### Second semester

BES 220	Engineering statistics 220	8	
EIR 221	Electrical engineering 221	16	EBN111/122, WTW161
NMC 223	Materials science 223	16	NMC 113/123
NPT 220	Process thermodynamics 220	16	(CHM171/172)
WTW 238	Mathematics 238	16	WTW258GS, 256
	<b>Total</b>	<b>56</b>	

**STUDENTS WHO REGISTERED IN 2009****Second year of study****First semester**

<b>Module</b>		<b>Credits</b>	<b>Prerequisites</b>
CIL 111	Computer literacy 111	4	
EBN 111	Electricity and electronics 111	16	
JCP 203	Community-based project 203	8	
WTW 256	Differential equations 256	8	WTW 158, 161, 168
WTW 258	Calculus 258	8	WTW158, 168
JPO 112	Additional electricity and electronics 112	8	
	<b>Total</b>	<b>52</b>	

**Second semester**

CIL 121	Information literacy 121	4	
SWK 122	Mechanics 122	16	WTW158
WTW 238	Mathematics 238	16	WTW258GS, 256
JPO 125	Additional mechanics 125	8	
	<b>Total</b>	<b>44</b>	

**Third year of study****First semester**

<b>Module</b>		<b>Credits</b>	<b>Prerequisites</b>
JSQ 216	Communication skills 216	8	
GMI 210	Mineralogy 210	16	
MSD 210	Dynamics 210	16	SWK122, FSK116/176, WTW256#
MPR 212	Programming and data processing 212	16	CIL111, 121
	<b>Total</b>	<b>56</b>	

**Second semester**

BES 220	Engineering statistics 220	8	
EIR 221	Electrical engineering 221	16	EBN111/122, WTW161
NMC 223	Materials science 223	16	NMC 113/123
NPT 220	Process thermodynamics 220	16	(CHM171/172)
WTW 263	Numerical methods 263	8	WTW161, 168
	<b>Total</b>	<b>64</b>	

**STUDENTS WHO REGISTERED IN 2008****Third year of study****First semester**

<b>Module</b>		<b>Credits</b>	<b>Prerequisites</b>
JCP 203	Community-based project 203	8	
JSQ 216	Communication skills 216	8	

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MSD 210	Dynamics 210	16	SWK122, FSK116/176, WTW256#
MPR 212	Programming and data processing 212	16	CIL111, 121
	<b>Total</b>	<b>48</b>	
<b>Second semester</b>			
BES 220	Engineering statistics 220	8	
EIR 221	Electrical engineering 221	16	EBN111/122, WTW161
NMC 223	Materials science 223	16	NMC 113/123
NPT 220	Process thermodynamics 220	16	(CHM171/172)
	<b>Total</b>	<b>56</b>	

### (i) Mining Engineering

#### First year of study

##### First semester

Module		Credits	Prerequisites
WTW 158	Calculus 158	16	
CHM 171	General chemistry 171	16	
JPO 110	Professional orientation 110	8	
JPO 116	Additional mathematics 116	8	
JPO 111	Additional chemistry 111	8	
	<b>Total</b>	<b>56</b>	

##### Second semester

WTW 161	Linear algebra 161	8	
WTW 168	Calculus 168	8	WTW 158 GS
FSK 176	Physics 176	16	
JPO 120	Professional orientation 120	8	JPO 110
JPO 126	Additional mathematics 126	8	
JPO 122	Additional physics 122	8	
	<b>Total</b>	<b>56</b>	

#### Recess training

PWP 121	Workshop practice 121	8	
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#### Second year of study (Will be phased in in 2011)

##### First semester

Module		Credits	Prerequisites
CIL 111	Computer literacy 111	4	
EBN 111	Electricity and electronics 111	16	
MGC 110	Graphical communication 110	16	
JCP 203	Community-based project 203	8	
WTW 256	Differential equations 256	8	WTW 158, 161, 168
JPO 112	Additional electricity and electronics 112	8	

JPO 113	Additional graphical communication 113	8	
	<b>Total</b>	<b>68</b>	
<b>Second semester</b>			
CIL 121	Information literacy 121	4	
NMC 123	Materials science 123	16	
SWK 122	Mechanics 122	16	WTW158
WTW 263	Numerical methods 263	8	WTW161, 168
JPO 123	Additional materials science 123	8	
JPO 125	Additional mechanics 125	8	
	<b>Total</b>	<b>60</b>	

**Note**

Students may be promoted in Graphical communication 110, if a semester test mark and a practicum mark of at least 65% each is obtained.

**Third year of study (Will be phased in in 2012)****First semester**

<b>Module</b>		<b>Credits</b>	<b>Prerequisites</b>
JSQ 216	Communication skills 216	8	
MSD 210	Dynamics 210	16	SWK122, FSK116/176, WTW256#
MPR 212	Programming and data processing 212	16	CIL111, 121
SWK 210	Strength of materials 210	16	SWK122, WTW168#
WTW 258	Calculus 258	8	WTW158, 168
	<b>Total</b>	<b>64</b>	

**Second semester**

BES 220	Engineering statistics 220	8	
MTX 221	Thermodynamics 221	16	FSK 116/176
SUR 220	Surveying 220	16	
WTW 238	Mathematics 238	16	WTW258GS, 256
	<b>Total</b>	<b>56</b>	

**STUDENTS WHO REGISTERED IN 2009****Second year of study****First semester**

<b>Module</b>		<b>Credits</b>	<b>Prerequisites</b>
CIL 111	Computer literacy 111	4	
EBN 111	Electricity and electronics 111	16	
JCP 203	Community-based project 203	8	
WTW 256	Differential equations 256	8	WTW 158, 161, 168
WTW 258	Calculus 258	8	WTW158, 168
JPO 112	Additional electricity and electronics 112	8	
	<b>Total</b>	<b>52</b>	

## Engineering 2010

### Second semester

CIL 121	Information literacy 121	4	
SWK 122	Mechanics 122	16	WTW158
WTW 238	Mathematics 238	16	WTW258GS, 256
JPO 125	Additional mechanics 125	8	
	<b>Total</b>	<b>44</b>	

### Third year of study

#### First semester

Module		Credits	Prerequisites
JSQ 216	Communication skills 216	8	
MSD 210	Dynamics 210	16	SWK122, FSK116/176, WTW256#
MPR 212	Programming and data processing 212	16	CIL111, 121
SWK 210	Strength of materials 210	16	SWK122, WTW168#
	<b>Total</b>	<b>56</b>	

#### Second semester

BES 220	Engineering statistics 220	8	
IPB 320	Project management 320	8	
MTX 221	Thermodynamics 221	16	FSK 116/176
SUR 220	Surveying 220	16	
WTW 263	Numerical methods 263	8	WTW161, 168
	<b>Total</b>	<b>56</b>	

## STUDENTS WHO REGISTERED IN 2008

### Third year of study

#### First semester

Module		Credits	Prerequisites
JCP 203	Community-based project 203	8	
JSQ 216	Communication skills 216	8	
MSD 210	Dynamics 210	16	SWK122, FSK116/176, WTW256#
MPR 212	Programming and data processing 212	16	CIL111, 121
	<b>Total</b>	<b>48</b>	

#### Second semester

BES 220	Engineering statistics 220	8	
IPB 320	Project management 320	8	
MTX 221	Thermodynamics 221	16	FSK 116/176
SUR 220	Surveying 220	16	
	<b>Total</b>	<b>48</b>	

**REQUIREMENTS FOR PROMOTION TO THE FOLLOWING YEAR OF STUDY****Eng. 16****Promotion to the second semester of the first year and to the second year of study**

- (a) A new first-year student who has failed in all the prescribed modules of the programme at the end of the first semester, is excluded from studies in the School of Engineering. A student registered for the five-year programme who has passed the Professional Orientation module, but who has failed in all the other prescribed modules, is also not readmitted.
- (b) A student who complies with all the requirements of the first year of study, is promoted to the second year of study.
- (c) A student who has not passed at least 70% of the credits of the first year of study after the November examinations, must reapply for admission should he/she intend to proceed with his/her studies. Application on the prescribed form must be submitted to the Student Administration of the School of Engineering not later than 11 January. Late applications will be accepted only in exceptional circumstances after approval by the Dean. Should first-year students be readmitted, conditions of readmission will be determined by the Admissions Committee.
- (d) Students who have not passed all the prescribed modules at first year level (level 100), as well as students who are readmitted in terms of Regulation Eng. 16.(c) must register for the outstanding first year level (level 100) modules.
- (e) A student who is repeating his or her first year, may, on recommendation of the relevant heads of department and with the approval of the Dean, be permitted to enrol for modules of the second-year of study in addition to the first-year modules which he or she failed, providing that he or she complies with the prerequisites for the second-year modules and no timetable clashes occur. On recommendation of the relevant head of department and with special permission from the Dean, permission may be granted to exceed the prescribed number of credits. The total number of credits which may be approved may not exceed the normal number of credits per semester by more than 16 credits.
- (f) Students in Computer, Electrical and Electronic Engineering, who fail a first-year module for the second time, forfeit the privilege of registering for any modules of an advanced year of study.

**Please note:**

- (i) From the second year of study each student should be in possession of an approved calculator. It is assumed that each student will have easy access to a personal computer.
- (ii) Students who intend transferring to Mining Engineering, must familiarise themselves with the stipulations set out in the syllabi of (PWP 121) Workshop Practice 121.

**Eng. 17****Promotion to the third year of study of the Four-year Programme, as well as to the third and the fourth years of study of the Five-year Programme. In case of the fourth year of study of the Five-year Programme, the words "first", "second" and "third" must be substituted with the words "second", "third" and "fourth" respectively.**

- (a) A student who complies with all the requirements of the second year of study, is promoted to the third year of study.
- (b) A student must pass all the prescribed modules at first year level (level 100) before he or she is admitted to any module at third year level (level 300).

- (c) A student who is repeating his or her second year must register for all the second-year modules still outstanding. Such a student may, on recommendation of the relevant head of department and with the approval of the Dean, be permitted to enrol for modules of the third year of study in addition to the second-year modules which he or she failed, providing that he or she complies with the prerequisites for the third-year modules and no timetable clashes occur. On recommendation of the relevant head of department, and with special permission from the Dean, permission may be granted to exceed the prescribed number of credits. The total number of credits which may be approved, may not exceed the normal number of credits per semester by more than 16 credits.
- (d) Students in Computer, Electrical and Electronic Engineering who fail a second-year module for the second time, forfeit the privilege of registering for any modules of the third year of study.
- (e) Students who intend transferring to Mining Engineering, must familiarise themselves with the stipulations set out in the syllabi of (PWP 120) Workshop Practice 120, as well as (PPY 317) Practical Training 317.

#### **Eng. 18**

**Promotion to the fourth year of study of the Four-year Programme, as well as to the fifth year of study of the Five-year Programme. In case of the fifth year of study of the Five-year Programme, the words "second", "third" and "fourth" must be substituted with the words "third", "fourth" and "fifth" respectively.**

- (a) A student who complies with all the requirements of the third year of study is promoted to the fourth year of study. A student who does not comply with all the requirements but who is able to register for all outstanding modules in order to complete the degree programme, may at registration be promoted to the fourth year of study.
- (b) A student must pass all the prescribed modules of the second year of study, before he or she is admitted to any module of the fourth year of study.
- (c) A student who has not passed all the prescribed modules of the third year of study, must register for the outstanding modules. A student may be admitted by the Dean, on the recommendation of the head of department concerned, to modules of the fourth year of study, in addition to the outstanding third-year modules, provided that he or she complies with the prerequisites of the fourth-year modules and no timetable clashes occur. The total number of credits per semester for which a student registers may not exceed the normal number of credits per semester by more than 16 credits. In exceptional cases, the Dean may, on recommendation of the relevant head of department, permit a student to exceed the above limit.
- (d) Students in Computer, Electrical and Electronic Engineering who fail a third-year module for the second time, forfeit the privilege of registering for any modules of the fourth year of study.

<b>REGULATIONS FOR POSTGRADUATE PROGRAMMES IN THE SCHOOL OF ENGINEERING AND THE GRADUATE SCHOOL OF TECHNOLOGY MANAGEMENT</b>
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<b>Bachelor of Engineering Honours [BEngHons]</b>
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#### **Eng. 19**

Also consult the General Regulations G.16 to G.29.

- (a) Subject to the stipulations of Reg. G.1.3 and G.62, a BEng degree or equivalent qualification is required for admission.



- (b) The minimum duration of the programme is one year of full-time study.
- (c) The curriculum is determined in consultation with the relevant heads of departments. A student is required to pass modules to the value of at least 128 credits.
- (d) The degree is awarded in the following fields of engineering:
- |                                    |                 |
|------------------------------------|-----------------|
| (i) Bioengineering                 | (Code 12240201) |
| (ii) Chemical Engineering          | (Code 12240021) |
| (iii) Computer Engineering         | (Code 12240211) |
| (iv) Control Engineering           | (Code 12240231) |
| (v) Electrical Engineering         | (Code 12240031) |
| (vi) Electronic Engineering        | (Code 12240091) |
| (vii) Environmental Engineering    | (Code 12240221) |
| (viii) Geotechnical Engineering    | (Code 12240212) |
| (ix) Industrial Engineering        | (Code 12240011) |
| (x) Mechanical Engineering         | (Code 12240051) |
| (xi) Metallurgical Engineering     | (Code 12240061) |
| (xii) Microelectronic Engineering  | (Code 12240191) |
| (xiii) Mining Engineering          | (Code 12240071) |
| (xiv) Software Engineering         | (Code 12240202) |
| (xv) Structural Engineering        | (Code 12240121) |
| (xvi) Technology Management        | (Code 12240251) |
| (xvii) Transportation Engineering  | (Code 12240111) |
| (xviii) Urban Engineering          | (Code 12240213) |
| (xix) Water Resources Engineering  | (Code 12240161) |
| (xx) Water Utilisation Engineering | (Code 12240101) |
- (e) The degree is awarded on the basis of examinations only.
- (f) **Examinations**
- (i) The examination in each module for which a student is registered, takes place during the normal examination period after the conclusion of lectures (i.e. November/January or June/July).
- (ii) A student registered for the honours degree must complete his or her studies within two years (full-time), or within three years (part-time) after first registration for the degree: Provided that the Dean, on recommendation of the relevant head of department, may approve a stipulated limited extension of this period.
- (iii) A student must obtain at least 50% in an examination for each module where no semester or year mark is required. A module may only be repeated once.
- (iv) In modules where semester or year marks are awarded, a minimum examination mark of 40% and a final mark of 50% is required.
- (v) No supplementary or special examinations are granted at postgraduate level.
- (g) A student passes with distinction if he or she obtains a weighted average of at least 75% in the first 128 credits for which he or she has registered (excluding modules which were discontinued timeously). The degree is not awarded with distinction if a student fails any one module (excluding modules which were discontinued timeously).
- (h) **Credit for modules**  
Consult General Regulation G.23

**Master of Engineering [MEng]**  
**Master of Science (Engineering Management) [MSc (Engineering Management)]**  
**Master of Science (Project Management) [MSc (Project Management)]**

**Eng. 20**

Also consult the General Regulations G.30 to G.44. and G.57 to G.62

- (a) Subject to the stipulations of Reg. G.1.3 and G.62, a BEngHons degree or equivalent qualification is required for admission to the MEng programmes [excluding the MEng (Engineering Management) and the MEng (Project Management)]. The admission requirement for the MEng (Engineering Management) and the MEng (Project Management) is a BEng or equivalent qualification. The admission requirement for the MSc (Engineering Management) and the MSc (Project Management) is a BScHons or equivalent qualification.
- (b) The minimum duration of the MEng programmes [excluding the MEng (Engineering Management) and the MEng (Project Management)] is one year of full-time study. The programmes in MEng (Engineering Management), MEng (Project Management), MSc (Engineering Management) and the MSc (Project Management) can be completed in a minimum period of two years.
- (c) A minimum of 128 credits is required to obtain the MEng degree [excluding the MEng (Engineering Management) and the MEng (Project Management)]. Either a mini-dissertation (64 credits) and coursework (64 credits) **or** a dissertation (128 credits) is included in the programme. A minimum of 256 credits is required for the MEng (Engineering Management), MEng (Project Management), MSc (Engineering Management) and the MSc (Project Management), including a mini-dissertation (64 credits) and coursework (192 credits).
- (d) Recognition is not granted for credits acquired during studying for the BEngHons or the BScHons.
- (e) The degree Master of Engineering is awarded in the following fields of engineering:

		<b>Degree code</b>	<b>Dissertation</b>	<b>Degree code</b>	<b>Mini-dissertation</b>
(i)	Bioengineering	12250201	EIB 890		
(ii)	Chemical Engineering	12250021	CVD 800	12256021	CSC 800
(iii)	Computer Engineering	12250211	ERI 890		
(iv)	Control Engineering	12250231	CVD 800	12256231	CSC 800
(v)	Electrical Engineering	12250031	EIR 890		
(vi)	Electronic Engineering	12250091	EIN 890		
(vii)	Engineering Management			12250172	IGB 898
(viii)	Environmental Engineering	12250221	CVD 800	12256221	CSC 800
(ix)	Geotechnical Engineering	12250212	SGI 890	12256212	SGT 896
(x)	Industrial Engineering	12250011	BIR 890		
(xi)	Mechanical Engineering	12250051	MIR 890		
(xii)	Metallurgical Engineering	12250061	NIN 890		
(xiii)	Microelectronic Engineering	12250191	EEY 890		
(xiv)	Mining Engineering	12250071	PYI 890		
(xv)	Software Engineering	12250202	EPR 890		
(xvi)	Project Management			12250262	IGB 898
(xvii)	Structural Engineering	12250121	SIN 890	12256121	SIN 896

(xviii)	Technology Management	12250251	ITB 890	12250252	IGB 898
(xix)	Transportation Engineering	12250111	SVI 890	12256111	SVI 896
(xx)	Urban Engineering	12250213	SSI 890	12256213	SSI 896
(xxi)	Water Utilisation Engineering	12250101	CVD 800	12256101	CSC 800
(xxii)	Water Resources Engineering	12250161	WBK 890	12256161	SSC 890

- (f) Unless the Dean, on recommendation of the relevant head of department, decides otherwise, the master's degree is conferred on the basis of examinations of coursework and a mini-dissertation **or** a dissertation (including an examination on the dissertation).
- (g) The curriculum is determined in consultation with the relevant head of department.
- (h) **Examinations**
- (i) The stipulations of Eng. 19 (f)(i), (iii), (iv) and (v) are applicable.
  - (ii) An MEng student [excluding the MEng (Engineering Management) and the MEng (Project Management)] is required to complete his or her degree studies within three years after the first registration: Provided that the Dean, in consultation with the relevant head of department, may, in exceptional circumstances, approve a stipulated limited extension of this period.
  - (iii) A student for an MEng (Engineering Management), MEng (Project Management), MSc (Engineering Management) or an MSc (Project Management) is required to complete his or her degree studies within four years after the first registration: Provided that the Dean, in consultation with the relevant head of department, may, in exceptional circumstances, approve a stipulated limited extension of this period.
  - (iv) The Dean may, on recommendation of the relevant head of department, exempt a student from the examination on the dissertation.
- (i) Guidelines for the preparation and examination of mini-dissertations are available from all departments. The average mark awarded by all the examiners is the final mark, with the pass mark being at least 50%.
- (j) **Pass with distinction**
- (i) A student who submits a dissertation passes with distinction if an average mark of at least 75% is obtained for the dissertation (and the examination on the dissertation).
  - (ii) A student who completes the master's degree on grounds of coursework and a mini-dissertation, passes with distinction if a weighted average mark of at least 75% is obtained in the first 128 credits obtained for the degree [first 256 credits in the case of the MEng (Engineering Management), MEng (Project Management), MSc (Engineering Management) or the MSc (Project Management)], provided that 64 of these credits are allocated to the mini-dissertation. However, the degree is not awarded with distinction should a student fail any of these modules (excluding modules which have been timeously discontinued). The degree is also not awarded with distinction if a student obtains less than 70% for the mini-dissertation.
- (k) **General master's degree requirements and draft article**
- A student must by means of a dissertation or mini-dissertation prove that he or she is capable of planning, instituting and executing a scientific investigation. Unless the Senate, on the recommendation of the supervisor, decides otherwise, a student, before or on submission of a dissertation, must submit proof issued by a recognised academic journal that an article was submitted, to the Head: Student

Administration. The draft article should be based on the research that the student has conducted for the dissertation and be approved by the supervisor if the supervisor is not a co-author. The supervisor shall be responsible for ensuring that the paper is taken through all the processes of revision and resubmission, as may be necessary. Conferment of the degree may be made subject to compliance with the stipulations of this regulation.

<b>Curricula for the BEngHons, MEng, MSc (Engineering Management) and MSc (Project Management) programmes</b>
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### Eng. 21

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

**Note:** The programmes are arranged in alphabetical order according to the names of the academic departments.

### (a) CHEMICAL ENGINEERING

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

#### **BEngHons (Chemical Engineering)(12240021)**

	<b>Code</b>	<b>Credits</b>
Carbon materials science and technology 732	CMS 732	32
Chemical engineering 702	CIR 702	32
Polymer materials science 732	CPW 732	32
Polymer processing 732	CPP 732	32
Process integration 732	CIP 732	32
Product design 732	CPO 732	32
Reactor design 700	CRO 700	32
Separation technology 732	CSK 732	32
Surfactant technology 732	CYM 732	32
Reactor hydrodynamics 732	CRH 732	32

#### **BEngHons (Control Engineering)(12240231)**

	<b>Code</b>	<b>Credits</b>
Model-based control laboratory 732	CML 732	32
Multivariable control system design 700	CBO 700	32
Multivariable control system theory 700	CBT 700	32
Process control system development 732	CSP 732	32

#### **BEngHons (Environmental Engineering)(12240221)**

	<b>Code</b>	<b>Credits</b>
Air management 780	CAM 780	32
Environmental management 780	CEM 780	32
Waste management 780	WAI 780	32
Water quality management 780	WQB 780	32

**BEngHons (Water Utilisation Engineering)(12240101)**

	<b>Code</b>	<b>Credits</b>
Biological water treatment 780	WBW 780	32
Chemical water treatment 780	WCW 780	32
Water quality management 780	WQB 780	32
<i>The remaining 32 credits may be taken by selecting one of the following relevant modules:</i>		
Waste management 780	WAI 780	32
Process integration 732	CIP 732	32
Separation technology 732	CSK 732	32

**MEng (Chemical Engineering)(12250021)****MEng (Control Engineering)(12250231)****MEng (Environmental Engineering)(12250221)****MEng (Water Utilisation Engineering)(12250101)**

	<b>Code</b>	<b>Credits</b>
Dissertation 800	CVD 800	128

**(b) CIVIL ENGINEERING**

A limited number of appropriate modules from other departments or from other divisions of Civil Engineering are allowed.

**BEngHons (Water Resources Engineering)(12240161)**

At least 128 credits from the following:

	<b>Code</b>	<b>Credits</b>
<i>At least 96 credits from the following:</i>		
Statistical methods 791	SHC 791	24
Flood hydrology 792	SHC 792	24
Hydraulic design 793	SHC 793	24
Free surface flow 794	SHC 794	24
Pipe flow 795	SHC 795	24
Pump systems 785	SHW 785	24
Water resource analysis and management 796	SHC 796	24

**and**

*the remainder of the credits from the following:*

Pavement design 793	SGC 793	24
Concrete technology 794	SGC 794	24
Reinforced concrete design 778	SIN 778	24
Geotechnical design special 795	SGC 795	24
Civil engineering special 792	SGC 792	24
Maintenance special 780	SVC 780	24

**or**

*the balance of the credits may also be elected from the following electives presented by the Department of Chemical Engineering:*

Environmental management 780	CEM 780	32
Air management 780	CAM 780	32
Water quality management 780	WQB 780	32
Chemical water treatment 780	WCW 780	32
Biological water treatment 780	WBW 780	32
Waste management 780	WAI 780	32

**BEngHons (Geotechnical Engineering)(12240212)**

At least 128 credits from the following:

	<b>Code</b>	<b>Credits</b>
<b>Core modules:</b>		
Geotechnical design special 795	SGC 795	24
Soil mechanics special 784	SGM 784	24
Geotechnical laboratory testing 785	SGS 785	24
In-situ soil testing and monitoring 786	SGS 786	24
Statistical methods 791	SHC 791	24
<b>Electives:</b>		
Engineering geology 703	IGL 703	16
Engineering geology 704	IGL 704	16
Civil engineering special 792	SGC 792	24
Pavement design 793	SGC 793	24
Concrete technology 794	SGC 794	24

**BEngHons (Urban Engineering)(12240213)**

This degree will not be presented as from 2009.

128 credits in consultation with the Head of the Department to enable students currently registered to complete the degree.

**BEngHons (Structural Engineering)(12240121)**

At least 128 credits from the following:

	<b>Code</b>	<b>Credits</b>
<i>At least 96 credits from the following:</i>		
Steel design 776	SIN 776	24
Structural mechanics 777	SIN 777	24
Reinforced concrete design 778	SIN 778	24
Timber design 779	SIN 779	24
Structural analysis 790	SIN 790	24
Prestressed concrete design 791	SIN 791	24
<b>and</b>		
<i>the remainder of the credits from the following:</i>		
Hydraulic design 793	SHC 793	24
Concrete technology 794	SGC 794	24
Geotechnical design special 795	SGC 795	24
Statistical methods 791	SHC 791	24
Civil engineering special 792	SGC 792	24
An approved module from the Department of Mathematics and Applied Mathematics.		
An approved module from the Department of Mechanical and Aeronautical Engineering.		

**BEngHons (Transportation Engineering)(12240111)**

At least 128 credits from the following:

	<b>Code</b>	<b>Credits</b>
<b>Core modules:</b>		
Transportation planning 789	SVC 789	24
Statistical methods 791	SHC 791	24
<b>Electives:</b>		
Asphalt technology 798	SGC 798	24
Pavement design 793	SGC 793	24
Stabilised materials and compaction 796	SGC 796	24
Road rehabilitation technology 797	SGC 797	24

Traffic engineering 792	SVC 792	24
Multimodal transport 788	SVV 788	24
Geometric design and safety 791	SVV 791	24
Concrete technology 794	SGC 794	24
Transportation studies 790	SVC 790	24
Transportation special 791	SVC 791	24
Maintenance special 780	SVC 780	24
Civil engineering special 792	SGC 792	24

**MEng (Water Resources Engineering)(12250161)**

	<b>Code</b>	<b>Credits</b>
Dissertation 890	WBK 890	128
<b>or</b>		

**MEng (Water Resources Engineering)(12256161)**

Mini-dissertation 890	SSC 890	64
<i>and 64 credits from the following:</i>		
Computer applications for civil engineers 880	SHC 880	32
Advanced hydraulics 885	SHC 885	32

**MEng (Geotechnical Engineering)(12250212)**

	<b>Code</b>	<b>Credits</b>
Dissertation 890	SGI 890	128

**MEng (Structural Engineering)(12250121)**

	<b>Code</b>	<b>Credits</b>
Dissertation 890	SIN 890	128
<b>or</b>		

**MEng (Structural Engineering)(12256121)**

Mini-dissertation 896	SIN 896	64
<i>and 64 credits from the following:</i>		
Computer applications for civil engineers 880	SHC 880	32
Advanced structural design 886	SIN 886	32
Advanced structural analysis 887	SIN 887	32
An approved module from the Department of Mechanical and Aeronautical Engineering.		

**MEng (Transportation Engineering)(12250111)**

	<b>Code</b>	<b>Credits</b>
Dissertation 890	SVI 890	128
<b>or</b>		

**MEng (Transportation Engineering)(12256111)**

Mini-dissertation 896	SVI 896	64
<i>and 64 credits from the following:</i>		
Advanced transportation I 882	SVV 882	32
Advanced transportation II 883	SVV 883	32
Computer applications for civil engineers 880	SHC 880	32

**(c) ELECTRICAL, ELECTRONIC AND COMPUTER ENGINEERING****BEngHons (Electrical Engineering)(12240031)**

Students may take modules to the value of 32 credits from other fields of specialisation or from other departments, with approval of the Coordinator: Postgraduate Studies.

	<b>Code</b>	<b>Credits</b>
Computer vision 732	ECV 732	32
Digital image processing 732	EAA 732	32
Energy management 732	EES 732	32
Hardware and software parallel processing 732	EHS 732	32
Power distribution engineering 732	EEV 732	32
Power electronics 780	EED 780	32
Power network stability 732	EKE 732	32
Real-time and reactive systems 732	ERR 732	32
Introduction to research 732	EIN 732	32
Advanced topics in energy research 732	ERT 732	32
Energy optimisation 732	ENO 732	32

**BEngHons (Electronic Engineering)(12240091)**

Students may take modules to the value of 32 credits from other fields of specialisation or from other departments, with approval of the Coordinator: Postgraduate Studies.

	<b>Code</b>	<b>Credits</b>
Adaptive systems 732	ETA 732	32
Advanced microprocessor system design 732	ERV 780	32
Antenna theory 780	EMA 780	32
Coding theory 732	ETK 732	32
Computer vision 732	ECV 732	32
Detection and estimation 732	EOP 732	32
Digital image processing 732	EAA 732	32
Digital communications 732	ETD 732	32
Digital radio techniques 732	ESR 732	32
Electro optics 732	EEO 732	32
Hardware and software parallel processing 732	EHS 732	32
Introduction to research 732	EIN 732	32
Microwave theory 780	EMM 780	32
Mobile communications 732	ETR 732	32
Multivariable control systems 732	EMB 732	32
Optical communication 732	EFO 732	32
Optimal control 780	EBO 780	32
Pattern recognition and neural networks 732	ERP 732	32
Real-time and reactive systems 732	ERR 732	32
Telecommunication systems engineering 732	ETT 732	32
Theory of bayesian inference 732	ETB 732	32
Cellular wireless telephony 710	ECW 710	32
Introduction to the science of measurement 716	EIS 716	16
Introductory radiometry and photometry 716	ERD 716	16
Interferometry 716	EFR 716	16
Optical networking 716	ENW 716	16
Advanced classical optics 732	EAD 732	32
Electro-optical systems design 732	ESD 732	32
Optical design 732	EOD 732	32
Topics in photonics 732	ETP 732	32



**BEngHons (Computer Engineering)(12240211)**

Students may take modules to the value of 32 credits from other fields of specialisation or from other departments, with approval of the Coordinator: Postgraduate Studies.

	<b>Code</b>	<b>Credits</b>
Advanced microprocessor system design 780	ERV 780	32
Computer networks 780	ERN 780	32
Computer vision 732	ECV 732	32
Detection and estimation 732	EOP 732	32
Digital Image processing 732	EAA 732	32
Hardware and software parallel processing 732	EHS 732	32
Information security 780	ETH 780	32
Introduction to research 732	EIN 732	32
New generation networks 732	ERC 732	32
Pattern recognition and neural networks	ERP 732	32
Real-time and reactive systems 732	ERR 732	32
Software architecture 780	ERA 780	16
Software construction 732	ERD 732	16
Software management and economics 780	ERS 780	32
Theory of bayesian inference 732	ETB 732	32
Wireless sensor networks 732	EKS 732	32

**BEngHons (Bioengineering)(12240201)**

Students may take modules to the value of 32 credits from other fields of specialisation or from other departments, with approval of the Coordinator: Postgraduate Studies.

It is a requirement that a student must complete all three the bioengineering honours modules, as well as Introduction to research 732 (EIN 732), to enrol for a master's or a PhD in Bioengineering.

	<b>Code</b>	<b>Credits</b>
Bioelectricity and electronics 732	EBE 732	32
Bioelectromagnetism and modelling 732	EBI 732	32
Biosignals and systems 732	EBB 732	32
Computer vision 732	ECV 732	32
Digital image processing 732	EAA 732	32
Hardware and software parallel processing 732	EHS 732	32
Real-time and reactive systems 732	ERR 732	32
Introduction to research 732	EIN 732	32

**BEngHons (Microelectronic Engineering)(12240191)**

Students may take modules to the value of 32 credits from other fields of specialisation or from other departments, with approval of the Coordinator: Postgraduate Studies.

	<b>Code</b>	<b>Credits</b>
Analogue electronic design 732	EME 732	32
Communication electronics 732	EMK 732	32
Computer vision 732	ECV 732	32
Digital electronic design 780	EDG 780	32
Digital image processing 732	EAA 732	32
Hardware and software parallel processing 732	EHS 732	32
Real-time and reactive systems 732	ERR 732	32
Introduction to research 732	EIN 732	32

**BEngHons (Software Engineering)(12240202)**

Students may take modules to the value of 32 credits from other fields of specialisation or from other departments, instead of the module Introduction to research 732 (EIN 732), with approval of the Coordinator: Postgraduate Studies. However, if a student wants to proceed to the MEng(Software Engineering) degree, the module Introduction to Research 732 (EIN 732) is mandatory.

It is compulsory for all students registered for the BEng(Hons)(Software Engineering) degree to complete all three the software modules (ERA 732, ERD 732 and ERS 732).

<b>Code</b>	<b>Credits</b>	
Computer vision 732	ECV 732	32
Digital image processing 732	EAA 732	32
Hardware and software parallel processing 732	EHS 732	32
Real-time and reactive systems 732	ERR 732	32
Software architecture 780	ERA 780	16
Software construction 732	ERD 732	16
Software management and economics 780	ERS 780	32
Introduction to research 732	EIN 732	32

**MEng (Electrical Engineering)(12250031)**

	<b>Code</b>	<b>Credits</b>
Dissertation 890	EIR 890	128

**MEng (Electronic Engineering)(12250091)**

	<b>Code</b>	<b>Credits</b>
Dissertation 890	EIN 890	128

**MEng (Computer Engineering)(12250211)**

	<b>Code</b>	<b>Credits</b>
Dissertation 890	ERI 890	128

**MEng (Bioengineering)(12250201)**

	<b>Code</b>	<b>Credits</b>
Dissertation 890	EIB 890	128

**MEng (Microelectronic Engineering)(12250191)**

	<b>Code</b>	<b>Credits</b>
Dissertation 890	EEY 890	128

**MEng (Software Engineering)(12250202)**

	<b>Code</b>	<b>Credits</b>
Dissertation 890	EPR 890	128

**(d) ENGINEERING AND TECHNOLOGY MANAGEMENT****BEngHons (Technology Management)(12240251)**

At least 128 credits from the following:

<b>Core modules:</b>	<b>Code</b>	<b>Credits</b>
Decision analysis 780	IBD 780	16
Technology and innovation management 780	ITI 780	16
Project management 780	IPK 780	16

Systems engineering 780	ISE 780	16
Operations management 781	IVV 781	16
Technological entrepreneurship 780	IEE 780	16
Quality management 780	IKK 780	16

**and**

**Electives /Ad hoc modules**

Maintenance management 780	IMC 780	16
Engineering logistics 780	IIX 780	16
Research methodology 781	INI 781	16

(Contact department for more information)

**MEng (Technology Management)(12250251)**

This qualification follows upon the BEng(Hons)(Technology Management).

	<b>Code</b>	<b>Credits</b>
Dissertation 890	ITB 890	128

**or**

**MEng (Technology Management)(12250252)**

Mini-dissertation 898	IGB 898	64
People management 884	PEM 884	16
Financial management 831	FBS 831	16
Strategic management 802	ISM 802	16

**and**

**Elective module**

Technology commercialisation 881	IKG 881	16
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**or**

Module from the MEM/MPM programme (subject to the approval of the head of department)

**MEng (Engineering Management)(12250172)**

**MSc (Engineering Management)(12251074)**

Minimum requirements: 192 credits of coursework modules and a mini-dissertation (64 credits).

Total: 256 credits.

	<b>Code</b>	<b>Credits</b>
Research methodology 800	INI 800	16
Mini-dissertation 898 (MEng)	IGB 898	64
Mini-dissertation 898 (MSc)	ISC 898	64

**and**

**Core modules**

Systems engineering and management 801	ISE 801	16
Production and operations management 801	IPP 801	16
People management 883	PEM 883	16
Financial management 830	FBS 830	16
Technology management 801	ITB 801	16
Maintenance management 801	IIB 801	16
Project management 803	IPK 803	16

**and**

**Select two modules from the domain of specialisation in consultation with the Department of Engineering and Technology Management.**

**Details regarding the curricula as well as syllabi of the respective domains are available from the Department.**

**Domain: General**

Decision analysis 804	IBD 804	16
Strategic management 801	ISM 801	16

**Electives**

Quality management 801	IKK 801	16
Marketing management 884	BEM 884	16
Engineering service management 801	IGB 801	16
New ventures and entrepreneurship 801	IOE 801	16
Engineering logistics 801	IIX 801	16
Life cycle management of SHE 802	ILE 802	16
Information management 884	ILB 884	16
Legal aspects of project management 803	ILC 803	16

or

**Domain: Asset and Maintenance Management**

Life cycle management of SHE 802	ILE 802	16
Asset management 801	IAM 801	16
Risk management 801	IRI 801	16

**Electives**

Reliability engineering 801	IBI 801	16
Engineering logistics 801	IIX 801	16
Strategic management 801	ISM 801	16

or

**Domain: Life-cycle Management**

Life cycle management of SHE 802	ILE 802	16
Strategic management 801	ISM 801	16

**Electives**

Asset management 801	IAM 801	16
Risk management 801	IRI 801	16
New ventures and entrepreneurship 801	IOE 801	16
Engineering logistics 801	IIX 801	16
Engineering service management 801	IGB 801	16
Marketing management 884	BEM 884	16
Legal aspects of project management 803	ILC 803	16

or

**Domain: Engineering Service Management**

Engineering service management 801	IGB 801	16
Advanced engineering service management 802	IGB 802	16
Strategic management 801	ISM 801	16

**Electives**

Information management 884	ILB 884	16
Decision analysis 804	IBD 804	16
Legal aspects of project management 803	ILC 803	16
Engineering logistics 801	IIX 801	16

**MEng (Project Management)(12250262)****MSc (Project Management)(12251075)**

Minimum requirements: 192 credits of coursework modules and a mini-dissertation (64 credits).

Total: 256 credits.

	<b>Code</b>	<b>Credits</b>
Research methodology 800	INI 800	16
Mini-dissertation 898 (MEng)	IGB 898	64

Mini-dissertation 898 (MSc)	ISC 898	64
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**and**

**Core modules**

Project system engineering 802	ISE 802	16
Introduction to project management 801	IPM 801	16
Project human resource management 801	IHR 801	16
Project finance and cost management 802	IPF 802	16
Project procurement management 801	IPJ 801	16
Project quality management 801	IQM 801	16
Project risk management 801	IRM 801	16
Strategic project management 804	ISM 804	16

**and**

**Select two modules from the domain of specialisation in consultation with the Department of Engineering and Technology Management.**

**Details regarding the curricula as well as syllabi of the respective domains are available from the Department.**

**Domain: General**

Project management practice 801	IMP 801	16
Strategic project management 804	ISM 804	16

**Electives**

Engineering service management 801	IGB 801	16
New ventures and entrepreneurship 801	IOE 801	16
Legal aspects of project management 803	ILC 803	16
Engineering logistics 801	IIX 801	16
Marketing management 884	BEM 884	16
Life cycle management of SHE 802	ILE 802	16
Information management 884	ILB 884	16

**or**

**Domain: Engineering Service Management**

Engineering service management 801	IGB 801	16
Advanced engineering service management 802	IGB 802	16
Strategic project management 804	ISM 804	16

**Electives**

Legal aspects of project management 803	ILC 803	16
Project management practice 801	IMP 801	16
Engineering logistics 801	IIX 801	16
Information management 884	ILB 884	16

**Domain: Construction Management**

Construction management I 803	KBS 803	16
Construction management II 804	KBS 804	16
Construction management III 805	KBS 805	16

**Electives**

Project management practice 801	IMP 801	16
Legal aspects of project management 803	ILC 803	16
New ventures and entrepreneurship 801	IOE 801	16
Engineering logistics 801	IIX 801	16

**(e) INDUSTRIAL AND SYSTEMS ENGINEERING**

A limited number of appropriate modules from other departments are allowed.

**BEngHons (Industrial Engineering)(12240011)**

	<b>Code</b>	<b>Credits</b>
Business architecture 780	BBA 780	16
Business engineering 780	BSI 780	16
Business logistics 780	BLK 780	16
Ergonomics 780	BEE 780	16
Health and safety in the workplace 780	BGW 780	16
Industrial analysis 780	BAN 780	16
Information systems 780	BIS 780	16
Megatronics 780	BMK 780	16
Operations research 780	BOZ 780	16
Probability models 780	BHM 780	16
Production management 781	BPZ 781	16
Quality management 780	BGH 780	16
Reliability engineering 780	BTH 780	16
Research methodology 781	INI 781	16
Simulation modelling 780	BUY 780	16
Supply chain design 780	BVK 780	16

**MEng(Industrial Engineering)(12250011)**

	<b>Code</b>	<b>Credits</b>
Dissertation 890	BIR 890	128

**(f) MATERIALS SCIENCE AND METALLURGICAL ENGINEERING**

A limited number of appropriate modules from other departments are allowed.

**BEngHons (Metallurgical Engineering)(12240061)**

	<b>Code</b>	<b>Credits</b>
Corrosion 700	NKR 700	32
Electrometallurgy 700	NEL 700	32
Froth flotation 700	NSF 700	32
Heat treatment 700	NHB 700	32
Hydrometallurgy 700	NHM 700	32
Literature survey 700	NLO 700	32
Mechanical metallurgy 700	NMM 700	32
Metallurgical analysis 700	NPA 700	32
Minerals processing 700	NMP 700	32
Physical metallurgy 700	NFM 700	32
Pyrometallurgy 700	NPM 700	32
Refractory materials 700	NVM 700	32
Welding metallurgy 700	NSW 700	32

**MEng (Metallurgical Engineering)(12250061)**

	<b>Code</b>	<b>Credits</b>
Dissertation 890	NIN 890	128

**(g) MECHANICAL AND AERONAUTICAL ENGINEERING**

A limited number of appropriate modules from other departments are allowed.

**BEngHons (Mechanical Engineering)(12240051)**

Modules are selected in consultation with the head of the department, in order to specialise in one of the following fields:

**Aeronautical Engineering****Design****Dynamics****Fluids and Thermoflow****Structural Mechanics****Vehicle Engineering**

	<b>Code</b>	<b>Credits</b>
Advanced fluid mechanics 732	MGM 732	32
Advanced heat and mass transfer 732	MHM 732	32
Advanced vehicle engineering 732	MGV 732	32
Aircraft design 780	MLW 780	16
Condition-based maintenance 732	MIC 732	32
Design 732	MOX 732	32
Finite element methods 732	MEE 732	32
Flight mechanics 780	MLV 780	16
Gas dynamics and aircraft propulsion systems 732	MGA 732	32
Independent study 732	MSS 732	32
Independent study 781	MSS 781	16
Numerical techniques and optimisation 732	MNO 732	32
Numerical thermoflow 732	MSM 732	32
Structural integrity 732	MSI 732	32
Tribology 732	MTF 732	32
Vibration 732	MEV 732	32

**MEng (Mechanical Engineering)(12250051)**

	<b>Code</b>	<b>Credits</b>
Dissertation 890	MIR 890	128

**(h) MINING ENGINEERING**

A limited number of appropriate modules from other departments are allowed.

**BEngHons (Mining Engineering)(12240071)**

	<b>Code</b>	<b>Credits</b>
Advanced mine design 780	PMZ 780	16
Airflow and fans 711	PKB 711	16
Financial mine evaluation 780	PFZ 780	16
Guided special studies 700	PSS 700	32
Heat and refrigeration 712	PKB 712	16
Slope stability 781	PHS 781	16
Strata control – Collieries 788	PSZ 788	16
Strata control – Hard rock mining 786	PSZ 786	16
Surface mining 783	POY 783	16
Rock breaking 785	PRX 785	16

**MEng (Mining Engineering)(12250071)**

Dissertation 890

**Code**  
PYI 890

**Credits**  
128

**(i) MODULES FROM OTHER DEPARTMENTS**

Postgraduate modules offered by the **Department of Geology:**

Engineering geology 703	IGL 703
Engineering geology 704	IGL 704

Postgraduate modules offered by the **Department of Mathematics and Applied**

**Mathematics:**

*First semester*

Mathematical models of financial engineering 732	WTW 732
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*Second semester*

Mathematical models of financial engineering 762	WTW 762
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(Prerequisite: WTW 732)

Postgraduate modules offered by the **Department of Computer Science:**

Computer networks 780	RNW 780
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Graphics 780	GRF 780
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Office systems 715	KAS 715
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Programming languages 780	PGT 780
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Software engineering 780	PIN 780
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**Bachelor of Science Honours in Applied Science**

**[BScHons (Applied Science)]**

**Bachelor of Science Honours in Technology Management**

**[BScHons (Technology Management)]**

**Eng. 22**

Also consult the General Regulations G.16 to G.29.

- (a) Admission requirements: An appropriate bachelor's degree, a BTech degree or equivalent qualification.
- (b) The minimum duration of the programme is one year of full-time study.
- (c) A minimum of 128 credits is required to obtain the BSc(Hons) degree.
- (d) The BScHons (Applied Science) degree is conferred by the following academic departments:
  - Chemical Engineering
  - Civil Engineering
  - Industrial and Systems Engineering
  - Materials Science and Metallurgical Engineering
  - Mechanical and Aeronautical Engineering
  - Mining Engineering
- (e) The BScHons (Technology Management) degree is conferred by the following academic department:
  - Engineering and Technology Management
- (f) The stipulations of Reg. Eng. 19 (e) to (g) apply *mutatis mutandis*.



**Master of Science in Applied Science  
[MSc (Applied Science)]  
Master of Science in Technology Management  
[MSc (Technology Management)]**

**Eng. 23**

Also consult the General Regulations G.30 to G.44. and G.57 to G.62

- (a) Subject to the stipulations of Regulation G.62, an appropriate BScHons or equivalent degree is required for admission.
- (b) The minimum duration of the programme is one year of full-time study.
- (c) The MSc (Applied Science) degree is conferred by the same departments as the BScHons (Applied Science) degree. The MSc (Technology Management) degree is conferred by the Department of Engineering and Technology Management.
- (d) A minimum of 128 credits is required to obtain the MSc degree. Either a mini-dissertation (64 credits) and coursework (64 credits) **or** a dissertation (128 credits) is included in the programme.
- (e) The stipulations of Regulation Eng. 20 (f) to (k) apply *mutatis mutandis*, excluding the stipulations applicable to the MEng (Engineering Management), MEng (Project Management), MSc (Engineering Management) and the MSc (Project Management).

**Curricula for the BScHons (Applied Science), BScHons (Technology Management), MSc (Applied Science) and the MSc (Technology Management) programmes**

**Eng. 24**

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

**Note:** The programmes are arranged in alphabetical order according to the names of the academic departments.

**(a) CHEMICAL ENGINEERING**

A limited number of appropriate postgraduate modules from other departments are allowed.

**BScHons (Applied Science) (Control)(12243012)**

	<b>Code</b>	<b>Credits</b>
<i>At least 64 credits from the following:</i>		
Process control 410	CPB 410	16
Chemical engineering 412	CIR 412	16
Process synthesis 410	CPS 410	16
Practice 420	CPR 420	16
Specialisation 420	CSS 420	16
<i>The modules above must be passed before any of the following modules can be registered:</i>		
Process control system development 732	CSP 732	32
Separation technology 732	CSK 732	32
Process integration 732	CIP 732	32

**BScHons (Applied Science) (Chemical Technology)(12243015)**

	<b>Code</b>	<b>Credits</b>
<i>Option: Carbon and Polymer Materials Science and Chemical Product Design - 128 credits from the following:</i>		
Polymer materials science 732	CPW 732	32
Polymer processing 732	CPP 732	32
Separation technology 732	CSK 732	32
Chemical engineering 707	CIR 707	32
Additive technology 732	CYM 732	32
Carbon materials science and technology 732	CMS 732	32
Product design 732	CPO 732	32
<i>Option: Process Design - 128 credits from the following:</i>		
Reactor design 410	CRO 410	16
Process control 410	CPB 410	16
Chemical engineering 412	CIR 412	16
Process synthesis 410	CPS 410	16
Practice 420	CPR 420	16
Specialisation 420	CSS 420	16
Product design 732	CPO 732	32
Separation technology 732	CSK 732	32
Process integration 732	CIP 732	32

**BScHons (Applied Science) (Environmental Technology)(12243025)**

	<b>Code</b>	<b>Credits</b>
<i>The following 128 credits are prescribed:</i>		
Environmental management 787	CEM 787	32
Air management 787	CAM 787	32
Water quality management 787	WQB 787	32
Waste management 787	WAI 787	32

**BScHons (Applied Science) (Water Utilisation)(12243029)**

	<b>Code</b>	<b>Credits</b>
<i>The following 128 credits are prescribed:</i>		
Chemical water treatment 787	WCW 787	32
Biological water treatment 787	WBW 787	32
Water quality management 787	WQB 787	32
Waste management 787	WAI 787	32

**MSc (Applied Science) (Control)(12253012)****MSc (Applied Science) (Chemical Technology)(12253015)****MSc (Applied Science) (Environmental Technology)(12253025)****MSc (Applied Science) (Water Utilisation)(12253029)**

	<b>Code</b>	<b>Credits</b>
Dissertation 807	CVD 807	128
<b>or</b>		

**MSc (Applied Science)(Coursework)(12253051)****(only available for specialisation in Water Utilisation)**

Mini-dissertation 807	CSC 807	64
<i>and 64 credits from the following:</i>		
Chemical engineering 807	CIR 807	32
Plant design 807	CAO 807	32

Plant design 817	CAO 817	32
Any of the modules as prescribed for the MEng programmes.		

## (b) CIVIL ENGINEERING

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

### BScHons (Applied Science)

At least 128 credits from the following:

	Code	Credits
<b>Specialisation in Water Resources (12243030)</b>		
Basic applied hydraulics 786	SHW 786	24
Basic fundamental hydraulics 787	SHW 787	24
<i>and 24 credits from the following:</i>		
Basic soil mechanics 785	SGM 785	24
Basic concrete structures 792	SIC 792	24
Basic structural analysis 790	SIC 790	24
Basic steel structures 791	SIC 791	24
Basic transportation and traffic engineering 789	SVV 789	24
Basic pavements 786	SGM 786	24
Basic statistical methods 797	SHC 797	24
<i>and the remainder of the modules chosen from the modules prescribed for the BEng(Hons)(Water Resource Engineering) programme, as approved by the head of department, and after completion of the appropriate modules from the list above.</i>		
<b>Specialisation in Geotechnics (12243019)</b>		
Statistical methods 791	SHC 791	24
Basic soil mechanics 785	SGM 785	24
Geotechnical design special 795	SGC 795	24
Soil mechanics special 784	SGM 784	24
Geotechnical laboratory testing 785	SGS 785	24
In-situ soil testing and monitoring 786	SGS 786	24
<b>Specialisation in Structures (12243031)</b>		
Basic concrete structures 792	SIC 792	24
Basic structural analysis 790	SIC 790	24
Basic steel structures 791	SIC 791	24
<i>and the remainder of the credits chosen from the modules prescribed for the BEng(Hons)(Structural Engineering) programme, as approved by the head of department, and after completion of the appropriate modules from the list above.</i>		
<b>Specialisation in Transportation Planning (12243028)</b>		
Basic transportation and traffic engineering 789	SVV 789	24
Basic pavement materials and design 786	SGM 786	24
Basic statistical methods 797	SHC 797	24
Transportation planning 789	SVC 789	24
<i>and the remainder of the credits chosen from the modules for the BEng(Hons)(Transportation Engineering) programme, as approved by the head of department, and after completion of the appropriate modules from the list above.</i>		

**MSc (Applied Science) (Geotechnics)(12253019)****MSc (Applied Science) (Structures)(12253036)****MSc (Applied Science) (Transportation Planning)(12253028)****MSc (Applied Science) (Water Resources)(12253031)**

	<b>Code</b>	<b>Credits</b>
Dissertation 890	SST 890	128

**or****MSc (Applied Science)(Coursework)**Specialisation in **Water Resources (12253053)**

Mini-dissertation 896	SST 896	64
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**and**

Computer applications for civil engineers 880	SHC 880	32
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Advanced hydraulics 885	SHC 885	32
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**or**Specialisation in **Structures (12253054)**

Mini-dissertation 896	SST 896	64
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**and***64 credits from the following:*

Computer applications for civil engineers 880	SHC 880	32
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Advanced structural analysis 887	SIN 887	32
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Advanced structural design 886	SIN 886	32
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An approved module from the Department of Mechanical and Aeronautical Engineering.

**or**Specialisation in **Transportation Planning (12253052)**

Mini-dissertation 896	SST 896	64
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**and**

Advanced transportation I 882	SVV 882	32
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Computer applications for civil engineers 880	SHC 880	32
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**(c) ELECTRICAL, ELECTRONIC AND COMPUTER ENGINEERING****MSc (Applied Science)(12253046)**

	<b>Code</b>	<b>Credits</b>
Dissertation 891	EER 891	128

**(d) ENGINEERING AND TECHNOLOGY MANAGEMENT****BScHons (Technology Management)(12241072)**

128 credits from the following:

	<b>Code</b>	<b>Credits</b>
<b>Core modules</b>		
Engineering economics 780	IKN 780	16
Technology and innovation management 780	ITI 780	16
Project management 780	IPK 780	16
Systems engineering 780	ISE 780	16
Operations management 781	IVV 781	16
Technological entrepreneurship 780	IEE 780	16
Quality management 780	IKK 780	16

**and**

**Electives**

(Ad hoc module for students from other departments)

Maintenance management 780	IMC 780	16
Engineering logistics 780	IIX 780	16
Research methodology 781	INI 781	16

**MSc (Technology Management)(12251072)**

This qualification follows upon the BSc(Hons)(Technology Management)

	<b>Code</b>	<b>Credits</b>
Dissertation 895	ITB 895	128

**or**

**MSc (Technology Management)(Coursework)(12251076)**

Mini-dissertation 898	ISC 898	64
People management 884	PEM 884	16
Financial management 831	FBS 831	16
Strategic management 802	ISM 802	16

**and****Elective module**

Technology commercialisation 881	IKG 881	16
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**or**

Module from the MEM/MPM programme (subject to the approval of the head of department)

**(e) INDUSTRIAL AND SYSTEMS ENGINEERING**

A limited number of appropriate modules from other departments are allowed.

**BScHons (Applied Science) (Industrial Systems)(12243011)**

	<b>Code</b>	<b>Credits</b>
<i>The following modules are compulsory:</i>		
Basic statistical methods 790	SHC 790	16
Research methodology 781	INI 781	16
Industrial analysis 780	BAN 780	16
Production management 781	BPZ 781	16
Business logistics 780	BLK 780	16

**and***a maximum of 48 credits elected from the BEng(Hons) programme.***MSc (Applied Science) (Industrial Systems)(12253011)**

	<b>Code</b>	<b>Credits</b>
Dissertation 891	BIR 891	128

**(f) MATERIALS SCIENCE AND METALLURGICAL ENGINEERING**

A limited number of appropriate postgraduate modules from other departments are allowed.

**BScHons (Applied Science) (Metallurgy)(12243022)**

	<b>Code</b>	<b>Credits</b>
<i>At least 32 credits from the following:</i>		
Basic hydrometallurgy 701	NHM 701	32
Basic physical metallurgy 701	NFM 701	32
Basic pyrometallurgy 701	NPM 701	32
<b>and</b>		
<i>a maximum of 32 credits from the following: (optional)</i>		
Basic statistical methods 790	SHC 790	16
Research methodology 781	INI 781	16
Project management 780	IPK 780	16
<b>or (optional)</b>		
Project 411	NSC 411	8
Project 421	NSC 421	44

**and**

*the balance of the credits (for a total of 128) chosen from the modules for the BEng(Hons) programme, as approved by the head of department and after completion of the appropriate 701 modules.*

**MSc (Applied Science) (Metallurgy)(12253022)**

	<b>Code</b>	<b>Credits</b>
Dissertation 891	NIN 891	128

**(g) MECHANICAL AND AERONAUTICAL ENGINEERING**

A limited number of appropriate modules from other departments are allowed.

**BScHons (Applied Science) (Mechanics)(12243021)**

	<b>Code</b>	<b>Credits</b>
Structural mechanics 732	MSY 732	32
Thermoflow 732	MTV 732	32

**and**

*at least 64 credits chosen from the modules as prescribed for the BEng(Hons) programme, as approved by the head of department.*

**MSc (Applied Science) (Mechanics)(12253021)**

	<b>Code</b>	<b>Credits</b>
Dissertation 891	MIR 891	128

**(h) MINING ENGINEERING**

A limited number of appropriate modules from other departments are allowed.

**BScHons (Applied Science) (Mining Environmental Control)(12243023)****or****BScHons (Applied Science) (Mine Strata Control)(12243024)**

	<b>Code</b>	<b>Credits</b>
<i>At least 64 credits from the following:</i>		
Basic mine environment engineering 701	PKB 701	32
Basic rock mechanics 703	PSZ 703	32

Basic mining methods 701  
and

PMY 701 32

at least 64 credits chosen from the modules as prescribed for the BEng(Hons) programme (excluding Financial mine evaluation PFZ 780), as approved by the head of department.

**MSc (Applied Science) (Mining Environmental Control)(12253023)**  
or  
**MSc (Applied Science) (Mine Strata Control)(12253024)**

	<b>Code</b>	<b>Credits</b>
Dissertation 891	PYI 891	128

## DOCTORAL DEGREES

### Doctor of Philosophy in Engineering [PhD (Engineering)]

#### Eng. 25

Also consult the General Regulations G.45 to G.55 and G.57 to G.62.

- (a) Subject to the stipulations of Regulations G.45 and G.62, no candidate is admitted to doctoral studies unless such a candidate holds a master's degree in Engineering or an equivalent master's degree.
- (b) Unless otherwise decided by the Dean, on the recommendation of the supervisor, the PhD(Engineering) degree is awarded on the basis of a thesis and an examination on the thesis.
- (c) Unless the Senate, on the recommendation of the supervisor, decides otherwise, a student, before or on submission of a thesis, must submit proof of submission of an article from/issued by an accredited journal, to the Head: Student Administration. The submitted article should be based on the research that the student has conducted for the thesis and be approved by the supervisor if the supervisor is not a co-author. The supervisor shall be responsible for ensuring that the paper is taken through all the processes of revision and resubmission, as may be necessary. Conferment of the degree may be made subject to compliance with the stipulations of this regulation.
- (d) The student must provide proof by means of his work, thesis and examination of advanced original research and/or creative work which makes a real and substantial contribution to the knowledge of Engineering Science and/or Practice.

### Doctor of Philosophy [PhD]

#### Eng. 26

Also consult the General Regulations G.45 to G.55 and G.57 to G.62.

- (a) Subject to the stipulations of Regulations G.45 and G.62 a master's degree is required for admission to studies for a PhD.
- (b) Unless otherwise decided by the Dean, on the recommendation of the supervisor, the PhD degree is awarded on the basis of a thesis and an examination on the thesis.

- (c) Unless the Senate, on the recommendation of the supervisor, decides otherwise, a student, before or on submission of a thesis, must submit proof of submission of an article issued by an accredited journal, to the Head: Student Administration. The submitted article should be based on the research that the student has conducted for the thesis and be approved by the supervisor if the supervisor is not a co-author. The supervisor shall be responsible for ensuring that the paper is taken through all the processes of revision and resubmission, as may be necessary. Conferment of the degree may be made subject to compliance with the stipulations of this regulation.
- (d) The student must provide proof by means of his work, thesis and examination of advanced original research and/or creative work which makes a real and substantial contribution to the knowledge of Engineering Science and/or Practice.

<b>Doctor of Engineering [DEng] (Code 12260001)</b>
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### **Eng. 27**

The degree DEng is awarded on the basis of publications. Subject to General Regulation G.56, the following applies:

#### **1. Admission**

The degree is conferred on a candidate who can demonstrate that he/she enjoys international recognition in her/his field of expertise by virtue of the quality and impact of the publications that have been produced.

#### **2. Application**

- (a) A candidate must apply in writing to be considered for the degree.
- (b) Should a candidate wish to graduate at a particular ceremony, an application must be submitted before the closing date of the various graduation ceremonies, which is announced annually.
- (c) The application must be accompanied by
  - (i) four sets of copies of the publications by virtue of which application is made;
  - (ii) a declaration in which the candidate testifies that the publication/s submitted for the doctoral degree
    - has/have not previously been submitted to this or any other tertiary institution for such a doctoral degree;
    - is/are his or her own work, and with regard to such publication/s of which he or she is co-author, that his or her personal contribution to those works is clearly stated;
    - take(s) place with due recognition given to the author's copyright in accordance with the case.
  - (iii) a summary of not more than 500 words that indicates the contribution that the work has made to the discipline.

#### **3. Registration**

A candidate must register in the manner determined by the University and pay the prescribed registration fee.



#### 4. Evaluation of the publications

- (a) The dean appoints a committee, chaired by the chairperson of the Research Committee and of which the head of the department concerned is a member, to make a recommendation to the faculty board as to whether the works have sufficient substance to be submitted for examination in terms of G.56.5(b).
- (b) If the faculty board accepts the recommendation, the Postgraduate Committee appoints an examination panel for a particular candidate, subject to approval by the dean.
- (c) The head of the department concerned compiles a list of names of potential examiners both inside and outside of South Africa from which the Postgraduate Committee chooses at least three external examiners from outside the University, all of whom must be recognised internationally as having made significant contributions in the field of study. Normally, at least two of these examiners would be from outside South Africa.
- (d) No examiner should have any interest in the candidate or in any way be involved in the research that the candidate has done previously.
- (e) External examiners must be from different institutions.
- (f) As soon as a potential examiner has accepted his/her appointment as examiner, he/she is supplied with a formal letter of appointment as well as documentation on the policy of the University concerning examinations. Examiners must sign an acceptance form that is to be returned to the Head: Student Administration.
- (g) A candidate passes if all the members of the examination panel accept the publications for the purposes of conferring the doctoral degree, and on condition that if all but one of the examiners accept the work, the dean, after consultation with the Postgraduate Committee, may appoint a knowledgeable and esteemed academic of stature from outside the University as additional examiner. If the additional examiner accepts the publications, the candidate passes. If such an examiner also rejects the publications, the doctorate is not conferred.
- (h) A candidate is only considered once for a doctoral degree based on publications.
  - (i) The degree is not conferred with distinction.
  - (j) After a decision on whether the degree is to be conferred or not, has been reached, as indicated in (g) above, the Head: Student Administration has to
    - (i) address a letter to the examiners to thank them for their participation in the examination and for their recommendations;
    - (ii) inform the examiners of the final result and indicate to them what their further involvement, if any, will be in the remainder of the process;
    - (iii) inform the candidate and the head of the department of the final result.

<b>SYLLABI</b>
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**Note:**

The list of modules and the module descriptions are available at:  
<http://web.up.ac.za/modules>