

**CHAPTER 20****FACULTY OF ENGINEERING AND INFORMATION TECHNOLOGY**

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<b>LECTURERS</b>	Mr NJ Grobbelaar, MTech (CUT), PrTechEng Mr CM Korff, NHDip (CUT) Dr OJ Gericke, MTech (CUT), MSc (US), PhD (UKZN), PrTechEng Mr S Tetsoane, MTech (CUT) Mr R Gopinath, MEng (IIT) Mr J Honiball, MTech (CUT) Mr W Strydom, MSc (Heriot-Watt University – UK)
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**TECHNICAL ASSISTANTS (Computer)** Mr RJ Jansen van Nieuwenhuizen, MTech (CUT)  
**(Electrical)** Vacant  
**(Electronic)** Vacant

## DEPARTMENT OF INFORMATION TECHNOLOGY

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<b>TECHNICAL ASSISTANT</b>	Mr L Masheane, BTech (CUT)
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<b>SENIOR LECTURER</b>	Dr HE Brink, PhD (US)

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Mr R Sypkens, MSc (UFS)

Dr G Makanda, PhD (UKZN)

Dr M Talwanga, BSc(Ed) (UPN), BScHons (UFH), PhD  
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Dr DH Delpont, PhD (UFS)

Ms BN Dyakopu, MSc (UWC)

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## **1. RULES OF THE FACULTY OF ENGINEERING AND INFORMATION TECHNOLOGY**

The following rules are supplementary to the rules of the Central University of Technology, Free State (CUT):

## **2. DURATION OF SEMESTER AND YEAR LEARNING PROGRAMMES**

For Electrical, Mechanical and Civil Engineering, there are two intakes per year, i.e. one in January and one in July. For all other learning programmes presented in the Faculty, there is only one intake per year, i.e. in January.

The duration of a semester is approximately six months.

The first semester extends from January to June, whilst the second semester extends from July to November.

## **3. STRUCTURE OF LEARNING PROGRAMMES (REFER TO THE REMARKS PRINTED UNDER EACH LEARNING PROGRAMME)**

## **4. NATIONAL DIPLOMA, DIPLOMA AND DEGREE LEARNING PROGRAMMES**

The student has the option of exiting upon successful completion of the first three years of study, thereby earning a national diploma. Diploma programmes in Engineering and Building consist of two components, namely the formal study period and a period of work-integrated learning.

Formal study period:

The period of formal study at CUT extends over four semesters.

Work-integrated learning period (Engineering and Building programmes):

The period of compulsory WIL training applicable to each programme, to be completed at a suitable place of employment, extends over two semesters.

A student may register for a Baccalaureus Technologiae degree in the fourth year, upon successful completion of a national diploma. Admission to the Baccalaureus Technologiae year of study is subject to certain prerequisites (see specific learning programme). Some of the final annual instructional offerings for the Baccalaureus Technologiae in learning programmes related to Engineering are presented on either a full-time or a part-time block basis. A minimum of one year's work-integrated learning is to be completed before Baccalaureus Technologiae studies in the field of Engineering can commence. Further information is available from the relevant Heads of Department (HoDs) or the Faculty Officer.

## **5. FORMAL STUDIES**

### **5.1 Students with an employer**

The student enrolls directly at national diploma level, provided that he/she complies with the minimum admission requirements. After a period of one year (two semesters) at CUT, the student may return to the employer for work-integrated learning (in a programme of Engineering), or alternatively may continue with the subsequent academic part, and join the employer for work-integrated learning purposes at a later stage.

## 5.2 Students without an employer

The student enrolls at national diploma level, provided that he/she complies with the minimum admission requirements. The student attends classes with the other groups, and at any stage after the first year (two semesters) may commence with his/her work-integrated learning training at a suitable place of employment. Upon completion of the formal study period at CUT and the prerequisite work-integrated learning (Engineering programmes), the student may either apply for a national diploma and leave the University, or continue with his/her studies towards the Baccalaureus Technologiae degree.

## 6. REGISTRATION DURING WORK-INTEGRATED LEARNING

Employers prepare a programme for work-integrated learning in collaboration with CUT. With regard to Computer Systems, it is recommended that students complete all four semesters of study before commencing with their work-integrated learning. The Centre for Work-integrated Learning and Skills Development assists in placing students with employers.

During the work-integrated learning phase, **the student must register at CUT every six months, except for the Building programme, where students register in January for the full academic year.** The student compiles a report containing details of the training period, which serves as a means of monitoring the progress made in the student's work-integrated learning. The rules applicable to the writing of the report are contained in a study guide, available from the secretary of the relevant department. After every semester of prescribed work-integrated learning, the student must approach the secretary of the relevant department to arrange for an interview, during which his/her work-integrated learning is assessed by the relevant lecturer, no later than 14 days after commencing with the subsequent semester, unless otherwise stipulated in specific programme study guides.

## 7. USE OF POCKET CALCULATORS

Unless otherwise specified for a particular instructional offering, no alphanumeric pocket calculators may be used during tests or assessments.

## 8. INTEGRATED TERTIARY SOFTWARE (ITS) CODES

When completing a registration or other form, the student must be certain of the correct codes used to identify the learning programme and instructional offerings selected. As accounts, class lists, progress reports and assessment results are compiled according to these codes, it is in the best interest of the student to ensure that the correct codes are used, and that he/she writes clearly.

## 9. INTERNET-BASED LEARNING

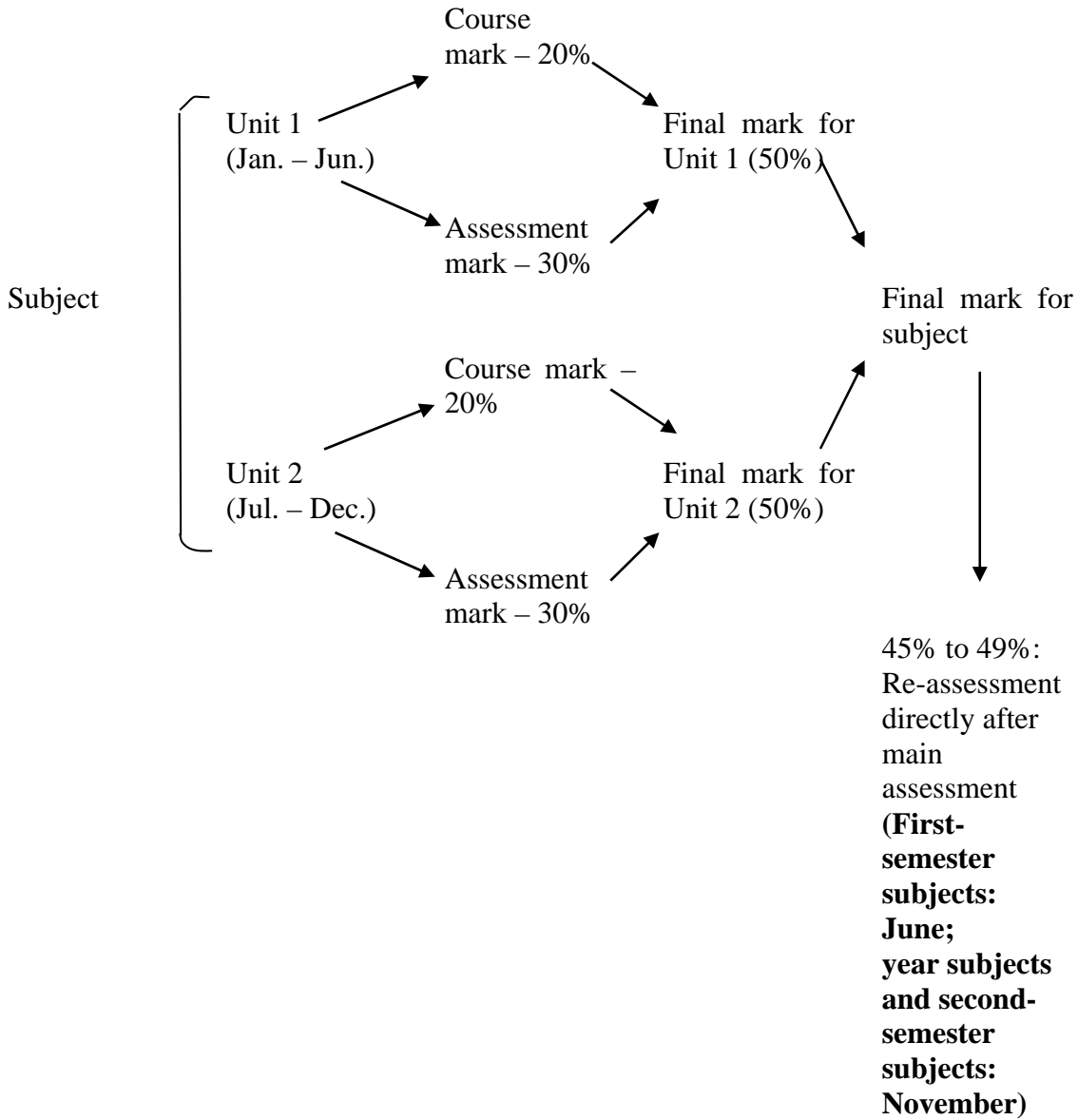
Internet-based learning has been implemented in respect of several instructional offerings, and is used as an additional instructional support aid in the Faculty of Engineering and Information Technology. Information in this regard will be provided by the lecturers concerned.



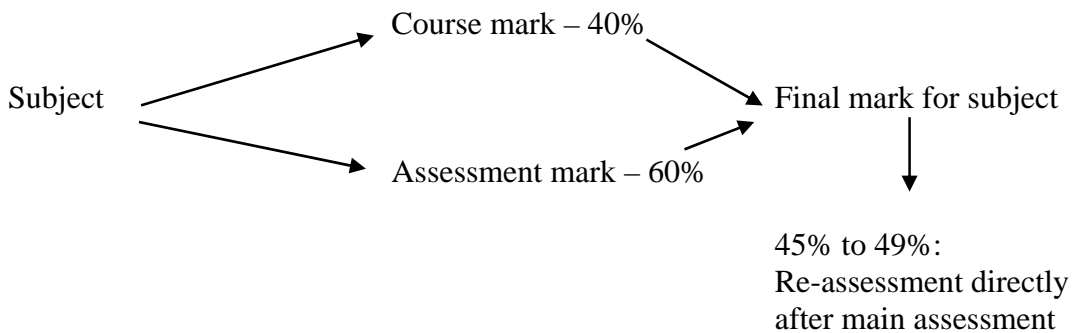
**10. ASSESSMENT MODEL FOR ALL PROGRAMMES: 2017**

**Unless otherwise determined by a resolution of Senate:**

**1. Year subjects**



**2. Semester subjects**



## 10.1. ASSESSMENT AND RESULTS (ALL faculties, unless otherwise specified)

10.1.1 A subject is considered a credit, and therefore the following provisions apply:

- A student must pass any subject that is a prerequisite for another subject before he/she may register for the next level of the subject concerned.
- The pass requirements for a specific subject are as follows: A result is determined from a calculated average of tests and assessment opportunities. The minimum pass mark per subject is 50%. The minimum final mark required to pass a subject with distinction is 75%.
- **Please note that once a student has been granted a re-assessment or a special assessment as a result of illness or some other reason, no other such additional assessment will be granted.**

## 10.2 THE 2017 RULES FOR ALL PROGRAMMES

10.2.1 For all Engineering programmes, a subminimum mark of 50%, accumulated for practical work and projects in specified subjects, is compulsory to gain access to the relevant assessment session and to pass the subject. This rule applies to all those subjects identified as such in the study guides.

10.2.2 An admission mark of at least 40% is required for admission to the main assessments.

10.2.3 A re-assessment is granted to a candidate who has achieved a final mark of 45% to 49% in a subject. The re-assessment of a year subject – covering the subject content of the entire year – takes place directly after the main assessment in November. The re-assessment of semester subjects takes place immediately after the main assessment in June, whilst the re-assessment of second-semester and year subjects takes place in November.

Re-assessment will not be granted in continuous assessment subjects.

## 11. ACCREDITATION STATUS OF ENGINEERING LEARNING PROGRAMMES

The following learning programmes are accredited by the Engineering Council of South Africa:

- Civil Engineering
- Computer Systems Engineering
- Electrical Engineering
- Mechanical Engineering

## 12. GENERAL

The student may only enrol for second-, third- or fourth-year level instructional offerings of a learning programme if he/she has passed the first-, second- or third-year level respectively.

## 13. THE FOLLOWING HIGHER CERTIFICATE PROGRAMMES ARE OFFERED IN THE FACULTY:

Higher Certificate in Construction  
Higher Certificate in Renewable Energy Technologies

**14. THE FOLLOWING NATIONAL DIPLOMA PROGRAMMES ARE OFFERED IN THE FACULTY:**

National Diploma: Building  
 National Diploma: Engineering: Civil  
 National Diploma: Engineering: Computer Systems  
 National Diploma: Engineering: Electrical (Heavy Current)  
 National Diploma: Engineering: Electrical (Electronic Light Current)  
 National Diploma: Engineering: Mechanical  
 National Diploma: Information Technology (Software Development) (*Phasing out*)  
 National Diploma: Information Technology (Web and Application Development) (*Phasing out*)

**15. THE FOLLOWING NATIONAL DIPLOMA EXTENDED CURRICULUM PROGRAMMES (ECPs) ARE OFFERED IN THE FACULTY:**

National Diploma: Engineering: Civil ECP  
 National Diploma: Engineering: Electrical (Heavy Current) ECP  
 National Diploma: Engineering: Electrical (Electronic Light Current) ECP  
 National Diploma: Engineering: Mechanical ECP  
 National Diploma: Information Technology ECP (Software Development) (*Phasing out*)  
 National Diploma: Information Technology ECP (Web and Application Development) (*Phasing out*)

**16. THE FOLLOWING DIPLOMA PROGRAMMES ARE OFFERED IN THE FACULTY:**

Diploma in Computer Networking  
 Diploma in Information Technology

**17. THE FOLLOWING DIPLOMA EXTENDED CURRICULUM PROGRAMMES (ECPs) ARE OFFERED IN THE FACULTY:**

Diploma in Computer Networking (ECP)  
 Diploma in Information Technology (ECP)

**18. THE FOLLOWING ADVANCED DIPLOMA PROGRAMME IS OFFERED IN THE FACULTY:**

Advanced Diploma in Logistics and Transportation Management

**19. THE FOLLOWING BACCALAUREUS TECHNOLOGIAE PROGRAMMES ARE OFFERED IN THE FACULTY:**

Baccalaureus Technologiae: Construction Management  
 Baccalaureus Technologiae: Engineering: Civil  
 Baccalaureus Technologiae: Engineering: Electrical  
 Baccalaureus Technologiae: Engineering: Mechanical  
 Baccalaureus Technologiae: Information Technology (Software Development)  
 Baccalaureus Technologiae: Information Technology (Web and Application Development)  
 Baccalaureus Technologiae: Quantity Surveying

**20. THE FOLLOWING BACHELOR OF SCIENCE PROGRAMME IS OFFERED IN THE FACULTY:**

Bachelor of Science in Hydrology and Water Resources Management

**21. THE FOLLOWING MAGISTER TECHNOLOGIAE PROGRAMMES ARE OFFERED IN THE FACULTY:**

Magister Technologiae: Engineering: Civil (*Phasing out*)

Magister Technologiae: Engineering: Electrical (*Phasing out*)

Magister Technologiae: Engineering: Mechanical (*Phasing out*)

Magister Technologiae: Information Technology (*Phasing out*)

**22. THE FOLLOWING MASTER'S DEGREE PROGRAMMES ARE OFFERED IN THE FACULTY:**

Master of Engineering in Civil Engineering

Master of Engineering in Electrical Engineering

Master of Engineering in Mechanical Engineering

Master of Information Technology

**23. THE FOLLOWING DOCTOR TECHNOLOGIAE PROGRAMMES ARE OFFERED IN THE FACULTY:**

Doctor Technologiae: Engineering: Civil (*Phasing out*)

Doctor Technologiae: Engineering: Electrical (*Phasing out*)

Doctor Technologiae: Engineering: Mechanical (*Phasing out*)

Doctor Technologiae: Information Technology (*Phasing out*)

**24. THE FOLLOWING DOCTORATE PROGRAMMES ARE OFFERED IN THE FACULTY:**

Doctor of Engineering in Civil Engineering

Doctor of Engineering in Electrical Engineering

Doctor of Engineering in Mechanical Engineering

**25. THE FOLLOWING DOCTOR OF PHILOSOPHY PROGRAMME IS OFFERED IN THE FACULTY:**

Doctor of Philosophy in Information Technology

## 26. HIGHER CERTIFICATES

### 26.1 HIGHER CERTIFICATE IN CONSTRUCTION HC\_CON

*This learning programme will be offered in Bloemfontein.*

<b>SAQA CREDITS:</b>	<b>140</b>
<b>MINIMUM CREDITS REQUIRED:</b>	<b>140</b>
<b>NQF LEVEL:</b>	<b>5</b>
<b>DURATION OF LEARNING PROGRAMME:</b>	<b>1 year full-time or 2 years part-time</b>

#### Instructional offerings

1 <sup>ST</sup> YEAR	INSTRUCTIONAL OFFERINGS	CREDITS
CET00BE	Construction and the Environment	15
COM00BE	Construction Management	20
CMT00BE	Construction Mathematics	15
CTG00BE	Construction Technology	20
FCL00BE	Fundamentals of Contract Law	15
FHD00BE	Fundamentals of Human Settlement Development	15
MET00BE	Measurement, Estimating and Tendering	20
PBS00BE	Physical Building Science	15
SES00BE	Site Establishment and Supervision	20
<b>Total:</b>		<b>140</b>

#### REMARKS

- All instructional offerings are compulsory.
- Any application for subject recognition will be considered ONLY for subjects completed at equivalent level, not at a lower level.
- The qualification will be issued upon completion of 140 credits.
- One intake per year, in January.
- After successful completion of this qualification, the Higher Certificate will be awarded during an official graduation ceremony at CUT.

#### Admission requirements:

##### For candidates who matriculated in 2007 and before:

A Grade 12 National Senior Certificate with a minimum score of 27 on the CUT scoring scale, plus a minimum mark of 50% on standard grade or 40% on higher grade in both Physical Sciences and Mathematics. Candidates with a score of 23 to 26 on the CUT scoring scale must successfully complete the selection process for admission, which could include the writing of an admission selection test. Mathematical Literacy will **not** be accepted.

##### For candidates who matriculated in 2008 and thereafter:

A National Senior Certificate with a score of 27 on the CUT scoring scale, plus a minimum pass mark of 50% (rating 4) in both Mathematics and Physical Sciences. Candidates with a score of 23 to 26 on the CUT scoring scale must successfully complete the selection process for admission, which could include the writing of an admission selection test. Mathematical Literacy will **not** be accepted.

Applicants in possession of the National Certificate Vocational (NCV) will be selected according to the selection requirements as approved by Senate.

## 26.2 HIGHER CERTIFICATE IN RENEWABLE ENERGY TECHNOLOGIES IEHCRE

*This learning programme will be offered in Bloemfontein.*

<b>SAQA CREDITS:</b>	<b>120</b>
<b>MINIMUM CREDITS REQUIRED:</b>	<b>120</b>
<b>NQF LEVEL:</b>	<b>5</b>
<b>DURATION OF LEARNING PROGRAMME:</b>	<b>1 year</b>

### Instructional offerings

1 <sup>ST</sup> YEAR		INSTRUCTIONAL OFFERINGS	CREDITS
SEMESTER 1	SEMESTER 2		
	LCS5001	Academic Literacy and Communication Studies	12
PPE5011		Applied Physics of Energy Conversion I	12
DLC5011		Basic Digital Literacy	6
EEN5011		Electrical Engineering I	12
WIS5011		Mathematics IA	6
LES5011		Solar Energy Systems I	12
	EIP5012	Electrical Installation and Storage	12
	HPP5012	Health and Safety: Principles and Practice	6
	WIS5012	Mathematics IB	6
	PGS5012	Power Generation and Storage	12
	LES5022	Solar Energy Systems II	12
	LWG5012	Small-wind Generation	12
<b>Total:</b>			<b>120</b>

### REMARKS

- All instructional offerings are compulsory.
- Any application for subject recognition will be considered ONLY for subjects completed at equivalent level, not at a lower level.
- The qualification will be issued upon completion of 120 credits.
- One intake per year, in January.
- After successful completion of this qualification, the Higher Certificate will be awarded during an official graduation ceremony at CUT.

### Admission requirements:

#### For candidates who matriculated in 2007 and before:

A Grade 12 National Senior Certificate with a minimum score of 27 on the CUT scoring scale, plus a minimum mark of 50% on standard grade or 40% on higher grade in both Physical Sciences and Mathematics. Candidates with a score of 23 to 26 on the CUT scoring scale must successfully complete the selection process for admission, which could include the writing of an admission selection test. Mathematical Literacy will **not** be accepted.

#### For candidates who matriculated in 2008 and thereafter:

A National Senior Certificate with a score of 27 on the CUT scoring scale, plus a minimum pass mark of 50% (rating 4) in both Mathematics and Physical Sciences. Candidates with a score of 23 to 26 on the CUT scoring scale must successfully complete the selection process for admission, which could include the writing of an admission selection test. Mathematical Literacy will **not** be accepted.

Applicants in possession of the National Certificate Vocational (NCV) will be selected according to the selection requirements as approved by Senate.

**27. NATIONAL DIPLOMAS**

**27.1 NATIONAL DIPLOMA: BUILDING ISNDBO**

*This learning programme will be offered in Bloemfontein.*

**SAQA CREDITS: 360**  
**MINIMUM CREDITS REQUIRED: 360**  
**NQF LEVEL: 6**  
**DURATION OF LEARNING PROGRAMME: 3 years**

**Instructional offerings**

1 <sup>ST</sup> YEAR	2 <sup>ND</sup> YEAR	3 <sup>RD</sup> YEAR	INSTRUCTIONAL OFFERINGS	CREDITS
TBW10AI			Applied Building Science I	20
ECM12BI			Communication Skills I ( <b>Semester 2</b> )	5
RTP11AI			Computer Applications I ( <b>Semester 1</b> )	5
KON10AI			Construction Management I	20
KTG10AI			Construction Technology I	20
PRE1A			English Proficiency <b>and</b>	10
PRE2B			English Proficiency	
PIM5011			Personal Information Management	0
RSK11AB			Reading Skills	0
BRK10AI			Quantity Surveying I	20
TRO10AI			Site Surveying I	20
	TBW20ZI		Work-integrated Learning: Building	60
	KON20AI		Construction Management II	20
	KTG20AI		Construction Technology II	20
	BRK20AI		Quantity Surveying II	20
		KOR30AI	Construction Accounting III	20
		KON30AI	Construction Management III	20
		KTG30AI	Construction Technology III	20
		PRY30AI	Price Analysis & Estimating III	20
		BRK30AI	Quantity Surveying III	20
		STR30AI	Structures & Concrete III	20
<b>Total:</b>				<b>360</b>

**PREREQUISITES**

<b>Instructional offerings</b>	<b>Credits</b>	<b>Prerequisite instructional offerings</b>
Applied Building Science I	20	Grade 12
English Proficiency	10	
Communication Skills I (Semester 2)	5	Grade 12
Computer Applications I (Semester 1)	5	Grade 12
Construction Accounting III	20	Quantity Surveying I
Construction Management I	20	Grade 12
Construction Management II	20	Construction Management I
Construction Management III	20	Construction Management II
Construction Technology I	20	Grade 12
Construction Technology II	20	Construction Technology I
Construction Technology III	20	Construction Technology II
Price Analysis & Estimating III	20	Quantity Surveying I
Quantity Surveying I	20	Grade 12
Quantity Surveying II	20	Quantity Surveying I
Quantity Surveying III	20	Quantity Surveying II
Site Surveying I	20	Grade 12
Structures and Concrete III	20	Site Surveying I, Construction Technology II and Applied Building Science I
Work-integrated Learning	60	All first-year subjects

**REMARKS**

All instructional offerings are compulsory.

The minimum total credit value of theoretical instructional offerings is 240 credits. The work-integrated learning component, together with the project-based subjects of the second year, amounts to 120 credits.

Only one intake per year, in January.

After successful completion of this qualification, the National Diploma will be awarded during an official graduation ceremony of CUT.

Academic Literacy and Communication Studies requires the successful completion of two instructional offerings, A and B, in this specific order. The following will apply to Academic Literacy and Communication Studies, and where a subject is denoted with an \*: A distinction (75% or more) in instructional offering A ensures exemption from instructional offering B. A pass (without distinction) means that the student must pass instructional offering B in order to meet the prerequisite for the learning programme. Failing instructional offering A means that the student must re-register for instructional offering A in a subsequent semester.

No student will be allowed to graduate without successfully completing the following instructional offerings: Academic Literacy; Communication Studies, Personal Information Management and Reading Skills.

**Admission requirements:**



For candidates who matriculated in 2007 and before:

A Senior Certificate with a score of 27 and higher on the CUT scoring scale, plus a minimum mark of 50% on standard grade or 40% on higher grade in Mathematics. Physical Sciences is recommended.

For candidates who completed the NSC in 2008 and thereafter:

A National Senior Certificate with a score of 27 and higher on the CUT scoring scale, plus a minimum mark of 50% (rating 4) in Mathematics. Physical Sciences is recommended.

Students who do not fully comply with the stated admission requirements may be considered on the strength of their academic record, as well as the successful completion of a selection test, provided there is sufficient space available for admission.

Applicants in possession of the National Certificate Vocational (NCV) will be selected according to the selection requirements as approved by Senate.

**PREREQUISITES**

Students need to follow the curriculum as prescribed.

- The student is not permitted to continue with an instructional offering on the subsequent level before successfully completing the preceding level (see prerequisites).
- A student must be enrolled for all prescribed second-year instructional offerings simultaneously, unless credits have already been obtained for any of the prescribed instructional offerings.

**27.2 NATIONAL DIPLOMA: ENGINEERING: CIVIL ISNDLS**

*This learning programme will be offered in Bloemfontein.*

<b>SAQA CREDITS:</b>	<b>360</b>
<b>MINIMUM CREDITS REQUIRED:</b>	<b>360</b>
<b>NQF LEVEL:</b>	<b>6</b>
<b>DURATION OF LEARNING PROGRAMME:</b>	<b>3 years</b>

**Statement of the purpose of the qualification:**

The purpose of this qualification is to build the necessary knowledge, understanding and skills required for the student's progression towards becoming a competent practising Engineering Technician. It is intended to subsequently empower the Candidate Engineering Technician to demonstrate his/her ability to apply his/her acquired knowledge, understanding, skills, attitudes and values in the South African work environment. The qualification is also designed to add value to the qualifying student in terms of personal enrichment, as well as status and recognition.

A person in possession of this qualification is able to do the following:

- Competently apply an integration of theory, principles, proven techniques, practical experience and appropriate skills towards solving well-defined problems in the field of Engineering, whilst operating within the relevant standards and codes.
- Demonstrate well-rounded general engineering knowledge, as well as systematic knowledge of the main terms, procedures, principles and operations of one of the disciplines of Engineering.

- Gather evidence from primary sources and journals using advanced retrieval skills, and also organise, synthesise and present the information professionally in a mode appropriate to the audience.
- Apply the acquired knowledge to new situations, both concrete and abstract, in the workplace or community.
- Identify, analyse, conduct and manage a project.
- Make independent decisions/judgements, taking into account the relevant technical, economic, social and environmental factors.
- Work both independently and as a member of a team, and also as a team leader.
- Relate engineering activity to health and safety, as well as environmental, cultural and economic sustainability.
- Meet the requirements for registration with the Engineering Council of South Africa as a Candidate Engineering Technician (at national diploma level).
- Demonstrate the capacity to explore and exploit educational, entrepreneurial and career opportunities, and to engage in professional development.

### Instructional offerings

1 <sup>ST</sup> YEAR				INSTRUCTIONAL OFFERINGS	CREDITS
SEMESTER 1		SEMESTER 2			
January	July	January	July		
CAM11AI	CAM12AI			Applied Mechanics I	10
COM11AI	COM12AI			Computer Skills I	5
KMA11AI	KMA12AI			Construction Materials I	10
CDR11AI	CDR12AI			Drawing I	10
PRE1A PRE2B				English Proficiency <b>and</b> English Proficiency	0
	PRE2A PRE1B PIM5011			English Proficiency <b>and</b> English Proficiency Personal Information Management	0 0
RSK11AB	RSK11AB			Reading Skills	0
CMC11AI	CMC12AI			Management (Civil) I	10
WIS11AI	WIS12AI			Mathematics I	10
		ECM11BI	ECM12BI	Communication Skills I	5
		KMT11AI	KMT12AI	Construction Methods I	10
		CDR21AI	CDR22AI	Drawing II	10
		CMC21AI	CMC22AI	Management (Civil) II	10
		WIS21AI	WIS22AI	Mathematics II	10
		CSU11AI	CSU12AI	Surveying I	10
		CTS21AI	CTS22AI	Theory of Structures II	10
<b>Total:</b>					<b>120</b>

<b>2<sup>ND</sup> YEAR</b>				<b>INSTRUCTIONAL OFFERINGS</b>	<b>CREDITS</b>
<b>SEMESTER 3</b>		<b>SEMESTER 4</b>			
<b>January</b>	<b>July</b>	<b>January</b>	<b>July</b>		
CGE21AI	CGE22AI			Geotechnical Engineering II	10
SSL31AI	SSL32AI			Structural Steel & Timber Design III	10
CSA21AI	CSA22AI			Structural Analysis II	10
CSU21AI	CSU22AI			Surveying (Civil) II	10
CTE21AI	CTE22AI			Transportation Engineering II	10
CWE21AI	CWE22AI			Water Engineering II	10
		CDO31AI	CDO32AI	Documentation III	10
		CGE31AI	CGE32AI	Geotechnical Engineering III	10
		GWP31AI	GWP32AI	Reinforced Concrete & Masonry Design III	10
		CSA31AI	CSA32AI	Structural Analysis III	10
		CTE31AI	CTE32AI	Transportation Engineering III	10
		CWE31AI	CWE32AI	Water Engineering III	10
				<b>Total:</b>	<b>120</b>

<b>3<sup>RD</sup> YEAR</b>		<b>INSTRUCTIONAL OFFERINGS</b>	<b>CREDITS</b>
<b>SEMESTERS 5 &amp; 6</b>			
<b>January</b>	<b>July</b>		
CEX11ZI	CEX12ZI	Work-integrated Learning I	60
CEX21ZI	CEX22ZI	Work-integrated Learning II	60
		<b>Total:</b>	<b>120</b>

**PREREQUISITES**

<b>Instructional offerings</b>	<b>Credits</b>	<b>Prerequisite instructional offerings</b>
Applied Mechanics I	10	Grade 12
Communication Skills I	5	Grade 12
Computer Skills I	5	Grade 12
Construction Materials I	10	Grade 12
Construction Methods I	10	Grade 12
Documentation III	10	Management (Civil) II
Drawing I	10	Grade 12
Drawing II	10	Drawing I and Computer Skills I
Geotechnical Engineering II	10	Construction Materials I
Geotechnical Engineering III	10	Geotechnical Engineering II
Management (Civil) I	10	Grade 12
Management (Civil) II	10	Management (Civil) I
Mathematics I	10	Grade 12
Mathematics II	10	Mathematics I
Reinforced Concrete & Masonry Design III	10	Theory of Structures II
Structural Analysis II	10	Theory of Structures II
Structural Analysis III	10	Structural Analysis II
Structural Steel & Timber Design III	10	Theory of Structures II
Surveying I	10	Mathematics I
Surveying (Civil) II	10	Surveying I
Theory of Structures II	10	Applied Mechanics I

Transportation Engineering II	10	Drawing II and Surveying I
Transportation Engineering III	10	Transportation Engineering II
Water Engineering II	10	Applied Mechanics I and Mathematics I
Water Engineering III	10	Applied Mechanics I, Mathematics I and Drawing I
Work-integrated Learning I	60	All first- and second-semester instructional offerings passed
Work-integrated Learning II	60	Work-integrated Learning I

## REMARKS

All instructional offerings from semester 1 to 6 are compulsory.  
 The total credit value of all instructional offerings **must** add up to 240.  
 The total credit value for Work-integrated Learning is 120.  
 The National Diploma will be issued upon completion of 360 credits.  
 Two intakes per year, in January and July.

After successful completion of this qualification, the National Diploma will be awarded during an official graduation ceremony of CUT.

Academic Literacy and Communication Studies requires the successful completion of two instructional offerings, A and B, in this specific order. A distinction (75% or more) in instructional offering A ensures exemption from instructional offering B. A pass (without distinction) means that the student must pass instructional offering B in order to meet the prerequisite for the learning programme. Failing instructional offering A means that the student must re-register for instructional offering A in a subsequent semester.

No student will be allowed to graduate without successfully completing the following instructional offerings: Academic Literacy; Communication Studies; Personal Information Management and Reading Skills.

### Admission requirements:

#### For candidates who matriculated in 2007 and before:

A Senior Certificate with a score of 27 and higher on the CUT scoring scale, plus a minimum mark of 50% on standard grade or 40% on higher grade in both Physical Sciences and Mathematics.

#### For candidates who completed the NSC in 2008 and thereafter:

A National Senior Certificate with a score of 27 and higher on the CUT scoring scale, plus a minimum pass mark of 50% (rating 4) in both Mathematics and Physical Sciences. Mathematical Literacy will **not** be accepted.

Applicants in possession of the National Certificate Vocational (NCV) will be selected according to the selection requirements as approved by Senate.

## PREREQUISITES

- The student is not permitted to continue with an instructional offering on the subsequent level before successfully completing the preceding level (see prerequisites).

**27.3 NATIONAL DIPLOMA: ENGINEERING: COMPUTER SYSTEMS IENDCY**

*This learning programme will be offered in Bloemfontein.*

<b>SAQA CREDITS:</b>	<b>360</b>
<b>MINIMUM CREDITS REQUIRED:</b>	<b>360</b>
<b>NQF LEVEL:</b>	<b>6</b>
<b>DURATION OF LEARNING PROGRAMME:</b>	<b>3 years</b>

**Statement of the purpose of the qualification:**

The purpose of this qualification is to build the necessary knowledge, understanding and skills required for a student's progression towards becoming a competent practising Engineering Technician. It is intended to subsequently empower the Candidate Engineering Technician to demonstrate his/her ability to apply his/her acquired knowledge, understanding, skills, attitudes and values in the South African work environment. The qualification is also designed to add value to the qualifying student in terms of personal enrichment, as well as status and recognition.

A person in possession of this qualification is able to do the following:

- Competently apply an integration of theory, principles, proven techniques, practical experience and appropriate skills towards solving well-defined problems in the field of Engineering, whilst operating within the relevant standards and codes.
- Demonstrate well-rounded general engineering knowledge, as well as systematic knowledge of the main terms, procedures, principles and operations of one of the disciplines of Engineering.
- Gather evidence from primary sources and journals using advanced retrieval skills, and also organise, synthesise and present the information professionally in a mode appropriate to the audience.
- Apply the acquired knowledge to new situations, both concrete and abstract, in the workplace or community.
- Identify, analyse, conduct and manage a project.
- Make independent decisions/judgements, taking into account the relevant technical, economic, social and environmental factors.
- Work both independently and as a member of a team, and also as a team leader.
- Relate engineering activity to health and safety, as well as environmental, cultural and economic sustainability.
- Meet the requirements for registration with the Engineering Council of South Africa as a Candidate Engineering Technician (at national diploma level).
- Demonstrate the capacity to explore and exploit educational, entrepreneurial and career opportunities, and to engage in professional development.

### Instructional offerings

1 <sup>ST</sup> YEAR				INSTRUCTIONAL OFFERINGS	CREDITS
SEMESTER 1		SEMESTER 2			
January	July	January	July		
ECM11BI	ECM12BI			*Communication Skills I	5
COM11AI	COM12AI			*Computer Skills I	5
EDS11BI	EDS12BI			*Digital Systems I	10
EEN11AI	EEN12AI			*Electrical Engineering I	10
ELE11AI	ELE12AI			*Electronics I	10
PRE1A				English Proficiency <b>and</b> English Proficiency	0
	PRE2A PRE1B			English Proficiency <b>and</b> English Proficiency	0
PIM5011	PIM5011			Personal Information Management	0
RSK11AB	RSK11AB			Reading Skills	0
WIS11AI	WIS12AI			*Mathematics I	10
PRG11AI	PRG12AI			*Programming I	10
		EDS21BI	EDS22BI	*Digital Systems II	10
		ELE21AI	ELE22AI	*Electronics II	10
		ENT21AI	ENT22AI	Entrepreneurship II	10
		WIS21AI	WIS22AI	*Mathematics II	10
		NET21AI	NET22AI	*Network Systems II	10
		PRG21AI	PRG22AI	*Programming II	10
<b>Total:</b>					<b>120</b>

2 <sup>ND</sup> YEAR				INSTRUCTIONAL OFFERINGS	CREDITS
SEMESTER 3		SEMESTER 4			
January	July	January	July		
EDS31BI	EDS32BI			*Digital Systems III	10
ELA31BI	ELA32BI			*Electronics III	10
WIT31AI	WIT32AI			Mathematical Applications III	10
NET31AI	NET32AI			*Network Systems III	10
PRG31AI	PRG32AI			*Programming III	10
SYS21AI	SYS22AI			*Systems Analysis II	10
		DAT31BI	DAT32BI	*Database Principles III	10
		EDP31AI	EDP32AI	*Design Project III	10
		LOG31BI	LOG32BI	*Logic Design III	10
		MIP31BI	MIP32BI	Microprocessors III	10
		OPT31AI	OPT32AI	*Operating Systems III	10
		SOF31BI	SOF32BI	*Software Engineering III	10
<b>Total:</b>					<b>120</b>

3 <sup>RD</sup> YEAR		INSTRUCTIONAL OFFERINGS	CREDITS
SEMESTERS 5 & 6			
January	July		
EXP11ZI	EXP12ZI	*Work-integrated Learning I	60
EXP21ZI	EXP22ZI	*Work-integrated Learning II	60
<b>Total:</b>			<b>120</b>

**PREREQUISITES**

<b>Instructional offerings</b>	<b>Credits</b>	<b>Prerequisite instructional offerings</b>
Communication Skills I	5	Grade 12
Computer Skills I	5	Grade 12
Database Principles III	10	Programming II
Design Project III	10	Electronics II, Digital Systems II, Programming II
Digital Systems I	10	Grade 12
Digital Systems II	10	Digital Systems I
Digital Systems III	10	Digital Systems II
Electrical Engineering I	10	Grade 12
Electronics I	10	Grade 12
Electronics II	10	Electronics I
Electronics III	10	Electronics II
Entrepreneurship II	10	Grade 12
Logic Design III	10	Digital Systems II
Mathematical Applications III	10	Mathematics II
Mathematics I	10	Grade 12
Mathematics II	10	Mathematics I
Microprocessors III	10	Digital Systems III
Network Systems II	10	Grade 12
Network Systems III	10	Network Systems II (CCNA1)
Operating Systems III	10	Network Systems III (CCNA2)
Programming I	10	Grade 12
Programming II	10	Programming I
Programming III	10	Programming II
Software Engineering III	10	Systems Analysis II
Systems Analysis II	10	Programming I
Work-integrated Learning I	60	Completion of all first- and second-semester instructional offerings
Work-integrated Learning II	60	Work-integrated Learning I and successful completion of all instructional offerings

**REMARKS**

\*Compulsory instructional offerings.

The total credit value of all theoretical instructional offerings **must** add up to 240.

The total credit value for Work-integrated Learning is 120.

The National Diploma will be issued upon completion of 360 credits.

One intake per year, in January.

After successful completion of this qualification, the National Diploma will be awarded during an official graduation ceremony of CUT.

Academic Literacy and Communication Studies requires the successful completion of two instructional offerings, A and B, in this specific order. A distinction (75% or more) in instructional offering A ensures exemption from instructional offering B. A pass (without distinction) means that the student must pass

instructional offering B in order to meet the prerequisite for the learning programme. Failing instructional offering A means that the student must re-register for instructional offering A in a subsequent semester.

No student will be allowed to graduate without successfully completing the following instructional offerings namely: Academic Literacy; Communication Studies; Personal Information Management and Reading Skills.

### **Admission requirements**

For candidates who matriculated in 2007 and before:

A Grade 12 National Senior Certificate with a minimum score of 27 on the CUT scoring scale, plus a minimum mark of 50% on standard grade or 40% on higher grade in both Physical Sciences and Mathematics. Candidates with a score of 23 to 26 on the CUT scoring scale must successfully complete the selection process for admission, which could include the writing of an admission selection test. Mathematical Literacy will **not** be accepted.

For candidates who matriculated in 2008 and thereafter:

A National Senior Certificate with a score of 27 on the CUT scoring scale, plus a minimum pass mark of 50% (rating 4) in both Mathematics and Physical Sciences. Candidates with a score of 23 to 26 on the CUT scoring scale must successfully complete the selection process for admission, which could include the writing of an admission selection test. Mathematical Literacy will **not** be accepted.

Applicants in possession of the National Certificate Vocational (NCV) will be selected according to the selection requirements as approved by Senate.

### **PREREQUISITES**

- The student is not permitted to continue with an instructional offering on the subsequent level before successfully completing the preceding level.

## **27.4 NATIONAL DIPLOMA: ENGINEERING: ELECTRICAL (HC) IENDTS**

*This learning programme will be offered in Bloemfontein.*

<b>SAQA CREDITS:</b>	<b>360</b>
<b>MINIMUM CREDITS REQUIRED:</b>	<b>360</b>
<b>NQF LEVEL:</b>	<b>6</b>
<b>DURATION OF LEARNING PROGRAMME:</b>	<b>3 years</b>

### **Statement of the purpose of the qualification:**

The purpose of the qualification is to build the necessary knowledge, understanding and skills required for a student's progression towards becoming a competent practising Engineering Technician. It is intended to subsequently empower the Candidate Engineering Technician to demonstrate his/her ability to apply his/her acquired knowledge, understanding, skills, attitudes and values in the South African work environment. The qualification is also designed to add value to the qualifying student in terms of personal enrichment, as well as status and recognition.



A person in possession of this qualification is able to do the following:

- Competently apply an integration of theory, principles, proven techniques, practical experience and appropriate skills towards solving well-defined problems in the field of Engineering, whilst operating within the relevant standards and codes.
- Demonstrate well-rounded general engineering knowledge, as well as systematic knowledge of the main terms, procedures, principles and operations of one of the disciplines of Engineering.
- Gather evidence from primary sources and journals using advanced retrieval skills, and also organise, synthesise and present the information professionally in a mode appropriate to the audience.
- Apply the acquired knowledge to new situations, both concrete and abstract, in the workplace or community.
- Identify, analyse, conduct and manage a project.
- Make independent decisions/judgements, taking into account the relevant technical, economic, social and environmental factors.
- Work both independently and as a member of a team, and also as a team leader.
- Relate engineering activity to health and safety, as well as environmental, cultural and economic sustainability.
- Meet the requirements for registration with the Engineering Council of South Africa as a Candidate Engineering Technician (at national diploma level).
- Demonstrate the capacity to explore and exploit educational, entrepreneurial and career opportunities, and to engage in professional development.

**Instructional offerings**

1 <sup>ST</sup> YEAR				INSTRUCTIONAL OFFERINGS	CREDITS
SEMESTER 1		SEMESTER 2			
January	July	January	July		
ECM11BI	ECM12BI			*Communication Skills I	6
COM11AI	COM12AI			*Computer Skills I	6
EDS11BI	EDS12BI			Digital Systems I	12
EEN11AI	EEN12AI			*Electrical Engineering I	12
ELE11AI	ELE12AI			*Electronics I	12
PRE1A PRE2B				English Proficiency <b>and</b> English Proficiency	0
	PRE2A PRE1B			English Proficiency <b>and</b> English Proficiency	0
WIS11AI PIM5011	WIS12AI PIM5011			*Mathematics I Personal Information Management	12 0
RSK11AB MEC11AI	RSK11AB MEC12AI			Reading Skills Mechanics I	0 12

1 <sup>ST</sup> YEAR				INSTRUCTIONAL OFFERINGS	CREDITS
SEMESTER 1		SEMESTER 2			
January	July	January	July		
		EDS21BI	EDS22BI	Digital Systems II	12
		EEN21AI	EEN22AI	*Electrical Engineering II	12
		ELE21AI	ELE22AI	*Electronics II	12
		WIS21AI	WIS22AI	*Mathematics II	12
		EMD11AI	EMD12AI	Mechanical Technology I	12
		EMJ21AI	EMJ22AI	Electrical Machines	12
		MSM21AI	MSM22AI	Strength of Materials II	10
		EPR11AI	EPR12AI	Projects I	12
				<b>Total:</b>	<b>120</b>

2 <sup>ND</sup> YEAR				INSTRUCTIONAL OFFERINGS	CREDITS
SEMESTER 3		SEMESTER 4			
January	July	January	July		
EDS31BI	EDS32BI			Digital Systems III	12
EEN31AI	EEN32AI			Electrical Engineering III	12
EMJ31AI	EMJ32AI			Electrical Machines III	12
EKM21AI	EKM22AI			Electronic Communication II	12
ELA31BI	ELA32BI			Electronics III	12
EID21AI	EID22AI			Industrial Electronics II	12
WIS31AI	WIS32AI			Mathematics III	12
EMD21AI	EMD22AI			Mechanical Technology II	12
EPR21AI	EPR22AI			Projects II	12
MSM31BI	MSM32BI			Strength of Materials III	10
		MSK31AI	MSK32AI	Applied Strength of Materials III	10
		ECN31BI	ECN32BI	Control Systems III	12
		EDP31HI	EDP32HI	*Design Project III <b>(Heavy Current)</b>	12
		EBE31AI	EBE32AI	Electrical Protection III	12
		ELT31AI	ELT32AI	Electronic Applications III	12
		LOG31BI	LOG32BI	Logic Design III	12
		EMD31AI	EMD32AI	Mechanical Technology III	12
		EPE31AI	EPE32AI	Power Electronics III	12
		ERE31AI	ERE32AI	Radio Engineering III	12
		ESO21AI	ESO22AI	Software Design II	12
		EVE31AI	EVE32AI	Electrical Distribution III	12
				<b>Total:</b>	<b>120</b>

3 <sup>RD</sup> YEAR		INSTRUCTIONAL OFFERINGS	CREDITS
SEMESTERS 5 & 6			
January	July		
EEX11ZI	EEX12ZI	Work-integrated Learning I	60
EEX21ZI	EEX22ZI	Work-integrated Learning II	60
		<b>Total:</b>	<b>120</b>

**PREREQUISITES**

<b>Instructional offerings</b>	<b>Credits</b>	<b>Prerequisite instructional offerings</b>
Applied Strength of Materials III	10	Strength of Materials III
Communication Skills I	6	Grade 12
Computer Skills I	6	Grade 12
Control Systems III	12	Mathematics III and Electronics II
Design Project III	12	Electronics II and Projects II, or Electrical Machines II and Electrical Engineering II
Digital Systems I	12	Grade 12
Digital Systems II	12	Digital Systems I
Digital Systems III	12	Digital Systems II
Electrical Distribution III	12	Electrical Engineering II
Electrical Engineering I	12	Grade 12
Electrical Engineering II	12	Electrical Engineering I
Electrical Engineering III	12	Electrical Engineering II
Electrical Machines II	12	Electrical Engineering I
Electrical Machines III	12	Electrical Machines II
Electrical Protection III	12	Electrical Engineering II and Electronics II
Electronic Applications III	12	Electronics III
Electronic Communication II	12	Electrical Engineering I and Electronics II
Electronics I	12	Grade 12
Electronics II	12	Electronics I
Electronics III	12	Electronics II
Industrial Electronics II	12	Electronics II and Mathematics II
Logic Design III	12	Digital Systems II
Mathematics I	12	Grade 12
Mathematics II	12	Mathematics I
Mathematics III	12	Mathematics II
Mechanical Technology I	12	Mechanics I
Mechanical Technology II	12	Mechanical Technology I
Mechanical Technology III	12	Mechanical Technology II
Mechanics I	12	Grade 12
Power Electronics III	12	Industrial Electronics II
Projects I	12	Electronics I
Projects II	12	Projects I and Electronics II
Radio Engineering III	12	Electronic Communication II
Software Design II	12	Computer Skills I
Strength of Materials II	10	Mechanics I
Strength of Materials III	10	Strength of Materials II
Work-integrated Learning I	60	Successful completion of all Semester 1 and Semester 2 instructional offerings
Work-integrated Learning II	60	Work-integrated Learning I and successful completion of all instructional offerings

## REMARKS

\*Compulsory instructional offerings.

The total credit value of all instructional offerings **must** add up to 240.

The total credit value for Work-integrated Learning is 120.

The National Diploma will be issued upon completion of 360 credits.

At least 50 credits must be earned in third-level instructional offerings.

A maximum of 50 credits in any Engineering-related learning programme may be presented for Semesters 1 to 4.

Two intakes per year, in January and July.

After successful completion of this qualification, the National Diploma will be awarded during an official graduation ceremony of CUT.

Academic Literacy and Communication Studies requires the successful completion of two instructional offerings, A and B, in this specific order. A distinction (75% or more) in instructional offering A ensures exemption from instructional offering B. A pass (without distinction) means that the student must pass instructional offering B in order to meet the prerequisite for the learning programme. Failing instructional offering A means that the student must re-register for instructional offering A in a subsequent semester.

No student will be allowed to graduate without successfully completing the following instructional offerings: Academic Literacy; Communication Studies; Personal Information Management and Reading Skills.

### Admission requirements

For candidates who matriculated in 2007 and before:

A Grade 12 National Senior Certificate with a minimum score of 27 on the CUT scoring scale, plus a minimum mark of 50% on standard grade or 40% on higher grade in both Physical Sciences and Mathematics. Candidates with a score of 23 to 26 on the CUT scoring scale must successfully complete the selection process for admission, which could include the writing of an admission selection test. Mathematical Literacy will **not** be accepted.

For candidates who matriculated in 2008 and thereafter:

A National Senior Certificate with a score of 27 on the CUT scoring scale, plus a minimum pass mark of 50% (rating 4) in both Mathematics and Physical Sciences. Candidates with a score of 23 to 26 on the CUT scoring scale must successfully complete the selection process for admission, which could include the writing of an admission selection test. Mathematical Literacy will **not** be accepted.

Applicants in possession of the National Certificate Vocational (NCV) will be selected according to the selection requirements as approved by Senate.

### PREREQUISITES

- The student is not permitted to continue with an instructional offering on the subsequent level before successfully completing the preceding level.

**27.5 NATIONAL DIPLOMA: ENGINEERING: ELECTRICAL (ELECTRONIC LC)  
IENDLC**

*This learning programme will be offered in Bloemfontein.*

<b>SAQA CREDITS:</b>	<b>360</b>
<b>MINIMUM CREDITS REQUIRED:</b>	<b>360</b>
<b>NQF LEVEL:</b>	<b>6</b>
<b>DURATION OF LEARNING PROGRAMME:</b>	<b>3 years</b>

**Statement of the purpose of the qualification:**

The purpose of the qualification is to build the necessary knowledge, understanding and skills required for a student's progression towards becoming a competent practising Engineering Technician. It is intended to subsequently empower the Candidate Engineering Technician to demonstrate his/her ability to apply his/her acquired knowledge, understanding, skills, attitudes and values in the South African work environment. The qualification is also designed to add value to the qualifying student in terms of personal enrichment, as well as status and recognition.

A person in possession of this qualification is able to do the following:

- Competently apply an integration of theory, principles, proven techniques, practical experience and appropriate skills towards solving well-defined problems in the field of Engineering, whilst operating within the relevant standards and codes.
- Demonstrate well-rounded general engineering knowledge, as well as systematic knowledge of the main terms, procedures, principles and operations of one of the disciplines of Engineering.
- Gather evidence from primary sources and journals using advanced retrieval skills, and also organise, synthesise and present the information professionally in a mode appropriate to the audience.
- Apply the acquired knowledge to new situations, both concrete and abstract, in the workplace or community.
- Identify, analyse, conduct and manage a project.
- Make independent decisions/judgements, taking into account the relevant technical, economic, social and environmental factors.
- Work both independently and as a member of a team, and also as a team leader.
- Relate engineering activity to health and safety, as well as environmental, cultural and economic sustainability.
- Meet the requirements for registration with the Engineering Council of South Africa as A Candidate Engineering Technician (at national diploma level).
- Demonstrate the capacity to explore and exploit educational, entrepreneurial and career opportunities, and to engage in professional development.

### Instructional offerings

1 <sup>ST</sup> YEAR				INSTRUCTIONAL OFFERINGS	CREDITS
SEMESTER 1		SEMESTER 2			
January	July	January	July		
ECM11BI	ECM12BI			*Communication Skills I	6
COM11AI	COM12AI			*Computer Skills I	6
EDS11BI	EDS12BI			Digital Systems I	12
EEN11AI	EEN12AI			*Electrical Engineering I	12
ELE11AI	ELE12AI			*Electronics I	12
PRE1A				English Proficiency <b>and</b> English Proficiency	0
PRE2B				English Proficiency <b>and</b> English Proficiency	0
PIM5011	PIM5011			Personal Information Management	0
RSK11AB	RSK11AB			Reading Skills	0
WIS11AI	WIS12AI			*Mathematics I	12
		EDS21BI	EDS22BI	Digital Systems II	12
		EEN21AI	EEN22AI	*Electrical Engineering II	12
		ELE21AI	ELE22AI	*Electronics II	12
		WIS21AI	WIS22AI	*Mathematics II	12
		EPR11AI	EPR12AI	Projects I	12
<b>Total:</b>					<b>120</b>

2 <sup>ND</sup> YEAR				INSTRUCTIONAL OFFERINGS	CREDITS
SEMESTER 3		SEMESTER 4			
January	July	January	July		
EDS31BI	EDS32BI			Digital Systems III	12
EEN31AI	EEN32AI			Electrical Engineering III	12
EKM21AI	EKM22AI			Electronic Communication II	12
ELA31BI	ELA32BI			Electronics III	12
WIS31AI	WIS32AI			Mathematics III	12
EPR21AI	EPR22AI			Projects II	12
		ECN31BI	ECN32BI	Control Systems III	12
		EDP31LI	EDP32LI	*Design Project III ( <b>Light Current</b> )	12
		ELT31AI	ELT32AI	Electronic Applications III	12
		LOG31BI	LOG32BI	Logic Design III	12
		ERE31AI	ERE32AI	Radio Engineering III	12
		ESO21AI	ESO22AI	Software Design II	12
<b>Total:</b>					<b>120</b>

3 <sup>RD</sup> YEAR		INSTRUCTIONAL OFFERINGS	CREDITS
SEMESTERS 5 & 6			
January	July		
EEX11ZI	EEX12ZI	Work-integrated Learning I	60
EEX21ZI	EEX22ZI	Work-integrated Learning II	60
<b>Total:</b>			<b>120</b>

**PREREQUISITES**

<b>Instructional offerings</b>	<b>Credits</b>	<b>Prerequisite instructional offerings</b>
Applied Strength of Materials III	10	Strength of Materials III
Communication Skills I	6	Grade 12
Computer Skills I	6	Grade 12
Control Systems III	12	Mathematics III and Electronics II
Design Project III	12	Electronics II and Projects II, or Electrical Machines II and Electrical Engineering II
Digital Systems I	12	Grade 12
Digital Systems II	12	Digital Systems I
Digital Systems III	12	Digital Systems II
Electrical Distribution III	12	Electrical Engineering II
Electrical Engineering I	12	Grade 12
Electrical Engineering II	12	Electrical Engineering I
Electrical Engineering III	12	Electrical Engineering II
Electrical Machines II	12	Electrical Engineering I
Electrical Machines III	12	Electrical Machines II
Electrical Protection III	12	Electrical Engineering II and Electronics II
Electronic Applications III	12	Electronics III
Electronic Communication II	12	Electrical Engineering I and Electronics II
Electronics I	12	Grade 12
Electronics II	12	Electronics I
Electronics III	12	Electronics II
Industrial Electronics II	12	Electronics II and Mathematics II
Logic Design III	12	Digital Systems II
Mathematics I	12	Grade 12
Mathematics II	12	Mathematics I
Mathematics III	12	Mathematics II
Mechanical Technology I	12	Mechanics I
Mechanical Technology II	12	Mechanical Technology I
Mechanical Technology III	12	Mechanical Technology II
Mechanics I	12	Grade 12
Power Electronics III	12	Industrial Electronics II
Projects I	12	Electronics I
Projects II	12	Projects I and Electronics II
Radio Engineering III	12	Electronic Communication II
Software Design II	12	Computer Skills I
Strength of Materials II	10	Mechanics I
Strength of Materials III	10	Strength of Materials II
Work-integrated Learning I	60	Successful completion of all Semester 1 and Semester 2 instructional offerings
Work-integrated Learning II	60	Work-integrated Learning I and successful completion of all instructional offerings

## REMARKS

\*Compulsory instructional offerings.

The total credit value of all instructional offerings **must** add up to 240.

The total credit value for Work-integrated Learning is 120.

The National Diploma will be issued upon completion of 360 credits.

At least 50 credits must be earned in third-level instructional offerings.

A maximum of 50 credits in any Engineering-related learning programme may be presented for Semesters 1 to 4.

Two intakes per year, in January and July.

After successful completion of this qualification, the National Diploma will be awarded during an official graduation ceremony of CUT.

Academic Literacy and Communication Studies requires the successful completion of two instructional offerings, A and B, in this specific order. A distinction (75% or more) in instructional offering A ensures exemption from instructional offering B. A pass (without distinction) means that the student must pass instructional offering B in order to meet the prerequisite for the learning programme. Failing instructional offering A means that the student must re-register for instructional offering A in a subsequent semester.

No student will be allowed to graduate without successfully completing the following instructional offerings: Academic Literacy; Communication Studies; Personal Information Management and Reading Skills.

### Admission requirements

For candidates who matriculated in 2007 and before:

A Grade 12 National Senior Certificate with a minimum score of 27 on the CUT scoring scale, plus a minimum mark of 50% on standard grade or 40% on higher grade in both Physical Sciences and Mathematics. Candidates with a score of 23 to 26 on the CUT scoring scale must successfully complete the selection process for admission, which could include the writing of an admission selection test. Mathematical Literacy will **not** be accepted.

For candidates who matriculated in 2008 and thereafter:

A National Senior Certificate with a score of 27 on the CUT scoring scale, plus a minimum pass mark of 50% (rating 4) in both Mathematics and Physical Sciences. Candidates with a score of 23 to 26 on the CUT scoring scale must successfully complete the selection process for admission, which could include the writing of an admission selection test. Mathematical Literacy will **not** be accepted.

Applicants in possession of the National Certificate Vocational (NCV) will be selected according to the selection requirements as approved by Senate.

### PREREQUISITES

- The student is not permitted to continue with an instructional offering on the subsequent level before successfully completing the preceding level.



**27.6 NATIONAL DIPLOMA: ENGINEERING: MECHANICAL IMNDNG**

*This learning programme will be offered in Bloemfontein.*

<b>SAQA CREDITS:</b>	<b>360</b>
<b>MINIMUM CREDITS REQUIRED:</b>	<b>360</b>
<b>NQF LEVEL:</b>	<b>6</b>
<b>DURATION OF LEARNING PROGRAMME:</b>	<b>3 years</b>

**Statement of the purpose of the qualification:**

The purpose of the qualification is to build the necessary knowledge, understanding and skills required for a student's progression towards becoming a competent practising Engineering Technician. It is intended to subsequently empower the Candidate Engineering Technician to demonstrate his/her ability to apply his/her acquired knowledge, understanding, skills, attitudes and values in the South African work environment. The qualification is also designed to add value to the qualifying student in terms of personal enrichment, as well as status and recognition.

A person in possession of this qualification is able to do the following:

- Competently apply an integration of theory, principles, proven techniques, practical experience and appropriate skills towards solving well-defined problems in the field of Engineering, whilst operating within the relevant standards and codes.
- Demonstrate well-rounded general engineering knowledge, as well as systematic knowledge of the main terms, procedures, principles and operations of one of the disciplines of Engineering.
- Gather evidence from primary sources and journals using advanced retrieval skills, and also organise, synthesise and present the information professionally in a mode appropriate to the audience.
- Apply the acquired knowledge to new situations, both concrete and abstract, in the workplace or community.
- Identify, analyse, conduct and manage a project.
- Make independent decisions/judgements, taking into account the relevant technical, economic, social and environmental factors.
- Work both independently and as a member of a team, and also as a team leader.
- Relate engineering activity to health and safety, as well as environmental, cultural and economic sustainability.
- Meet the requirements for registration with the Engineering Council of South Africa as a Candidate Engineering Technician (at national diploma level).
- Demonstrate the capacity to explore and exploit educational, entrepreneurial and career opportunities, and to engage in professional development.

## Instructional offerings

1 <sup>ST</sup> YEAR				INSTRUCTIONAL OFFERINGS	CREDITS
SEMESTER 1		SEMESTER 2			
January	July	January	July		
EMC11BI	EMC12BI			Communication Skills I	10
RPV11AI	RPV12AI			Computer & Programming Skills I	10
PRE1A				English Proficiency <b>and</b>	
PRE2B				English Proficiency	0
	PRE1A			English Proficiency <b>and</b>	
	PRE2B			English Proficiency	0
PIM5011	PIM5011			Personal Information Management	0
RSK11AB	RSK11AB			Reading Skills	0
WIS11AI	WIS12AI			Mathematics I	10
MDR11AI	MDR12AI			Mechanical Engineering Drawing I	10
MAN11AI	MAN12AI			Mechanical Manufacturing Engineering I	10
MEC11AI	MEC12AI			Mechanics I	10
		MEL11AI	MEL12AI	Electrotechnology I	10
		MFM21AI	MFM22AI	Fluid Mechanics II	10
		WIS21AI	WIS22AI	Mathematics II	10
		MEM21AI	MEM22AI	Mechanics of Machines II	10
		MSM21AI	MSM22AI	Strength of Materials II	10
		MTH21AI	MTH22AI	Thermodynamics II	10
<b>Total:</b>					<b>120</b>

2 <sup>ND</sup> YEAR				INSTRUCTIONAL OFFERINGS	CREDITS
SEMESTER 3		SEMESTER 4			
January	July	January	July		
MFM31BI	MFM32BI			Fluid Mechanics III	10
WIS31AI	WIS32AI			Mathematics III	10
MED21AI	MED22AI			Mechanical Engineering Design II	10
MEM31BI	MEM32BI			Mechanics of Machines III	10
MSM31BI	MSM32BI			Strength of Materials III	10
MTB31BI	MTB32BI			Thermodynamics III	10
		MSK31AI	MSK32AI	Applied Strength of Materials III	10
		MEL21AI	MEL22AI	Electrotechnology II	10
		MHM31AI	MHM32AI	Hydraulic Machines III	10
		MED31BI	MED32BI	Mechanical Engineering Design III	10
		MST31AI	MST32AI	Steam Plant III	10
		MTM31AI	MTM32AI	Theory of Machines III	10
<b>Total:</b>					<b>120</b>

<b>3<sup>RD</sup> YEAR</b>		<b>INSTRUCTIONAL OFFERINGS</b>	<b>CREDITS</b>
<b>SEMESTERS 5 &amp; 6</b>			
<b>January</b>	<b>July</b>		
MEX11ZI	MEX12ZI	Work-integrated Learning I	60
MEX21ZI	MEX22ZI	Work-integrated Learning II	60
<b>Total:</b>			<b>120</b>

**PREREQUISITES**

<b>Instructional offerings</b>	<b>Credits</b>	<b>Prerequisite instructional offerings</b>
Applied Strength of Materials III	10	Strength of Materials III
Communication Skills I	10	Grade 12
Computer & Programming Skills I	10	Grade 12
Electrotechnology I	10	Grade 12
Electrotechnology II	10	Electrotechnology I
Fluid Mechanics II	10	Mechanics I
Fluid Mechanics III	10	Fluid Mechanics II
Hydraulic Machines III	10	Fluid Mechanics III
Mathematics I	10	Grade 12
Mathematics II	10	Mathematics I
Mathematics III	10	Mathematics II
Mechanical Engineering Design II	10	Mechanics I
Mechanical Engineering Design III	10	Mechanical Engineering Design II
Mechanical Engineering Drawing I	10	Grade 12
Work-integrated Learning I	60	Successful completion of all Semesters 1 to 4 instructional offerings
Work-integrated Learning II	60	Work-integrated Learning I
Mechanical Manufacturing Engineering I	10	Grade 12
Mechanics I	10	Grade 12
Mechanics of Machines II	10	Mechanics I
Mechanics of Machines III	10	Mechanics of Machines II
Steam Plant III	10	Thermodynamics III
Strength of Materials II	10	Mechanics I
Strength of Materials III	10	Strength of Materials II
Theory of Machines III	10	Mechanics of Machines III
Thermodynamics II	10	Mechanics I
Thermodynamics III	10	Thermodynamics II

**REMARKS**

The total credit value of all instructional offerings **must** add up to 240.

The total credit value for Work-integrated Learning is 120.

The National Diploma will be issued upon completion of 360 credits.

A maximum of 50 credits may be earned in a selection of suitable instructional offerings from any other Engineering-related learning programme approved by Faculty Management.

At least 60 credits must be earned in the third-year level instructional offerings.

Two intakes per year, in January and July.

After successful completion of this qualification, the National Diploma will be awarded during an official graduation ceremony of CUT.

Academic Literacy and Communication Studies requires the successful completion of two instructional offerings, A and B, in this specific order. A distinction (75% or more) in instructional offering A ensures exemption from instructional offering B. A pass (without distinction) means that the student must pass instructional offering B in order to meet the prerequisite for the learning programme. Failing instructional offering A means that the student must re-register for instructional offering A in a subsequent semester.

No student will be allowed to graduate without successfully completing the following instructional offerings: Academic Literacy; Communication Studies; Personal Information Management and Reading Skills.

**Admission requirements**

For candidates who matriculated in 2007 and before:

A Senior Certificate with a score of 27 or higher on the CUT scoring scale, plus a minimum mark of 50% on standard grade or 40% on higher grade in both Physical Sciences and Mathematics.

For candidates who completed the NSC in 2008 and thereafter:

A National Senior Certificate with a score of 27 or higher on the CUT scoring scale, plus a minimum pass mark of 50% (rating 4) in both Mathematics, Physical Sciences and English. Mathematical Literacy will **not** be accepted.

Applicants in possession of the National Certificate Vocational (NCV) will be selected according to the selection requirements as approved by Senate.

**PREREQUISITES**

- The student is not permitted to continue with an instructional offering on the subsequent level before successfully completing the preceding level.

## 28.7 NATIONAL DIPLOMA: INFORMATION TECHNOLOGY (SOFTWARE DEVELOPMENT) EINDSD

*(No new first-year intake for the National Diploma: Information Technology (Software Development) as from 2017. This programme will be phased out.)*

*This learning programme will be offered in Bloemfontein and Welkom.*

<b>SAQA CREDITS:</b>	<b>360</b>
<b>MINIMUM CREDITS REQUIRED:</b>	<b>360</b>
<b>NQF LEVEL:</b>	<b>6</b>
<b>DURATION OF LEARNING PROGRAMME:</b>	<b>3 years</b>

### Instructional offerings

1 <sup>ST</sup> YEAR	2 <sup>ND</sup> YEAR	3 <sup>RD</sup> YEAR	INSTRUCTIONAL OFFERINGS	CREDITS
OPG10BB			Development Software I	30
PRE1A			English Proficiency <b>and</b>	9
PRE2B			English Proficiency	9
INL10DB			Information Systems I	30
ITV10AB			Information Technology Skills I	30
ITW10AB			IT Mathematics I	30
PIM5011			Personal Information Management	0
RSK11AB			Reading Skills	0
	OPG20BB		Development Software II	30
	INL20DB		Information Systems II	30
	TPG10AB		Technical Programming I	30
	SPG11AB		System Software I ( <b>Semester 1</b> )	15
	SPG12AB		System Software I ( <b>Semester 2</b> )	15
		OPG30BB	Development Software III	30
		INL30EB	Information Systems III	30
		TPG20AB	Technical Programming II	30
		SPG21CB	System Software II ( <b>Semester 1</b> ) <b>or</b>	15
		GID10AB	Graphical User Interface Design I	30
		SPG22CB	System Software II ( <b>Semester 2</b> ) <b>or</b>	15
		GID10AB	Graphical User Interface Design I	30
<b>Total:</b>				<b>369</b>

### REMARKS

16 instructional offerings are to be taken over a period of three years.  
The National Diploma will be issued upon completion of 360 credits.

Only one intake per year, in January.

After successful completion of this qualification, the National Diploma will be awarded during an official graduation ceremony of CUT.

### Optional instructional offerings

Refer to the optional instructional offerings listed under “Instructional offerings”.

## Admission requirements

Admission to this learning programme is subject to selection.

### For candidates who matriculated in 2007 and before:

A Grade 12 National Senior Certificate with a score of 27 on the CUT scoring scale, plus a minimum mark of 60% on standard grade or 40% on higher grade in Mathematics or Computer Science. A candidate must also successfully complete the selection process for admission.

### For candidates who completed the NSC in 2008 and thereafter:

A National Senior Certificate with a score of 27 on the CUT scoring scale, plus a minimum pass mark of 40% (rating 3) in Mathematics or Computer Science, or 60% (rating 5) in Mathematical Literacy.

Applicants in possession of the National Certificate Vocational (NCV) will be selected according to the selection requirements as approved by Senate.

## PREREQUISITES

Refer to the heading “General” – point 12 of this chapter.

Academic Literacy and Communication Studies requires the successful completion of two instructional offerings, A and B, in this specific order.

A distinction (75% or more) in instructional offering A ensures exemption from instructional offering B. A pass (without distinction) means that the student must pass instructional offering B in order to meet the prerequisite for the learning programme. Failing instructional offering A means that the student must re-register for instructional offering A in a subsequent semester.

No student will be allowed to graduate without successfully completing the following instructional offerings: Academic Literacy; Communication Studies; Personal Information Management and Reading Skills.

<b>Instructional offerings</b>	<b>Credits</b>	<b>Prerequisite instructional offerings</b>
Development Software I	30	Grade 12
English Proficiency	9	Grade 12
Information Systems I	30	Grade 12
Information Technology Skills I	30	Grade 12
IT Mathematics I	30	Grade 12
Development Software II	30	Development Software I
Information Systems II	30	Development Software I and Information Systems I
Technical Programming I	30	Development Software I
System Software I (Semester 1)	15	Information Systems I
System Software I (Semester 2)	15	System Software I (Semester 1)
Development Software III	30	Development Software II
Information Systems III	30	Information Systems II
Technical Programming II	30	Technical Programming I
System Software II (Semester 1)	15	System Software I (Semester 2)
System Software II (Semester II)	15	System Software II (Semester 1)
Graphical User Interface Design I	30	Development Software I

**28.8 NATIONAL DIPLOMA: INFORMATION TECHNOLOGY  
(WEB AND APPLICATION DEVELOPMENT) BCNDIA**

*(No new first-year intake for the National Diploma: Information Technology (Web and Application Development) as from 2017. This programme will be phased out.)*

*This learning programme will be offered in Bloemfontein.*

<b>SAQA CREDITS:</b>	<b>360</b>
<b>MINIMUM CREDITS REQUIRED:</b>	<b>360</b>
<b>NQF LEVEL:</b>	<b>6</b>
<b>DURATION OF LEARNING PROGRAMME:</b>	<b>3 years</b>

**Instructional offerings**

1 <sup>ST</sup> YEAR	2 <sup>ND</sup> YEAR	3 <sup>RD</sup> YEAR	INSTRUCTIONAL OFFERINGS	CREDITS
OPG10BB			Development Software I	30
PRE1A			English Proficiency <b>and</b>	9
PRE2B			English Proficiency	9
INL10DB			Information Systems I	30
ITV10AB			Information Technology Skills I	30
ITW10AB			IT Mathematics I	30
PIM5011			Personal Information Management	0
RSK11AB			Reading Skills	0
	INP20AB		Internet Programming II	30
	INL20DB		Information Systems II	30
	WEB20AB		Web Management II	30
	SPG11AB		Systems Software I ( <b>Semester 1</b> )	15
	SPG12AB		Systems Software I ( <b>Semester 2</b> )	15
		INP30AB	Internet Programming III	30
		INL30EB	Information Systems III	30
		WEB30AB	Web Management III	30
		GID10AB	Graphical User Interface Design I	30
<b>Total:</b>				<b>369</b>

**REMARKS**

16 instructional offerings are to be taken over a period of three years.

The National Diploma will be issued upon completion of 360 credits.

Only one intake per year, in January.

After successful completion of this qualification, the National Diploma will be awarded during an official graduation ceremony of CUT.

**Admission requirements**

Admission to this learning programme is subject to selection.

**For candidates who matriculated in 2007 and before:**

A Grade 12 National Senior Certificate with a score of 27 on the CUT scoring scale, plus a minimum mark of 60% on standard grade or 40% on higher grade in Mathematics or Computer Science. A candidate must also successfully complete the selection process for admission.

**For candidates who completed the NSC in 2008 and thereafter:**

A National Senior Certificate with a score of 27 on the CUT scoring scale, plus a minimum pass mark of 40% (rating 3) in either Mathematics or Information Technology or 60% (rating 5) in Mathematical Literacy.

Applicants in possession of the National Certificate Vocational (NCV) will be selected according to the selection requirements approved by Senate.

**Optional instructional offerings**

Refer to the optional instructional offerings listed under “instructional offerings”.

**PREREQUISITES**

Refer to the heading “General” – point 12 of this chapter.

Academic Literacy and Communication Studies requires the successful completion of two instructional offerings, A and B, in this specific order.

A distinction (75% or more) in instructional offering A ensures exemption from instructional offering B. A pass (without distinction) means that the student must pass instructional offering B in order to meet the prerequisite for the learning programme. Failing instructional offering A means that the student must re-register for instructional offering A in a subsequent semester.

No student will be allowed to graduate without successfully completing the following instructional offerings: Academic Literacy; Communication Studies; Personal Information Management and Reading Skills.

<b>Instructional offerings</b>	<b>Credits</b>	<b>Prerequisite instructional offerings</b>
Development Software I	30	Grade 12
English Proficiency	9	Grade 12
Information Systems I	30	Grade 12
Information Technology Skills I	30	Grade 12
IT Mathematics I	30	Grade 12
Internet Programming II	30	Development Software I
Information Systems II	30	Development Software I and Information Systems I
Web Management II	30	Development Software I
System Software I (Semester 1)	15	Information Systems I
System Software I (Semester 2)	15	System Software I (Semester 1)
Information Systems III	30	Information Systems II
Internet Programming III	30	Internet Programming II
Web Management III	30	Web Management II
Graphical User Interface Design I	30	Development Software I



<b>29. NATIONAL DIPLOMAS: EXTENDED CURRICULUM PROGRAMMES</b>
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**29.1 NATIONAL DIPLOMA: ENGINEERING: CIVIL ECP EXNDCE**

*(No new first-year intake for the National Diploma: Engineering: Civil ECP as from 2017. This programme will be phased out.)*

*This learning programme will be offered in Bloemfontein.*

<b>SAQA CREDITS:</b>	<b>360</b>
<b>MINIMUM CREDITS REQUIRED:</b>	<b>390</b>
<b>NQF LEVEL:</b>	<b>6</b>
<b>DURATION OF LEARNING PROGRAMME:</b>	<b>4 years</b>

**Statement of the purpose of the qualification:**

The purpose of this qualification is to build the necessary knowledge, understanding and skills required for a student's progression towards becoming a competent practising Engineering Technician. It is intended to subsequently empower the Candidate Engineering Technician to demonstrate his/her ability to apply his/her acquired knowledge, understanding, skills, attitudes and values in the South African work environment. The qualification is also designed to add value to the qualifying student in terms of personal enrichment, as well as status and professional recognition.

A person in possession of this qualification is able to do the following:

- Competently apply an integration of theory, principles, proven techniques, practical experience and appropriate skills towards solving well-defined problems in the field of Engineering, whilst operating within the relevant standards and codes.
- Demonstrate well-rounded general engineering knowledge, as well as systematic knowledge of the main terms, procedures, principles and operations of one of the disciplines of Engineering.
- Gather evidence from primary sources and journals using advanced retrieval skills, and also organise, synthesise and present the information professionally in a mode appropriate to the audience.
- Apply the acquired knowledge to new situations, both concrete and abstract, in the workplace or community.
- Identify, analyse, conduct and manage a project.
- Make independent decisions/judgements, taking into account the relevant technical, economic, social and environmental factors.
- Work both independently and as a member of a team, and also as a team leader.
- Relate engineering activity to health and safety, as well as environmental, cultural and economic sustainability.
- Meet the requirements for registration with the Engineering Council of South Africa as a Candidate Engineering Technician (at national diploma level).
- Demonstrate the capacity to explore and exploit educational, entrepreneurial and career opportunities, and to engage in professional development.

**Instructional offerings**

<b>1<sup>ST</sup> YEAR</b>				<b>INSTRUCTIONAL OFFERINGS</b>	<b>CREDITS</b>
<b>SEMESTER 1</b>		<b>SEMESTER 2</b>			
<b>January</b>	<b>July</b>	<b>January</b>	<b>July</b>		
ECM11BI	ECM12BI			Communication Skills I	5
COM11AI	COM12AI			Computer Skills	5
PRE1A				English Proficiency <b>and</b>	0
PRE2B				English Proficiency	
	PRE2B			English Proficiency <b>and</b>	0
	PRE1A			English Proficiency	
INX01CP	INX02CP			Industrial Experience	6
LSS01CP	LSS02CP			Life Skills	4
WIS01CP	WIS02CP			Mathematics	10
FIS01CP	FIS02CP			Physics	10
PIM5011	PIM5011			Personal Information Management	0
RSK11AB	RSK11AB			Reading Skills	0
		CAM11AI	CAM12AI	Applied Mechanics I	10
		KMA11AI	KMA12AI	Construction Materials I	10
		CDR11AI	CDR12AI	Drawing I	10
		CMC11AI	CMC12AI	Management (Civil) I	10
		WIS11AI	WIS12AI	Mathematics I	10
<b>Total:</b>					<b>90</b>

<b>2<sup>ND</sup> YEAR</b>				<b>INSTRUCTIONAL OFFERINGS</b>	
<b>SEMESTER 3</b>		<b>SEMESTER 4</b>			
<b>January</b>	<b>July</b>	<b>January</b>	<b>July</b>		
KMT11AI	KMT12AI			Construction Methods I	10
CDR21AI	CDR22AI			Drawing II	10
CMC21AI	CMC22AI			Management (Civil) II	10
WIS21AI	WIS22AI			Mathematics II	10
CSU11AI	CSU12AI			Surveying I	10
		CGE21AI	CGE22AI	Geotechnical Engineering II	10
		CSU21AI	CSU22AI	Surveying (Civil) II	10
		CTS21AI	CTS22AI	Theory of Structures II	10
		CTE21AI	CTE22AI	Transportation Engineering II	10
		CWE21AI	CWE22AI	Water Engineering II	10
<b>Total:</b>					<b>100</b>

<b>3<sup>RD</sup> YEAR</b>				<b>INSTRUCTIONAL OFFERINGS</b>	<b>CREDITS</b>
<b>SEMESTER 5</b>		<b>SEMESTER 6</b>			
<b>January</b>	<b>July</b>	<b>January</b>	<b>July</b>		
CDO31AI	CDO32AI			Documentation III	10
CGE31AI	CGE32AI			Geotechnical Engineering III	10
SSL31AI	SSL32AI			Structural Steel & Timber Design III	10
CSA21AI	CSA22AI			Structural Analysis II	10

3 <sup>RD</sup> YEAR				INSTRUCTIONAL OFFERINGS	CREDITS
SEMESTER 5		SEMESTER 6			
January	July	January	July		
		GWP31AI	GWP32AI	Reinforced Concrete & Masonry Design III	10
		CSA31AI	CSA32AI	Structural Analysis III	10
		CTE31AI	CTE32AI	Transportation Engineering III	10
		CWE31AI	CWE32AI	Water Engineering III	10
				<b>Total:</b>	<b>80</b>

4 <sup>TH</sup> YEAR		INSTRUCTIONAL OFFERINGS	CREDITS
SEMESTERS 7 & 8			
January	July		
CEX11ZI	CEX12ZI	Work-integrated Learning I	60
CEX21ZI	CEX22ZI	Work-integrated Learning II	60
		<b>Total:</b>	<b>120</b>

## REMARKS

- All instructional offerings from Semesters 1 to 8 are compulsory.
- The minimum total credit value of all instructional offerings **must** add up to 240.
- The total credit value for Work-integrated Learning is 120.
- The National Diploma will be issued upon completion of 360 credits.
- Two intakes per year, in January and July.

After successful completion of this qualification, the National Diploma will be awarded during an official graduation ceremony of CUT.

Academic Literacy and Communication Studies requires the successful completion of two instructional offerings, A and B, in this specific order.

A distinction (75% or more) in instructional offering A ensures exemption from instructional offering B. A pass (without distinction) means that the student must pass instructional offering B in order to meet the prerequisite for the learning programme. Failing instructional offering A means that the student must re-register for instructional offering A in a subsequent semester.

No student will be allowed to graduate without successfully completing the following instructional offerings: Academic Literacy; Communication Studies; Personal Information Management and Reading Skills.

## Admission requirements

For candidates who matriculated in 2007 and before:

- A Grade 12 National Senior Certificate with a score of 22 to 26 on the CUT scoring scale, plus a minimum mark of 45% on standard grade or 40% on higher grade in both Physical Sciences and Mathematics. A candidate must also successfully complete the selection process for admission.
- Candidates must also adhere to the general admission regulations for candidates who matriculated in 2007 or before.

For candidates who matriculated in 2008 and thereafter:

- Candidates with a Grade 12 National Senior Certificate with a minimum score of 22 to 26 points on the CUT scoring scale, plus a minimum mark of 40% to 49% (level 3) in both Mathematics and Physical Sciences, may be admitted directly to the ECP. Mathematical Literacy will not be accepted in any of the Engineering disciplines.
- Candidates with a Grade 12 National Senior Certificate with a minimum score of 22 to 26 points on the CUT scoring scale, plus a minimum mark of 50% (rating 4) in both Mathematics and Physical Sciences, may also be required to undergo a selection test. Should the candidate pass the selection test, the applicant will be admitted to the mainstream programme. Mathematical Literacy will not be accepted in any of the Engineering disciplines.
- Candidates must also adhere to the general admission regulations for candidates who matriculated in 2008 or thereafter.
- Applicants in possession of the National Certificate Vocational (NCV) will be selected according to the selection requirements as approved by Senate. Candidates must also adhere to the general admission regulations for candidates who completed the N3, N4, N5 and N6 qualification at a Technical Vocational Education and Training (TVET) college.

**PREREQUISITES**

- A student will not be permitted to continue with an instructional offering on the subsequent level before successfully completing the preceding level.
- The student must pass all instructional offerings of the first semester of the extended curriculum in order to continue with his/her studies.

<b>Instructional offerings</b>	<b>Credits</b>	<b>Prerequisite instructional offerings</b>
Applied Mechanics I	10	Grade 12
Communication Skills I	5	Grade 12
Computer Skills I	5	Grade 12
Construction Materials I	10	Grade 12
Construction Methods I	10	Grade 12
Documentation III	10	Management (Civil) II
Drawing I	10	Grade 12
Drawing II	10	Drawing I and Computer Skills I
Geotechnical Engineering II	10	Construction Materials I
Geotechnical Engineering III	10	Geotechnical Engineering II
Industrial Experience 0	6	Grade 12
Life Skills 0	4	Grade 12
Management (Civil) I	10	Grade 12
Management (Civil) II	10	Management (Civil) I
Mathematics 0	10	Grade 12 Mathematics
Mathematics I	10	Mathematics 0
Mathematics II	10	Mathematics I
Physics 0	10	Grade 12 Physical Sciences
Reinforced Concrete and Masonry Design III	10	Theory of Structures II
Structural Analysis II	10	Theory of Structures II
Structural Analysis III	10	Structural Analysis II
Structural Steel and Timber Design III	10	Theory of Structures II
Surveying I	10	Mathematics I
Surveying (Civil) II	10	Surveying I

Theory of Structures II	10	Applied Mechanics I
Transportation Engineering II	10	Drawing II and Surveying I
Transportation Engineering III	10	Transportation Engineering II
Water Engineering II	10	Applied Mechanics I and Mathematics I
Water Engineering III	10	Applied Mechanics I, Mathematics I and Drawing I
Work-integrated Learning I	60	Successful completion of all Semester 1, Semester 2 and Semester 3 instructional offerings
Work-integrated Learning II	60	Work-integrated Learning I

## 29.2 NATIONAL DIPLOMA: ENGINEERING: ELECTRICAL (HC) ECP EXNDEL

*This learning programme will be offered in Bloemfontein.*

<b>SAQA CREDITS:</b>	<b>360</b>
<b>MINIMUM CREDITS REQUIRED:</b>	<b>380</b>
<b>NQF LEVEL:</b>	<b>6</b>
<b>DURATION OF LEARNING PROGRAMME:</b>	<b>4 years</b>

### Statement of the purpose of the qualification:

The purpose of the qualification is to build the necessary knowledge, understanding and skills required for a student's progression towards becoming a competent practising Engineering Technician. It is intended to subsequently empower the Candidate Engineering Technician to demonstrate his/her ability to apply his/her acquired knowledge, understanding, skills, attitudes and values in the South African work environment. The qualification is also designed to add value to the qualifying student in terms of personal enrichment, as well as status and professional recognition.

A person in possession of this qualification is able to do the following:

- Competently apply an integration of theory, principles, proven techniques, practical experience and appropriate skills towards solving well-defined problems in the field of Engineering, whilst operating within the relevant standards and codes.
- Demonstrate well-rounded general engineering knowledge, as well as systematic knowledge of the main terms, procedures, principles and operations of one of the disciplines of Engineering (Electrical Engineering).
- Gather evidence from primary sources and journals using advanced retrieval skills, and also organise, synthesise and present the information professionally in a mode appropriate to the audience.
- Apply the acquired knowledge to new situations, both concrete and abstract, in the workplace or community.
- Identify, analyse, conduct and manage a project.
- Make independent decisions/judgements, taking into account the relevant technical, economic, social and environmental factors.
- Work both independently and as a member of a team, and also as a team leader.
- Relate engineering activity to health and safety, as well as environmental, cultural and economic sustainability.
- Meet the requirements for registration with the Engineering Council of South Africa as a Candidate Engineering Technician (at national diploma level).

- Demonstrate the capacity to explore and exploit educational, entrepreneurial and career opportunities, and to engage in professional development.

**Instructional offerings:**

1 <sup>ST</sup> YEAR				INSTRUCTIONAL OFFERINGS	CREDITS
SEMESTER 1		SEMESTER 2			
January	July	January	July		
ECM11BI COM11AI	ECM12BI COM12AI			*Communication Skills I *Computer Skills	5 5
PRE1A PRE2B				English Proficiency <b>and</b> English Proficiency	0
	PRE2B PRE1A INX02CP			English Proficiency <b>and</b> English Proficiency Industrial Experience	0 0
INX01CP	INX02CP				
LSS01CP	LSS02CP			Life Skills	0
WIS01CP FIS01CP PIM5011	WIS02CP FIS02CP PIM5011			Mathematics Physics Personal Information Management	0 0 0
RSK11AB	RSK11AB			Reading Skills	0
		EDS11BI EEN11AI	EDS12BI EEN12AI	Digital Systems I *Electrical Engineering I	10 10
		ELE11AI WIS11AI MEC11AI	ELE12AI WIS12AI MEC12AI	*Electronics I *Mathematics I Mechanics I	10 10 10
				<b>Total:</b>	<b>50</b>

2 <sup>ND</sup> YEAR				INSTRUCTIONAL OFFERINGS	CREDITS
SEMESTER 3		SEMESTER 4			
January	July	January	July		
EDS21BI EEN21AI	EDS22BI EEN22AI			Digital Systems II *Electrical Engineering II	10 10
ELE21AI WIS21AI EMD11AI	ELE22AI WIS22AI EMD12AI			*Electronics II *Mathematics II Mechanical Technology I	10 10 10
EPR11AI	EPR12AI			Projects 1	10
		EDS31BI EEN31AI	EDS32BI EEN32AI	Digital Systems III Electrical Engineering III	10 10
		ELA31BI WIS31AI EMJ21AI	ELA32BI WIS32AI EMJ22AI	Electronics III Mathematics III Electrical Machines II	10 10 10
		MSM21AI	MSM22AI	Strength of Materials II	10
				<b>Total:</b>	<b>100</b>

3 <sup>RD</sup> YEAR				INSTRUCTIONAL OFFERINGS	CREDITS
SEMESTER 5		SEMESTER 6			
January	July	January	July		
EVE31AI	EVE32AI			Electrical Distribution III	10
EMJ31AI	EMJ32AI			Electrical Machines III	10
ELT31AI	ELT32AI			Electronic Applications III	10
EKM21AI	EKM22AI			Electronic Communication II	10
EID21AI	EID22AI			Industrial Electronics II	10
LOG31BI	LOG32BI			Logic Design III	10
EMD21AI	EMD22AI			Mechanical Technology II	10
EPR21AI	EPR22AI			Projects II	10
MSM31BI	MSM32BI			Strength of Materials III	10
		MSK31AI	MSK32AI	Applied Strength of Materials III	10
		ECN31BI	ECN32BI	Control Systems III	10
		EDP31HI	EDP32HI	*Design Project III (Heavy Current)	10
		EBE31AI	EBE32AI	Electrical Protection III	10
		EMD31AI	EMD32AI	Mechanical Technology III	10
		EPE31AI	EPE32AI	Power Electronics III	10
		ERE31AI	ERE32AI	Radio Engineering III	10
		ESO21AI	ESO22AI	Software Design II	10
		EVE31AI	EVE32AI	Electrical Distribution III	10
<b>Total:</b>					<b>80</b>

4 <sup>TH</sup> YEAR		INSTRUCTIONAL OFFERINGS	CREDITS
SEMESTERS 7 & 8			
January	July		
EEX11ZI	EEX12ZI	Work-integrated Learning I	60
EEX21ZI	EEX22ZI	Work-integrated Learning II	60
<b>Total:</b>			<b>120</b>

## REMARKS

- All instructional offerings indicated with an asterisk (\*) are compulsory.
- The minimum total credit value of all instructional offerings **must** add up to 240.
- The total credit value for Work-integrated Learning is 120.
- The National Diploma will be issued upon completion of 360 credits, which **may** include a maximum of 60 credits from any Engineering-related learning programme. It **must**, however, include a minimum of 60 credits of formal time at level III.
- Two intakes per year, in January and July.

After successful completion of this qualification, the National Diploma will be awarded during an official graduation ceremony of CUT.

Academic Literacy and Communication Studies requires the successful completion of two instructional offerings, A and B, in this specific order. A distinction (75% or more) in instructional offering A ensures exemption from instructional offering B. A pass (without distinction) means that the student must pass instructional offering B in order to meet the prerequisite for the learning programme. Failing

instructional offering A means that the student must re-register for instructional offering A in a subsequent semester.

No student will be allowed to graduate without successfully completing the following instructional offerings: Academic Literacy; Communication Studies; Personal Information Management and Reading Skills.

### Admission requirements

For candidates who matriculated in 2007 and before:

- A Grade 12 National Senior Certificate with a score of 22 to 26 on the CUT scoring scale, plus a minimum mark of 45% on standard grade in both Physical Sciences and Mathematics. A candidate must also successfully complete the selection process for admission.
- Candidates must adhere to the general admission regulations for candidates who matriculated in 2007 or before.

For candidates who matriculated in 2008 and thereafter:

- Candidates with a Grade 12 National Certificate with a minimum score of 22 to 26 points on the CUT scoring scale, plus a minimum mark of 40 to 49% (level 3) in both Mathematics and Physical Sciences, may be admitted directly to the ECP. Mathematical Literacy will not be accepted in any of the Engineering disciplines.
- Candidates with a Grade 12 National Senior Certificate with a minimum score of 22 to 26 points on the CUT scoring scale, plus a minimum mark of 50% (rating 4) in both Mathematics and Physical Sciences, may also be required to undergo a selection test. Should the candidate pass the selection test, the applicant will be admitted to the mainstream programme. Mathematical Literacy will not be accepted in any of the Engineering disciplines.
- Candidates must also adhere to the general admission regulations for candidates who matriculated in 2008 or after that.
- Applicants in possession of the National Certificate Vocational (NCV) will be selected according to the selection requirements as approved by Senate. Candidates must also adhere to the general admission regulations for candidates who completed the N3, N4, N5 and N6 qualification at a Technical Vocational Education and Training (TVET) college.

### PREREQUISITES

- A student will not be permitted to continue with an instructional offering on the subsequent level before successfully completing the preceding level.
- The student must pass all instructional offerings of the first semester of the extended curriculum in order to continue with his/her studies.

Instructional offerings	Credits	Prerequisite instructional offerings
Communication Skills I	5	Grade 12
Computer Skills I	5	Grade 12
Control Systems III	10	Mathematics III and Electronics III
Design Project III	10	Electronics II and Projects II
Digital Systems I	10	Grade 12
Digital Systems II	10	Digital Systems I
Digital Systems III	10	Digital Systems II
Electrical Engineering I	10	Grade 12
Electrical Engineering II	10	Electrical Engineering I
Electrical Engineering III	10	Electrical Engineering II



Electronic Applications III	10	Electronics III
Electronic Communication II	10	Electrical Engineering II and Electronics II
Electronics I	10	Grade 12
Electronics II	10	Electronics I
Electronics III	10	Electronics II
Industrial Experience 0	0	Grade 12
Life Skills 0	0	Grade 12
Logic Design III	10	Digital Systems II
Mathematics 0	0	Grade 12 Mathematics
Mathematics I	10	Mathematics 0
Mathematics II	10	Mathematics I
Mathematics III	10	Mathematics II
Physics 0	0	Grade 12 Physical Sciences
Projects I	10	Electronics I
Projects II	10	Projects I and Electronics II
Radio Engineering III	10	Electronic Communication II
Work-integrated Learning I	60	Successful completion of all Semester 1, Semester 2 and Semester 3 instructional offerings
Work-integrated Learning II	60	Work-integrated Learning I and successful completion of all instructional offerings

### 29.3 NATIONAL DIPLOMA: ENGINEERING: ELECTRICAL (ELECTRONIC LC) ECP EXNDEC

*This learning programme will be offered in Bloemfontein.*

<b>SAQA CREDITS:</b>	<b>360</b>
<b>MINIMUM CREDITS REQUIRED:</b>	<b>370</b>
<b>NQF LEVEL:</b>	<b>6</b>
<b>DURATION OF LEARNING PROGRAMME:</b>	<b>4 years</b>

#### **Statement of the purpose of the qualification:**

The purpose of the qualification is to build the necessary knowledge, understanding and skills required for a student's progression towards becoming a competent practising Engineering Technician. It is intended to subsequently empower the Candidate Engineering Technician to demonstrate his/her ability to apply his/her acquired knowledge, understanding, skills, attitudes and values in the South African work environment. The qualification is also designed to add value to the qualifying student in terms of personal enrichment, as well as status and professional recognition.

A person in possession of this qualification is able to do the following:

- Competently apply an integration of theory, principles, proven techniques, practical experience and appropriate skills towards solving well-defined problems in the field of Engineering, whilst operating within the relevant standards and codes.
- Demonstrate well-rounded general engineering knowledge, as well as systematic knowledge of the main terms, procedures, principles and operations of one of the disciplines of Engineering (Electrical Engineering).

- Gather evidence from primary sources and journals using advanced retrieval skills, and also organise, synthesise and present the information professionally in a mode appropriate to the audience.
- Apply the acquired knowledge to new situations, both concrete and abstract, in the workplace or community.
- Identify, analyse, conduct and manage a project.
- Make independent decisions/judgements, taking into account the relevant technical, economic, social and environmental factors.
- Work both independently and as a member of a team, and also as a team leader.
- Relate engineering activity to health and safety, as well as environmental, cultural and economic sustainability.
- Meet the requirements for registration with the Engineering Council of South Africa as a Candidate Engineering Technician (at national diploma level).
- Demonstrate the capacity to explore and exploit educational, entrepreneurial and career opportunities, and to engage in professional development.

### Instructional offerings:

1 <sup>ST</sup> YEAR				INSTRUCTIONAL OFFERINGS	CREDITS
SEMESTER 1		SEMESTER 2			
January	July	January	July		
ECM11BI	ECM12BI			*Communication Skills I	5
COM11AI	COM12AI			*Computer Skills	5
PRE1A PRE2B				English Proficiency <b>and</b> English Proficiency	0
	PRE2B PRE1A			English Proficiency <b>and</b> English Proficiency	0
INX01CP	INX02CP			Industrial Experience	0
LSS01CP	LSS02CP			Life Skills	0
WIS01CP	WIS02CP			Mathematics	0
FIS01CP	FIS02CP			Physics	0
PIM5011 RSK11AB	PIM5011 RSK11AB			Personal Information Management Reading Skills	0 0
		EDS11BI	EDS12BI	Digital Systems I	10
		EEN11AI	EEN12AI	*Electrical Engineering I	10
		ELE11AI	ELE12AI	*Electronics I	10
		WIS11AI	WIS12AI	*Mathematics I	10
<b>Total:</b>					<b>70</b>

2 <sup>ND</sup> YEAR				INSTRUCTIONAL OFFERINGS	CREDITS
SEMESTER 3		SEMESTER 4			
January	July	January	July		
EDS21BI	EDS22BI			Digital Systems II	10
EEN21AI	EEN22AI			*Electrical Engineering II	10
ELE21AI	ELE22AI			*Electronics II	10
WIS21AI	WIS22AI			*Mathematics II	10
		EDS31BI	EDS32BI	Digital Systems III	10
		EEN31AI	EEN32AI	Electrical Engineering III	10
		EMJ21AI	EMJ22AI	Electrical Machines II	10
		ELA31BI	ELA32BI	Electronics III	10
		WIS31AI	WIS32AI	Mathematics III	10
		EPR11AI	EPR12AI	Projects I	10
<b>Total:</b>					<b>100</b>

3 <sup>RD</sup> YEAR				INSTRUCTIONAL OFFERINGS	CREDITS
SEMESTER 5		SEMESTER 6			
January	July	January	July		
EVE31AI	EVE32AI			Electrical Distribution III	10
EMJ31AI	EMJ32AI			Electrical Machines III	10
ELT31AI	ELT32AI			Electronic Applications III	10
EKM21AI	EKM22AI			Electronic Communication II	10
EID21AI	EID22AI			Industrial Electronics II	10
LOG31BI	LOG32BI			Logic Design III	10
EPR21AI	EPR22AI			Projects II	10
		ECN31BI	ECN32BI	Control Systems III	10
		EDP31LI	EDP32LI	*Design Project III (Light Current)	10
		EBE31AI	EBE32AI	Electrical Protection III	10
		EPE31AI	EPE32AI	Power Electronics III	10
		ERE31AI	ERE32AI	Radio Engineering III	10
		ESO21AI	ESO22AI	Software Design II	10
<b>Total:</b>					<b>80</b>

4 <sup>TH</sup> YEAR		INSTRUCTIONAL OFFERINGS	CREDITS
SEMESTERS 7 & 8			
January	July		
EEX11ZI	EEX12ZI	Work-integrated Learning I	60
EEX21ZI	EEX22ZI	Work-integrated Learning II	60
<b>Total:</b>			<b>120</b>

## REMARKS

- All instructional offerings indicated with an asterisk (\*) are compulsory.
- The minimum total credit value of all instructional offerings **must** add up to 240.
- The total credit value for Work-integrated Learning is 120.
- The National Diploma will be issued upon completion of 360 credits, which **may** include a maximum of 60 credits from any Engineering-related learning programme. It **must**, however, include a minimum of 60 credits of formal time at level III.
- Two intakes per year, in January and July.

After successful completion of this qualification, the National Diploma will be awarded during an official graduation ceremony of CUT.

Academic Literacy and Communication Studies requires the successful completion of two instructional offerings, A and B, in this specific order. A distinction (75% or more) in instructional offering A ensures exemption from instructional offering B. A pass (without distinction) means that the student must pass instructional offering B in order to meet the prerequisite for the learning programme. Failing instructional offering A means that the student must re-register for instructional offering A in a subsequent semester.

No student will be allowed to graduate without successfully completing the following instructional offerings: Academic Literacy; Communication Studies; Personal Information Management and Reading Skills.

### Admission requirements

For candidates who matriculated in 2007 and before:

- A Grade 12 National Senior Certificate with a score of 22 to 26 on the CUT scoring scale, plus a minimum mark of 45% on standard grade in both Physical Sciences and Mathematics. A candidate must also successfully complete the selection process for admission.
- Candidates must also adhere to the general admission regulations for candidates who matriculated in 2007 or before.

For candidates who matriculated in 2008 and thereafter:

- Candidates with a Grade 12 National Certificate with a minimum score of 22 to 26 points on the CUT scoring scale, plus a minimum mark of 40% to 49% (level 3) in both Mathematics and Physical Sciences, may be admitted directly to the ECP. Mathematical Literacy will not be accepted in any of the Engineering disciplines.
- Candidates with a Grade 12 National Senior Certificate with a minimum score of 22 to 26 points on the CUT scoring scale, plus a minimum mark of 50% (rating 4) in both Mathematics and Physical Sciences, may also be required to undergo a selection test. Should the candidate pass the selection test, the applicant will be admitted to the mainstream programme. Mathematical Literacy will not be accepted in any of the Engineering disciplines.
- Candidates must also adhere to the general admission regulations for candidates who matriculated in 2008 or thereafter.
- Applicants in possession of the National Certificate Vocational (NCV) will be selected according to the selection requirements as approved by Senate. Candidates must also adhere to the general admission regulations for candidates who completed the N3, N4, N5 and N6 qualification at a Technical Vocational Education and Training (TVET) college.

**PREREQUISITES**

- A student will not be permitted to continue with an instructional offering on the subsequent level before successfully completing the preceding level.
- The student must pass all instructional offerings of the first semester of the extended curriculum in order to continue with his/her studies.

<b>Instructional offerings</b>	<b>Credits</b>	<b>Prerequisite instructional offerings</b>
Communication Skills I	5	Grade 12
Computer Skills I	5	Grade 12
Control Systems III	10	Mathematics III and Electronics III
Design Project III	10	Electronics II and Projects II
Digital Systems I	10	Grade 12
Digital Systems II	10	Digital Systems I
Digital Systems III	10	Digital Systems II
Electrical Engineering I	10	Grade 12
Electrical Engineering II	10	Electrical Engineering I
Electrical Engineering III	10	Electrical Engineering II
Electronic Applications III	10	Electronics III
Electronic Communication II	10	Electrical Engineering II and Electronics II
Electronics I	10	Grade 12
Electronics II	10	Electronics I
Electronics III	10	Electronics II
Industrial Experience 0	0	Grade 12
Life Skills 0	0	Grade 12
Logic Design III	0	Digital Systems II
Mathematics 0	0	Grade 12 Mathematics
Mathematics I	10	Mathematics 0
Mathematics II	10	Mathematics I
Mathematics III	10	Mathematics II
Physics 0	0	Grade 12 Physical Sciences
Projects I	10	Electronics I
Projects II	10	Projects I and Electronics II
Radio Engineering III	10	Electronic Communication II
Work-integrated Learning I	60	Successful completion of all Semester 1, Semester 2 and Semester 3 instructional offerings
Work-integrated Learning II	60	Work-integrated Learning I and successful completion of all instructional offerings

**29.4 NATIONAL DIPLOMA: ENGINEERING: MECHANICAL ECP EXNDMG**

*This learning programme will be offered in Bloemfontein.*

<b>SAQA CREDITS:</b>	<b>360</b>
<b>MINIMUM CREDITS REQUIRED:</b>	<b>390</b>
<b>NQF LEVEL:</b>	<b>6</b>
<b>DURATION OF LEARNING PROGRAMME:</b>	<b>4 years</b>

**Statement of purpose of the qualification:**

The purpose of the qualification is to build the necessary knowledge, understanding and skills required for a student's progression towards becoming a competent Practising Engineering Technician. It is intended to subsequently empower the Candidate Engineering Technician to demonstrate his/her ability to apply his/her acquired knowledge, understanding, skills, attitudes and values in the South African work environment. The qualification is also designed to add value to the qualifying student in terms of personal enrichment, as well as status and professional recognition.

- Competently apply an integration of theory, principles, proven techniques, practical experience and appropriate skills towards solving well-defined problems in the field of Engineering, whilst operating within the relevant standards and codes.
- Demonstrate well-rounded general engineering knowledge, as well as systematic knowledge of the main terms, procedures, principles and operations of one of the disciplines of Engineering (Mechanical Engineering).
- Gather evidence from primary sources and journals using advanced retrieval skills, and also organise, synthesise and present the information professionally in a mode appropriate to the audience.
- Apply the acquired knowledge to new situations, both concrete and abstract, in the workplace or community.
- Identify, analyse, conduct and manage a project.
- Make independent decisions or judgements, taking into account the relevant technical, economic, social and environmental factors.
- Work both independently and as a member of a team, and also as a team leader.
- Relate engineering activity to health and safety, as well as environmental, cultural and economic sustainability.
- Meet the requirements for registration with the Engineering Council of South Africa as a Candidate Engineering Technician (at national diploma level).
- Demonstrate the capacity to explore and exploit educational, entrepreneurial and career opportunities, and to engage in professional development.

**Instructional offerings:**

1 <sup>ST</sup> YEAR				INSTRUCTIONAL OFFERINGS	CREDITS
SEMESTER 1		SEMESTER 2			
January	July	January	July		
EMC11BI RPV11AI	EMC12BI RPV12AI			Communication Skills I	10
				Computer & Programming Skills I	10
PRE1A PRE2B				English Proficiency <b>and</b> English Proficiency	0
	PRE2B PRE1A			English Proficiency <b>and</b> English Proficiency	0
INX01CP	INX02CP			Industrial Experience	6
LSS01CP	LSS02CP			Life Skills	4
WIS01CP FIS01CP	WIS02CP FIS02CP			Mathematics Physics	10 10
PIM5011	PIM5011			Personal Information Management	0
RSK11AB	RSK11AB			Reading Skills	0
		WIS11AI MDR11AI	WIS12AI MDR12AI	Mathematics I Mechanical Engineering Drawing I	10 10
		MAN11AI	MAN12AI	Mechanical Manufacturing Engineering I	10
		MEC11AI	MEC12AI	Mechanics I	10
<b>Total:</b>					<b>90</b>

2 <sup>ND</sup> YEAR				INSTRUCTIONAL OFFERINGS	CREDITS
SEMESTER 3		SEMESTER 4			
January	July	January	July		
MEL11AI MFM21AI	MEL12AI MFM22AI			Electrotechnology I	10
				Fluid Mechanics II	10
WIS21AI MEM21AI MSM21AI	WIS22AI MEM22AI MSM22AI			Mathematics II Mechanics of Machines II Strength of Materials II	10 10 10
		MFM31BI WIS31AI MED21AI	MFM32BI WIS32AI MED22AI	Fluid Mechanics III Mathematics III Mechanical Engineering Design II	10 10 10
		MEM31BI	MEM32BI	Mechanics of Machines III	10
		MTH21AI	MTH22AI	Thermodynamics II	10
<b>Total:</b>					<b>100</b>

3 <sup>RD</sup> YEAR				INSTRUCTIONAL OFFERINGS	CREDITS
SEMESTER 5		SEMESTER 6			
January	July	January	July		
MEL21BI	MEL22BI			Electrotechnology II	10
MHM31AI	MHM32AI			Hydraulic Machines III	10
MSM31BI	MSM32BI			Strength of Materials III	10
MTB31BI	MTB32BI			Thermodynamics III	10
		MSK31AI	MSK32AI	Applied Strength of Materials III	10
		MED31BI	MED32BI	Mechanical Engineering Design III	10
		MST31AI	MST32AI	Steam Plant III	10
		MTM31AI	MTM32AI	Theory of Machines III	10
<b>Total:</b>					<b>80</b>

4 <sup>TH</sup> YEAR		INSTRUCTIONAL OFFERINGS	CREDITS
SEMESTERS 7 & 8			
January	July		
MEX11ZI	MEX12ZI	Work-integrated Learning I	60
MEX21ZI	MEX22ZI	Work-integrated Learning II	60
<b>Total:</b>			<b>120</b>

## REMARKS

- All instructional offerings from Semesters 1 to 8, are compulsory.
- The minimum total credit value of all instructional offerings is 240.
- The total credit value for Work-integrated Learning is 120.
- The National Diploma will be issued upon completion of 360 credits, which **may** include a maximum of 50 credits from any Engineering-related instructional programme. It **must**, however, include a minimum of 60 credits of formal time at level III.
- Two intakes per year, in January and July.

After successful completion of this qualification, the National Diploma will be awarded during an official graduation ceremony of CUT.

Academic Literacy and Communication Studies requires the successful completion of two instructional offerings, A and B, in this specific order. A distinction (75% or more) in instructional offering A ensures exemption from instructional offering B. A pass (without distinction) means that the student must pass instructional offering B in order to meet the prerequisite for the learning programme. Failing instructional offering A means that the student must re-register for instructional offering A in a subsequent semester.

No student will be allowed to graduate without successfully completing the following instructional offerings: Academic Literacy; Communication Studies; Personal Information Management and Reading Skills.

## Admission requirements

For candidates who matriculated in 2007 and before:

- A Grade 12 National Senior Certificate with a score of 22 to 26 on the CUT scoring scale, plus a minimum mark of 45% on standard grade in both Physical Sciences and Mathematics. A candidate must also successfully complete the selection process for admission.



- Candidates must also adhere to the general admission regulations for candidates who matriculated in 2007 or before.

For candidates who matriculated in 2008 and thereafter:

- Candidates with a Grade 12 National Certificate with a minimum score of 22 to 26 points on the CUT scoring scale, plus a minimum mark of 40% to 49% (level 3) in both Mathematics and Physical Sciences, may be admitted directly to the ECP. Mathematical Literacy will not be accepted in any of the Engineering disciplines.
- Candidates with a Grade 12 National Senior Certificate with a minimum score of 22 to 26 points on the CUT scoring scale, plus a minimum mark of 50% (rating 4) in both Mathematics and Physical Sciences, may also be required to undergo a selection test. Should the candidate pass the selection test, the applicant will be admitted to the mainstream programme. Mathematical Literacy will not be accepted in any of the Engineering disciplines.
- Candidates must also adhere to the general admission regulations for candidates who matriculated in 2008 or thereafter.
- Applicants in possession of the National Certificate Vocational (NCV) will be selected according to the selection requirements as approved by Senate. Candidates must also adhere to the general admission regulations for candidates who completed the N3, N4, N5 and N6 qualification at a Technical Vocational Education and Training (TVET) college.

**Optional instructional offerings**

All instructional offerings are compulsory.

**PREREQUISITES**

- A student will not be permitted to continue with an instructional offering on the subsequent level before successfully completing the preceding level.
- The student must pass all instructional offerings of the first semester of the extended curriculum in order to continue with his/her studies.

<b>Instructional offerings</b>	<b>Credits</b>	<b>Prerequisite instructional offerings</b>
Applied Strength of Materials III	10	Strength of Materials III
Communication Studies I	10	Grade 12
Computer & Programming Skills I	10	Grade 12
Electrotechnology I	10	Grade 12
Electrotechnology II	10	Electrotechnology I
Fluid Mechanics II	10	Mechanics I
Fluid Mechanics III	10	Fluid Mechanics II
Hydraulic Machines III	10	Fluid Mechanics III
Industrial Experience 0	6	Grade 12
Life Skills 0	4	Grade 12
Mathematics 0	10	Grade 12 Mathematics
Mathematics I	10	Mathematics 0
Mathematics II	10	Mathematics I
Mathematics III	10	Mathematics II
Mechanical Engineering Design II	10	Mechanics I
Mechanical Engineering Design III	10	Mechanical Engineering Design II
Mechanical Engineering Drawing I	10	Grade 12
Mechanical Manufacturing Engineering I	10	Grade 12

Mechanics I	10	Grade 12
Mechanics of Machines II	10	Mechanics I
Mechanics of Machines III	10	Mechanics of Machines II
Physics 0	10	Grade 12 Physical Sciences
Steam Plant III	10	Thermodynamics III
Strength of Materials II	10	Mechanics I
Strength of Materials III	10	Strength of Materials II
Theory of Machines III	10	Mechanics of Machines III
Thermodynamics II	10	Mechanics I
Thermodynamics III	10	Thermodynamics II
Work-integrated Learning I	10	Successful completion of all Semester 1 to Semester 6 instructional offerings
Work-integrated Learning II	10	Work-integrated Learning I

## 29.5 NATIONAL DIPLOMA: INFORMATION TECHNOLOGY ECP (SOFTWARE DEVELOPMENT) EXNDIS

*(No new first-year intake for the National Diploma: Information Technology ECP (Software Development) as from 2017. This programme will be phased out.)*

*This learning programme will be offered in Bloemfontein and Welkom.*

**SAQA CREDITS:** 360  
**MINIMUM CREDITS REQUIRED:** 414  
**NQF LEVEL:** 6  
**DURATION OF LEARNING PROGRAMME:** 4 years

### Instructional offerings

1 <sup>ST</sup> YEAR	2 <sup>ND</sup> YEAR	3 <sup>RD</sup> YEAR	4 <sup>TH</sup> YEAR	INSTRUCTIONAL OFFERINGS	CREDITS
PPC00FP				Programming Principles	15
LSK00FP				Life Skills	15
BSC00FP				Business Communication	15
PRE1A				English Proficiency <b>and</b>	9
PRE2B				English Proficiency	9
PIM5011				Personal Information Management	0
RSK11AB				Reading Skills	0
	OPG10BB			Development Software I	30
	INL10DB			Information Systems I	30
	ITV10AB			Information Technology Skills I	30
	ITW10AB			IT Mathematics I	30
		OPG20BB		Development Software II	30
		INL20DB		Information Systems II	30
		TPG10AB		Technical Programming I	30
		SPG11AB		System Software I <b>(Semester 1)</b>	15
		SPG12AB		System Software I <b>(Semester 2)</b>	15

1 <sup>ST</sup> YEAR	2 <sup>ND</sup> YEAR	3 <sup>RD</sup> YEAR	4 <sup>TH</sup> YEAR	INSTRUCTIONAL OFFERINGS	CREDITS
			OPG30BB	Development Software III	30
			INL30EB	Information Systems III	30
			TPG20AB	Technical Programming II	30
			SPG21CB	System Software II (Semester 1) or	15
			GID10AB	Graphical User Interface Design I	30
			SPG22CB	System Software II (Semester 2) or	15
			GID10AB	Graphical User Interface Design I	30
<b>Total:</b>					<b>414</b>

## REMARKS

16 instructional offerings are to be taken over a period of four years.

Only one intake per year, in January.

After successful completion of this qualification, the National Diploma will be awarded during an official graduation ceremony of CUT.

### Admission requirements

#### For candidates who matriculated in 2007 and before:

Students with an M-score of between 22 and 27, with a minimum mark of 60% in standard grade or 40% on higher grade in either Mathematics or Computer Studies, will be selected according to the outcome of a selection test.

#### For candidates who completed the NSC in 2008 and thereafter:

Students with an M-score of between 22 and 27 on the CUT scoring scale, with a minimum mark of 60% in Mathematical Literacy or 40% in either Mathematics or Information Technology, will be selected according to the outcome of a selection test.

Applicants in possession of the National Certificate Vocational (NCV) will be selected according to the selection requirements as approved by Senate.

Admission to this learning programme is subject to selection.

## PREREQUISITES

The student may only enrol for the second-, third- or fourth-year level of an instructional offering if he/she has passed the first-, second- or third-year level respectively.

Academic Literacy and Communication Studies requires the successful completion of two instructional offerings, A and B, in this specific order. A distinction (75% or more) in instructional offering A ensures exemption from instructional offering B. A pass (without distinction) means that the student must pass instructional offering B in order to meet the prerequisite for the learning programme. Failing instructional offering A means that the student must re-register for instructional offering A in a subsequent semester.

No student will be allowed to graduate without successfully completing the following instructional offerings: Academic Literacy; Communication Studies; Personal Information Management and Reading Skills.

<b>Instructional offerings</b>	<b>Credits</b>	<b>Prerequisite instructional offerings</b>
Programming Principles	15	Grade 12
Life Skills	15	Grade 12
Business Communication	15	Grade 12
English Proficiency	9	Grade 12
Development Software I	30	Programming Principles
Information Systems I	30	Grade 12
Information Technology Skills I	30	Grade 12
IT Mathematics I	30	Grade 12
Development Software II	30	Development Software I
Information Systems II	30	Development Software I and Information Systems I
Technical Programming I	30	Development Software I
System Software I (Semester 1)	15	Information Systems I
System Software I (Semester 2)	15	System Software I (Semester 1)
Development Software III	30	Development Software II
Information Systems III	30	Information Systems II
Technical Programming II	30	Technical Programming I
System Software II (Semester 1)	15	System Software I (Semester 2)
System Software II (Semester 2)	15	System Software II (Semester 1)
Graphical User Interface Design I	30	Development Software I

## 29.6 NATIONAL DIPLOMA: INFORMATION TECHNOLOGY ECP (WEB AND APPLICATION DEVELOPMENT) EXNDIT

*(No new first-year intake for the National Diploma: Information Technology ECP (Web and Application Development) as from 2017. This programme will be phased out.)*

*This learning programme will be offered in Bloemfontein.*

<b>SAQA CREDITS:</b>	<b>360</b>
<b>MINIMUM CREDITS REQUIRED:</b>	<b>414</b>
<b>NQF LEVEL:</b>	<b>6</b>
<b>DURATION OF LEARNING PROGRAMME:</b>	<b>4 years</b>

### Instructional offerings

1 <sup>ST</sup> YEAR	2 <sup>ND</sup> YEAR	3 <sup>RD</sup> YEAR	4 <sup>TH</sup> YEAR	INSTRUCTIONAL OFFERINGS	CREDITS
PPC00FP				Programming Principles	15
LSK00FP				Life Skills	15
BSC00FP				Business Communication	15
PRE1A				English Proficiency <b>and</b>	9
PRE2B				English Proficiency	9
PIM5011				Personal Information Management	0
RSK11AB				Reading Skills	0

1 <sup>ST</sup> YEAR	2 <sup>ND</sup> YEAR	3 <sup>RD</sup> YEAR	4 <sup>TH</sup> YEAR	INSTRUCTIONAL OFFERINGS	CREDITS
	OPG10BB INL10DB			Development Software I Information Systems I	30 30
	ITV10AB  ITW10AB			Information Technology Skills I IT Mathematics I	30 30
		INP20AB		Internet Programming II	30
		INL20DB SPG11AB		Information Systems II System Software I <b>(Semester 1)</b>	30 15
		SPG12AB		System Software I <b>(Semester 2)</b>	15
		WEB20AB		Web Management II	30
			INP30AB INL30EB GID10AB  WEB30AB	Internet Programming III Information Systems III Graphical User Interface Design I Web Management III	30 30 30 30
<b>Total:</b>					<b>414</b>

## REMARKS

16 instructional offerings are to be taken over a period of four years.

Only one intake per year, in January.

After successful completion of this qualification, the National Diploma will be awarded during an official graduation ceremony of CUT.

### Admission requirements

For candidates who matriculated in 2007 and before:

Students with an M-score of between 22 and 27, with a minimum mark of 60% in standard grade or 40% on higher grade in either Mathematics or Computer Studies, will be selected according to the outcome of a selection test.

For candidates who completed the NSC in 2008 and thereafter:

Students with an M-score of between 22 and 27 on the CUT scoring scale, with a minimum mark of 60% in Mathematical Literacy, or 40% in either Mathematics or Information Technology, will be selected according to the outcome of a selection test.

Applicants in possession of the National Certificate Vocational (NCV) will be selected according to the selection requirements as approved by Senate.

Admission to this learning programme is subject to selection.

## PREREQUISITES

The student may only enrol for the second-, third- or fourth-year level of an instructional offering if he/she has passed the first-, second- or third-year level respectively.

Academic Literacy and Communication Studies requires the successful completion of two instructional offerings, A and B, in this specific order. A distinction (75% or more) in instructional offering A ensures exemption from instructional offering B. A pass (without distinction) means that the student must pass instructional offering B in order to meet the prerequisite for the learning programme. Failing instructional offering A means that the student must re-register for instructional offering A in a subsequent semester.

No student will be allowed to graduate without successfully completing the following instructional offerings: Academic Literacy; Communication Studies; Personal Information Management and Reading Skills.

<b>Instructional offerings</b>	<b>Credits</b>	<b>Prerequisite instructional offerings</b>
Programming Principles	30	Grade 12
Life Skills	30	Grade 12
Business Communication	30	Grade 12
English Proficiency	9	Grade 12
Development Software I	30	Programming Principles
Information Systems I	30	Grade 12
Information Technology Skills I	30	Grade 12
IT Mathematics I	30	Grade 12
Internet Programming II	30	Development Software I
Information Systems II	30	Development Software I and Information Systems I
Web Management I	30	Development Software I
System Software I (Semester 1)	15	Information Systems I
System Software I (Semester 2)	15	System Software I (Semester 1)
Information Systems III	30	Information Systems II
Internet Programming III	30	Internet Programming II
Web Management III	30	Web Management II
Graphical User Interface Design I	30	Development Software I

### 30. DIPLOMAS

#### 30.1 DIPLOMA IN COMPUTER NETWORKING DP\_CMN

*This learning programme will be offered in Bloemfontein.*

**SAQA CREDITS:** 387  
**MINIMUM CREDITS REQUIRED:** 387  
**NQF LEVEL:** 6  
**DURATION OF LEARNING PROGRAMME:** 3 years

#### Instructional offerings

1 <sup>ST</sup> YEAR		INSTRUCTIONAL OFFERINGS	CREDITS
SEMESTER 1	SEMESTER 2		
ALP115C	ALP125C	Academic Literacy and Personal Competencies	12
ITE115C	ITE125C	Information Technology Essentials IA & IB	30
ITM115C	ITM125C	Information Technology Mathematics IA & IB	30
PIM5011		Personal Information Management	0
PSA115C		Problem-solving and Algorithms	15
RSK11AB		Reading Skills	0
SPG115C		System Software IA	15
	SPG125C	System Software IB	15
SSD115C	SSD125C	System Software Development I	30
<b>Total:</b>			<b>147</b>

2 <sup>ND</sup> YEAR		INSTRUCTIONAL OFFERINGS	CREDITS
SEMESTER 1	SEMESTER 2		
CMN216C		Communication Networks II A	15
DBS216C		Databases II	15
SSD216C	SSD226C	System Software Development II	30
SPG216C		System Software IIA	30
	CMN226C	Communication Networks IIB	15
	SPG226C	System Software IIB	15
	SSE226C	System Software Engineering II	15
<b>Total:</b>			<b>120</b>

3 <sup>RD</sup> YEAR		INSTRUCTIONAL OFFERINGS	CREDITS
SEMESTER 1	SEMESTER 2		
CNR316C		Communication Networks Routing III	15
CNS316C		Communication Networks Switching III	15
SSD316C		System Software Development III	15
SSE316C		System Software Engineering III	15
	CMN327W	Work-integrated Learning in Computer Networking	60
<b>Total:</b>			<b>120</b>

**REMARKS**

25 instructional offerings are to be taken over a period of three years.  
The Diploma will be issued upon completion of 375 credits.

Only one intake per year, in January.

After successful completion of this qualification, the Diploma will be awarded during an official graduation ceremony of CUT.

**Admission requirements**

Admission to this learning programme is subject to selection.

For candidates who matriculated in 2007 and before:

A Grade 12 National Senior Certificate with a score of 27 on the CUT scoring scale, plus a minimum mark of 60% on standard grade or 40% on higher grade in Mathematics or Computer Science. A candidate must also successfully complete the selection process for admission.

For candidates who completed the NSC in 2008 and thereafter:

A National Senior Certificate with a score of 27 on the CUT scoring scale, plus a minimum pass mark of 40% (rating 3) in Mathematics or Computer Science, or 60% (rating 5) in Mathematical Literacy.

Applicants in possession of the National Certificate Vocational (NCV) will be selected according to the selection requirements as approved by Senate.

**PREREQUISITES**

Refer to the heading “General” – point 12 of this chapter.

<b>Instructional offerings</b>	<b>Credits</b>	<b>Prerequisite instructional offerings</b>
Academic Literacy and Personal Competencies	06	Grade 12
Information Technology Mathematics IA	12	Grade 12
Information Technology Essentials IA	15	Grade 12
System Software IA	15	Grade 12
Problem-solving and Algorithms	15	Grade 12
System Software Development IA	15	Grade 12
System Software IB	15	System Software IA
Information Technology Mathematics IB	12	Information Technology Mathematics IA
Information Technology Essentials IB	15	Information Technology Essentials IA
System Software Development IB	15	System Software Development IA
Communication Networks IIA	15	System Software IB
Databases II	15	System Software Development IB
System Software Development IIB	15	System Software Development IA
System Software IIA	15	System Software IB



Communication Networks IIB	15	Communication Networks IIA
System Software Development IIB	15	System Software Development IIA
System Software Engineering II	15	Databases II
System Software IIB	15	System Software IIA
Communication Networks Switching III	15	System Software IIB
Communication Networks Routing III	15	System Software IIB
System Software Engineering III	15	System Software Engineering II
System Software Development III	15	System Software Development IIB
Work-integrated Learning in Computer Networking	60	System Software IIB & Communication Networks IIB

**30.2 DIPLOMA IN INFORMATION TECHNOLOGY DP\_ITC**

*This learning programme will be offered in Bloemfontein and Welkom.*

**SAQA CREDITS: 390**  
**MINIMUM CREDITS REQUIRED: 390**  
**NQF LEVEL: 6**  
**DURATION OF LEARNING PROGRAMME: 3 years**

**Instructional offerings**

1 <sup>ST</sup> YEAR		INSTRUCTIONAL OFFERINGS	CREDITS
SEMESTER 1	SEMESTER 2		
ALP115C	ALP125C	Academic Literacy and Personal Competencies	6
ITE115C	ITE125C	Information Technology Essentials IA & IB	30
ITM115C	ITM125C	Information Technology Mathematics IA & IB	24
PIM5011		Personal Information Management	0
PSA115C		Problem-solving and Algorithms	15
RSK11AB		Reading Skills	0
SOD115C	SOD125C	Software Development IA & IB	30
	INP125C	Internet Programming I	15
<b>Total:</b>			<b>120</b>

2 <sup>ND</sup> YEAR		INSTRUCTIONAL OFFERINGS	CREDITS
SEMESTER 1	SEMESTER 2		
DBS216C		Databases II	15
GID216C		Graphic Design II	15
SOD216C		Software Development IIA	15
TPG216C		Technical Programming IIA	15
WEB215C		Web Content Management II	15
	GUD226C	Graphical User Interface Design II	15
	INT226C	Internet Technologies II	15
	SOD226C	Software Development IIB	15
	SOE226C	Software Engineering II	15
	TPG226C	Technical Programming IIB	15
<b>Total:</b>			<b>150</b>

3 <sup>RD</sup> YEAR		INSTRUCTIONAL OFFERINGS	CREDITS
SEMESTER 1	SEMESTER 2		
CMN316C		Communication Networks II	15
ITS316C		Information Technology and Society I	10
SOD316C		Software Development III	15
SOE316C		Software Engineering III	15
TPG316C		Technical Programming III	15
	ITC327W	Work-integrated Learning in Information Technology	50
		<b>Total:</b>	<b>120</b>

## REMARKS

27 instructional offerings are to be taken over a period of three years.  
The Diploma will be issued upon completion of 390 credits.

Only one intake per year, in January.

After successful completion of this qualification, the Diploma will be awarded during an official graduation ceremony of CUT.

### Admission requirements

Admission to this learning programme is subject to selection.

For candidates who matriculated in 2007 and before:

A Grade 12 National Senior Certificate with a score of 27 on the CUT scoring scale, plus a minimum mark of 60% on standard grade or 40% on higher grade in Mathematics or Computer Science. A candidate must also successfully complete the selection process for admission.

For candidates who completed the NSC in 2008 and thereafter:

A National Senior Certificate with a score of 27 on the CUT scoring scale, plus a minimum pass mark of 40% (rating 3) in Mathematics or Computer Science, or 60% (rating 5) in Mathematical Literacy.

Applicants in possession of the National Certificate Vocational (NCV) will be selected according to the selection requirements as approved by Senate.

## PREREQUISITES

Refer to the heading “General” – point 12 of this chapter.

Instructional offerings	Credits	Prerequisite instructional offerings
Academic Literacy and Personal Competencies	06	Grade 12
Information Technology Mathematics IA	12	Grade 12
Information Technology Essentials IA	15	Grade 12
Internet Programming I	15	Grade 12
Problem-solving and Algorithms	15	Grade 12
Software Development IA	15	Grade 12

Information Technology Mathematics IB	12	Information Technology Mathematics IA
Information Technology Essentials IB	15	Information Technology Essentials IA
Software Development IB	15	Software Development IA
Databases II	15	Software Development IB
Graphic Design II	15	Software Development IB
Software Development II A	15	Software Development IB
Technical Programming II A	15	Software Development IB
Web Content Management II	15	Internet Programming I
Graphical User Interface Design II	15	Graphic Design II
Software Development II B	15	Software Development II A
Internet Technologies II	15	Web Content Management II
Software Engineering II	15	Databases II
Technical Programming II B	15	Technical Programming II A
Information Technology and Society I	10	Software Engineering II
Communication Networks II	15	Internet Technologies II
Software Engineering III	15	Software Engineering II
Software Development III	15	Software Development II B
Technical Programming III	15	Technical Programming II B
Work-integrated Learning in Information Technology	50	Software Engineering III and Software Development III

**31. DIPLOMAS : EXTENDED CURRICULUM PROGRAMMES**

**31.1 DIPLOMA IN COMPUTER NETWORKING ECP EX\_CMN**

*This learning programme will be offered in Bloemfontein.*

**SAQA CREDITS: 396**  
**MINIMUM CREDITS REQUIRED: 396**  
**NQF LEVEL: 6**  
**DURATION OF LEARNING PROGRAMME: 4 years**

**Instructional offerings**

1 <sup>ST</sup> YEAR		INSTRUCTIONAL OFFERINGS	CREDITS
SEMESTER 1	SEMESTER 2		
FIT115C		Foundation of IT Essentials IA	7
LSK115E		Life Skills I A	7
PPC115C		Programming Principles IA	7
RSK11AB		Reading Skills	0
	ALP125C	Academic Literacy and Personal Competencies	6
	FIT125C	Foundation of IT Essentials IB	8
	LSK125E	Life Skills IB	8
	PPC125C	Programming Principles IB	8
<b>Total:</b>			<b>51</b>

2 <sup>ND</sup> YEAR		INSTRUCTIONAL OFFERINGS	CREDITS
SEMESTER 1	SEMESTER 2		
ITM115C	ITM125C	Information Technology Mathematics IA & IB	30
PIM5011		Personal Information Management	0
SPG115C		System Software IA	15
SSD115C	SSD125C	System Software Development IA & IB	30
	ITE125C	Information Technology Essentials IB	15
	SPG125C	System Software IB	15
<b>Total:</b>			<b>105</b>

3 <sup>RD</sup> YEAR		INSTRUCTIONAL OFFERINGS	CREDITS
SEMESTER 1	SEMESTER 2		
CMN216C		Communication Networks IIA	15
DBS216C		Databases II	15
SSD216C	SSD226C	System Software Development IIA & IIB	30
SPG216C		System Software IIA	15
	CMN226C	Communication Networks IIB	15
	SPG226C	System Software IIB	15
	SSE226C	System Software Engineering II	15
<b>Total:</b>			<b>120</b>

4 <sup>TH</sup> YEAR		INSTRUCTIONAL OFFERINGS	CREDITS
SEMESTER 1	SEMESTER 2		
CNR316C		Communication Networks Routing III	15
CNS316C		Communication Networks Switching III	15
SSD316C		System Software Development III	15
SSE316C		System Software Engineering III	15
	CMN327W	Work-integrated Learning in Computer Networking	60
<b>Total:</b>			<b>120</b>

## REMARKS

29 instructional offerings are to be taken over a period of four years.  
The Diploma will be issued upon completion of 390 credits.

In the ECP programme, the following subjects have the same content and credits as the normal programme:

ECP subject		Credits	Diploma subject		Credits
PPC115C	Programming Principles IA	7	PSA115C	Problem-solving and Algorithms	15
PPC125C	Programming Principles IB	8			
FIT115C	Foundation of IT Essentials IA	7	ITE125C	Information Technology Essentials IA	15
FIT125C	Foundation of IT Essentials IB	8			

Only one intake per year, in January.

After successful completion of this qualification, the Diploma will be awarded during an official graduation ceremony of CUT.

## Admission requirements

Admission to this learning programme is subject to selection.

### For candidates who matriculated in 2007 and before:

Students with an M-score of between 22 and 27, with a minimum mark of 60% on standard grade or 40% on higher grade in Mathematics or Computer Studies, will be selected according to the outcome of a selection test.

### For candidates who completed the NSC in 2008 and thereafter:

Students with an M-score of between 22 and 27 on the CUT scoring scale, with a minimum pass mark of 60% in Mathematical Literacy or 40% in either Mathematics or Information Technology, will be selected according to the outcome of a selection test.

Applicants in possession of the National Certificate Vocational (NCV) will be selected according to the selection requirements as approved by Senate.

## PREREQUISITES

Refer to the heading “General” – point 12 of this chapter.

<b>Instructional offerings</b>	<b>Credits</b>	<b>Prerequisite instructional offerings</b>
Programming Principles IA	07	Grade 12
Life Skills IA	07	Grade 12
Foundation of IT Essentials IA	07	Grade 12
Reading Skills	00	Grade 12
Programming Principles IB	08	Programming Principles IA
Life Skills IB	08	Life Skills IA
Foundation of IT Essentials IB	08	Foundation of IT Essentials IA
Academic Literacy and Personal Competencies	06	Grade 12
Personal Information Management	00	Grade 12
Information Technology Mathematics IA	15	Grade 12
System Software IA	15	Programming Principles IB
System Software Development IA	15	Programming Principles IB
System Software IB	15	System Software IA
Information Technology Mathematics IB	15	Information Technology Mathematics IA
Information Technology Essentials IB	15	Foundation of IT Essentials IB
System Software Development IB	15	System Software Development IA
Communication Networks IIA	15	System Software IB
Databases II	15	System Software Development IB
System Software Development IIA	15	System Software Development IB
System Software IIA	15	System Software IB
Communication Networks IIB	15	Communication Networks IIA
System Software Development IIB	15	System Software Development IIA
System Software Engineering II	15	Databases II
System Software IIB	15	System Software IIA

Communication Networks Switching III	15	System Software IIB
Communication Networks Routing III	15	System Software IIB
System Software Engineering III	15	System Software Engineering II
System Software Development III	15	System Software Development II
Work-integrated Learning in Computer Networking	60	System Software IIB & Communication Networks IIB

### 31.2 DIPLOMA IN INFORMATION TECHNOLOGY ECP EX\_ITC

*This learning programme will be offered in Bloemfontein and Welkom.*

<b>SAQA CREDITS:</b>	<b>405</b>
<b>MINIMUM CREDITS REQUIRED:</b>	<b>405</b>
<b>NQF LEVEL:</b>	<b>6</b>
<b>DURATION OF LEARNING PROGRAMME:</b>	<b>4 years</b>

#### Instructional offerings

1 <sup>ST</sup> YEAR		INSTRUCTIONAL OFFERINGS	CREDITS
SEMESTER 1	SEMESTER 2		
FIT115C		Foundation of IT Essentials IA	7
LSK115E		Life Skills IA	7
PPC115C		Programming Principles IA	7
RSK11AB		Reading Skills	0
	ALP125C	Academic Literacy and Personal Competencies	6
	FIT125C	Foundation of IT Essentials IB	8
	LSK125E	Life Skills IB	8
	PPC125C	Programming Principles IB	8
<b>Total:</b>			<b>51</b>

2 <sup>ND</sup> YEAR		INSTRUCTIONAL OFFERINGS	CREDITS
SEMESTER 1	SEMESTER 2		
ITM115C	ITM125C	Information Technology Mathematics I	24
PIM5011		Personal Information Management	0
SOD115C	SOD125C	Software Development I	30
	ITE125C	Information Technology Essentials I	15
	INP125C	Internet Programming I	15
<b>Total:</b>			<b>84</b>

3 <sup>RD</sup> YEAR		INSTRUCTIONAL OFFERINGS	CREDITS
SEMESTER 1	SEMESTER 2		
DBS216C		Databases II	15
GID216C		Graphic Design II	15
SOD216C		Software Development IIA	15
TPG216C		Technical Programming IIA	15
WEB215C		Web Content Management II	15
	GUD226C	Graphical User Interface Design II	15
	INT226C	Internet Technologies II	15
	SOD226C	Software Development IIB	15
	SOE226C	Software Engineering II	15
	TPG226C	Technical Programming IIB	15
<b>Total:</b>			<b>150</b>

4 <sup>TH</sup> YEAR		INSTRUCTIONAL OFFERINGS	CREDITS
SEMESTER 1	SEMESTER 2		
CMN316C		Communication Networks II	15
ITS316C		Information Technology and Society I	10
SOD316C		Software Development III	15
SOE316C		Software Engineering III	15
TPG316C		Technical Programming III	15
	ITC327W	Work-integrated Learning in Information Technology	50
<b>Total:</b>			<b>120</b>

## REMARKS

31 instructional offerings are to be taken over a period of four years.  
The Diploma will be issued upon completion of 405 credits.

In the ECP programme, the following subjects have the same content and credits as the normal programme:

ECP subject		Credits	Diploma subject		Credits
PPC115C	Programming Principles IA	7	PSA115C	Problem-solving and Algorithms	15
PPC125C	Programming Principles IB	8			
FIT115C	Foundation of IT Essentials IA	7	ITE125C	Information Technology Essentials IA	15
FIT125C	Foundation of IT Essentials IB	8			

Only one intake per year, in January.

After successful completion of this qualification, the Diploma will be awarded during an official graduation ceremony of CUT.

### Admission requirements

Admission to this learning programme is subject to selection.

For candidates who matriculated in 2007 and before:

Students with an M-score of between 22 and 27, with a minimum mark of 60% on standard grade or 40% on higher grade in either Mathematics or Computer Studies, will be selected according to the outcome of a selection test.

For candidates who completed the NSC in 2008 and thereafter:

Students with an M-score of between 22 and 27 on the CUT scoring scale, with a minimum pass mark of 60% in Mathematical Literacy or 40% in either Mathematics or Information Technology, will be selected according to the outcome of a selection test.

Applicants in possession of the National Certificate Vocational (NCV) will be selected according to the selection requirements as approved by Senate.

## PREREQUISITES

Refer to the heading “General” – point 12 of this chapter.

<b>Instructional offerings</b>	<b>Credits</b>	<b>Prerequisite instructional offerings</b>
Programming Principles IA	07	Grade 12
Life Skills IA	07	Grade 12
Foundation of IT Essentials IA	07	Grade 12
Reading Skills	00	Grade 12
Programming Principles IB	08	Programming Principles IA
Life Skills IB	08	Life Skills IA
Foundation of IT Essentials IB	08	Foundation of IT Essentials IA
Academic Literacy and Personal Competencies	06	Grade 12
Personal Information Management	00	Grade 12
Information Technology Mathematics IA	12	Grade 12
Internet Programming I	15	Programming Principles IB
Software Development IA	15	Programming Principles IB
Information Technology Mathematics IB	12	Information Technology Mathematics IA
Information Technology Essentials IB	15	Foundation of IT Essentials IB
Software Development IB	15	Software Development IA
Databases II	15	Software Development IB
Graphic Design II	15	Software Development IB
Software Development IIA	15	Software Development IB
Technical Programming IIA	15	Software Development IB
Web Content Management II	15	Internet Programming I
Graphical User Interface Design II	15	Graphic Design II
Internet Technologies II	15	Web Content Management II
Software Development IIB	15	Software Development II A
Software Engineering II	15	Databases II
Technical Programming IIB	15	Technical Programming II A
Information Technology and Society I	10	Software Engineering II
Communication Networks II	15	Internet Technologies II
Software Engineering III	15	Software Engineering II
Software Development III	15	Software Development IIB
Technical Programming III	15	Technical Programming IIB



Work-integrated Learning in Information Technology	50	Software Engineering III and Software Development III
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**32. ADVANCED DIPLOMA**

**32.1 ADVANCED DIPLOMA IN LOGISTICS AND TRANSPORTATION MANAGEMENT ADLTME**

*This learning programme will be offered in Bloemfontein.*

**SAQA CREDITS: 132**  
**MINIMUM CREDITS REQUIRED: 160**  
**NQF LEVEL: 7**  
**DURATION OF LEARNING PROGRAMME: 1 year**

**Instructional offerings**

1 <sup>STH</sup> YEAR		INSTRUCTIONAL OFFERINGS	CREDITS
SEMESTER 1	SEMESTER 2		
BLM0011		Business Logistics and Management I	14
IRP0011		Introduction to Research and Research Project	12
PJM0011		Project Management	12
TPP0011		Transportation Planning	18
TFM0011		Traffic Planning and Management <sup>#</sup>	12
QTO0011		Quantitative Techniques and Optimisation <sup>#</sup>	12
	BML0012	Business Logistics and Management II	14
	TSE0022	Transportation Economics	12
	IVM0022	Inventory Management	12
	FRM0022	Freight Planning and Management	18
	THE0022	Transportation and Highway Engineering <sup>#</sup>	12
	URP0022	Urban and Regional Planning <sup>#</sup>	12
<b>Total:</b>			<b>160</b>

\*Year subject.

<sup>#</sup>Elective subjects: Students are required to choose at least one elective per semester.

<p><b>REMARKS</b></p> <ul style="list-style-type: none"> <li>• Only one intake per year, in January.</li> <li>• A minimum of 132 credits is required to obtain a qualification.</li> </ul> <p><b>Admission requirements</b></p> <p><u>For candidates who matriculated in 2007 and before:</u></p> <ul style="list-style-type: none"> <li>• A National Diploma in either Civil Engineering (or Engineering Technology in Civil) or Management (both at NQF level 6); <b>OR</b></li> </ul>
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- a Diploma in either Civil Engineering (or Engineering Technology in Civil) or Management (both at NQF level 6); **OR**
- relevant, sufficient experience in the logistics and transportation sector PLUS any qualification at NQF level 6. These applications will be considered individually by a CUT panel for admission.

For candidates who completed the NSC in 2008 and thereafter:

- A National Diploma in either Civil Engineering (or Engineering Technology in Civil) or Management (both at NQF level 6); **OR**
- a National Diploma in either Civil Engineering (or Engineering Technology in Civil) or Management (both at NQF level 6); **OR**
- relevant, sufficient experience in the logistics and transportation sector PLUS any qualification at NQF level 6. These applications will be considered individually by a CUT panel for admission.

#### **PREREQUISITES**

- An NQF-level 6 qualification, as indicated under “admission requirements”.

### **33. BACCALAUREUS TECHNOLOGIAE DEGREES**

#### **33.1 BACCALAUREUS TECHNOLOGIAE: CONSTRUCTION MANAGEMENT ISBTRR**

*This learning programme will be offered in Bloemfontein.*

<b>SAQA CREDITS:</b>	<b>120</b>
<b>MINIMUM CREDITS REQUIRED:</b>	<b>120</b>
<b>NQF LEVEL:</b>	<b>7</b>
<b>DURATION OF LEARNING PROGRAMME:</b>	<b>1 year full-time or 2 years part-time block release</b>

#### **Instructional offerings**

<b>4<sup>TH</sup> YEAR</b>	<b>INSTRUCTIONAL OFFERINGS</b>	<b>CREDITS</b>
APC40AI	Appropriate Construction IV	20
PRO40AI	Real Estate Management IV	20
BEP40AI	*Building Entrepreneurship IV	20
COE40AI	*Construction Economics IV	20
CLP40AI	*Construction Law & Procedure IV	20
KON40AI	*Construction Management IV	20
DEM40AI	Development Management IV	20
NMD10AI	*Research Methodology I	20
<b>Total:</b>		<b>120</b>

**REMARKS**

\*Compulsory instructional offerings.

The total credit value of fourth-level instructional offerings is 120.

Six instructional offerings must be taken at level IV, one of which must be an instructional offering selected from the list above.

\*\*The student must already be in possession of the National Diploma: Building, with the specific prescribed instructional offerings as stipulated in the CUT Calendar. Enquiries may be directed to the Head: Department of Built Environment. A 60% average for the National Diploma and a 60% average for Construction Management III are required.

After successful completion of this qualification, a Baccalaureus Technologiae Degree will be awarded during an official graduation ceremony of CUT.

Students following the part-time programme may not be enrolled for more than three subjects in any year of study.

### 33.2 BACCALAUREUS TECHNOLOGIAE: ENGINEERING: CIVIL ISBTCJ

*This learning programme will be offered in Bloemfontein.*

<b>SAQA CREDITS:</b>	<b>120</b>
<b>MINIMUM CREDITS REQUIRED:</b>	<b>120</b>
<b>NQF LEVEL:</b>	<b>7</b>
<b>DURATION OF LEARNING PROGRAMME:</b>	<b>1 year</b>

#### **Statement of the purpose of the qualification:**

The purpose of the qualification is to build the necessary knowledge, understanding and skills required for a student's progression towards becoming a competent practising Engineering Technologist. It is intended to subsequently empower the Candidate Engineering Technologist to demonstrate his/her ability to apply his/her acquired knowledge, understanding, skills, attitudes and values in the South African work environment. The qualification is also designed to add value to the qualifying student in terms of personal enrichment, as well as status and recognition.

A person in possession of this qualification is able to do the following:

- Competently apply an integration of theory, principles, proven techniques, practical experience and appropriate skills towards solving broadly defined problems in the field of Engineering, whilst operating within the relevant standards and codes.
- Demonstrate well-rounded general engineering knowledge, as well as systematic knowledge of the main terms, procedures, principles and operations of one of the disciplines of Engineering.
- Gather evidence from primary sources and journals using advanced retrieval skills, and also organise, synthesise and present the information professionally in a mode appropriate to the audience.
- Apply the acquired knowledge to new situations, both concrete and abstract, in the workplace or community.

- Identify, analyse, conduct and manage a project.
- Make independent decisions/judgements, taking into account the relevant technical, economic, social and environmental factors.
- Work both independently and as a member of a team, and also as a team leader.
- Relate engineering activity to health and safety, as well as environmental, cultural and economic sustainability.
- Meet the requirements for registration with the Engineering Council of South Africa as a Candidate Engineering Technologist (at BTech level).
- Demonstrate the capacity to explore and exploit educational, entrepreneurial and career opportunities, and to engage in professional development.

### Instructional offerings

4 <sup>TH</sup> -YEAR URBAN		INSTRUCTIONAL OFFERINGS	CREDITS
SEMESTER 1 January	SEMESTER 2 July		
	KMA42AI	Construction Materials Technology IV	15
PLA41AI	GEO42AI	Geometric Design IV	15
		Pavement Technology IV	15
	NWK42AI	Reticulation Design & Management IV	15
STE41AI	PJK42AI	Urban Planning & Design IV	15
PJK41AI		Project Management: Civil IV	15
<b>Total credits for specialist field:</b>			<b>90</b>
<b>Total credits for other field:</b>			<b>30</b>
<b>Grand total:</b>			<b>120</b>

4 <sup>TH</sup> -YEAR TRANSPORTATION		INSTRUCTIONAL OFFERINGS	CREDITS
SEMESTER 1 January	SEMESTER 2 July		
ASF41AI	BET42AI GEO42AI	Asphalt Technology IV	15
		Concrete Technology IV	15
		Geometrical Design IV	15
PLA41AI	VKR42AI VVR42AI	Pavement Technology IV	15
		Traffic Engineering IV	15
		Transportation Planning IV	15
PJK41AI	PJK42AI	Project Management: Civil IV	15
<b>Total credits for specialist field:</b>			<b>90</b>
<b>Total credits for other field:</b>			<b>30</b>
<b>Grand total:</b>			<b>120</b>

<b>4<sup>TH</sup>-YEAR WATER</b>		<b>INSTRUCTIONAL OFFERINGS</b>	
<b>SEMESTER 1 January</b>	<b>SEMESTER 2 July</b>		
HDR41AI HID41AI	DAM42AI	Dam Engineering IV Hydraulics IV Hydrology IV	15 15 15
	BSP42AI NWK42AI AFW42AI	Irrigation IV Reticulation Design & Management IV Waste Water Treatment Technology IV	15 15 15
WBH41AI PJK41AI	PJK42AI	Water Treatment Technology IV Project Management: Civil IV	15 15
		<b>Total credits for specialist field:</b>	<b>90</b>
		<b>Total credits for other field:</b>	<b>30</b>
		<b>Grand total:</b>	<b>120</b>

**PREREQUISITES**

To qualify for admission to the Baccalaureus Technologiae programme, a student must already be in possession of a national diploma, with the specific prescribed instructional offerings as stipulated in the CUT Calendar.

<b>Instructional offerings</b>	<b>Credits</b>	<b>Prerequisite instructional offerings</b>
Asphalt Technology IV	15	Transportation Engineering III
Concrete Technology IV	15	National Diploma
Construction Materials Technology IV	15	Transportation Engineering III or Geotechnical Engineering III
Dam Engineering IV	15	Water Engineering III and Geotechnical Engineering III
Geometric Design IV	15	Transportation Engineering III
Hydraulics IV	15	Water Engineering III
Hydrology IV	15	Water Engineering II & III
Irrigation IV	15	Water Engineering II & III
Pavement Technology IV	15	Transportation Engineering III and Geotechnical Engineering III
Project Management: Civil IV	15	National Diploma
Reticulation Design & Management IV	15	Water Engineering III
Traffic Engineering IV	15	Transportation Engineering III
Transportation Planning IV	15	Transportation Engineering III
Urban Planning & Design IV	15	National Diploma
Waste Water Treatment Technology IV	15	Water Engineering II and III
Water Treatment Technology IV	15	Water Engineering II and III

**REMARKS**

A student must choose a particular specialist field, provided he/she complies with the prerequisites thereof. In each specialist field, the learning programme consists of five CORE instructional offerings, plus three from other specialist fields (i.e., a total of eight instructional offerings). The details of learning programmes for the specialist fields are available from the secretary of the relevant department.

Construction Materials Technology IV may not be taken in combination with Concrete Technology IV and/or Asphalt Technology IV.

After successful completion of this qualification, a Baccalaureus Technologiae Degree will be awarded during an official graduation ceremony of CUT.

**33.3 BACCALAUREUS TECHNOLOGIAE: ENGINEERING: ELECTRICAL IEBTEG**

*This learning programme will be offered in Bloemfontein.*

<b>SAQA CREDITS:</b>	<b>120</b>
<b>MINIMUM CREDITS REQUIRED:</b>	<b>120</b>
<b>NQF LEVEL:</b>	<b>7</b>
<b>DURATION OF LEARNING PROGRAMME:</b>	<b>1 year full-time or 2 years part-time</b>

**Statement of the purpose of the qualification:**

The purpose of the qualification is to build the necessary knowledge, understanding and skills required for a student's progression towards becoming a competent Practising Engineering Technologist. It is intended to subsequently empower the Candidate Engineering Technologist to demonstrate his/her ability to apply his/her acquired knowledge, understanding, skills, attitudes and values in the South African work environment. The qualification is also designed to add value to the qualifying student in terms of personal enrichment, as well as status and recognition.

A person in possession of this qualification is able to do the following:

- Competently apply an integration of theory, principles, proven techniques, practical experience and appropriate skills towards solving broadly defined problems in the field of Engineering, whilst operating within the relevant standards and codes.
- Demonstrate well-rounded general engineering knowledge, as well as systematic knowledge of the main terms, procedures, principles and operations of one of the disciplines of Engineering.
- Gather evidence from primary sources and journals using advanced retrieval skills, and also organise, synthesise and present the information professionally in a mode appropriate to the audience.
- Apply the acquired knowledge to new situations, both concrete and abstract, in the workplace or community.
- Identify, analyse, conduct and manage a project.
- Make independent decisions or judgements, taking into account the relevant technical, economic, social and environmental factors.
- Work both independently and as a member of a team, and also as a team leader.
- Relate engineering activity to health and safety, as well as environmental, cultural and economic sustainability.
- Meet the requirements for registration with the Engineering Council of South Africa as a Candidate Engineering Technologist (at BTech level).

- Demonstrate the capacity to explore and exploit educational, entrepreneurial and career opportunities, and to engage in professional development.

**Instructional offerings**

4 <sup>TH</sup> YEAR		INSTRUCTIONAL OFFERINGS	CREDITS
SEMESTER 1	SEMESTER 2		
<b>January</b>	<b>July</b>		
REN41AI	REN42AI	Computer Networks IV	12
DBP41AI	DBP42AI	Database Programming IV	12
EDG41AI	EDG42AI	Digital Signal Processing IV	12
EMJ41AI	EMJ42AI	Electrical Machines IV	12
EBE41AI	EBE42AI	Electrical Protection IV	12
EKS41AI	EKS42AI	Electronic Communication Systems IV	12
EKM41AI	EKM42AI	Electronic Communication IV	12
ELE41AI	ELE42AI	Electronics IV	12
EIW41AI	EIW42AI	Engineering Mathematics IV	12
EHV41AI	EHV42AI	High-voltage Engineering IV	12
EMO41AI	EMO42AI	Microsystems Design IV	12
EMI41AI	EMI42AI	Microcontroller Systems IV	12
EPE41AI	EPE42AI	Power Electronics IV	12
EPS41AI	EPS42AI	Power Systems IV	12
EBT41AI	EBT42AI	Protection Technology IV	12
PIG41AI	PIG42AI	Software Engineering IV	12
SFS41AI	SFS42AI	Software Systems IV	12
EIP40AI		*Industrial Project IV ( <b>Light Current</b> )	36
EIP40HI		*Industrial Project IV ( <b>Heavy Current</b> )	36
<b>Total:</b>			<b>120</b>

**PREREQUISITES**

Instructional offerings	Credits	Prerequisite instructional offerings
Computer Networks IV	12	Network Systems III
Database Programming IV	12	Programming III
Digital Signal Processing IV	12	Digital Systems II and Mathematics III
Electrical Protection IV	12	Electrical Protection III
Electrical Machines IV	12	Electrical Machines III
Electronic Communication IV	12	Radio Engineering III
Electronic Communication Systems IV	12	Radio Engineering III
Electronics IV	12	Electronic Applications III
Engineering Mathematics IV	12	Mathematics III
High-voltage Engineering IV	12	Electrical Engineering III
Industrial Projects IV	36	Design Project III
Microcontroller Systems IV	12	Digital Systems III
Microsystems Design IV	12	Digital Systems III
Power Electronics IV	12	Power Electronics III
Power Systems IV	12	Electrical Engineering III and Power Electronics III

Protection Technology IV	12	Electrical Protection III
Software Engineering IV	12	Software Engineering III
Software Systems IV	12	Operating Systems III

## REMARKS

\*Compulsory instructional offering.

The total credit value of the instructional offerings is 120.

A maximum of 24 credits in any other Engineering-related learning programme may be presented.

A student must already be in possession of the National Diploma: Engineering: Electrical, with the specific prescribed instructional offerings as stipulated in the CUT Calendar. Enquiries may be directed to the Head of Department: Electrical, Electronic and Computer Engineering.

Two intakes per year, in January and July.

After successful completion of this qualification, a Baccalaureus Technologiae Degree will be awarded during an official graduation ceremony of CUT.

### 33.4 BACCALAUREUS TECHNOLOGIAE: ENGINEERING: MECHANICAL IMBTMB

*This learning programme will be offered in Bloemfontein.*

<b>SAQA CREDITS:</b>	<b>120</b>
<b>MINIMUM CREDITS REQUIRED:</b>	<b>120</b>
<b>NQF LEVEL:</b>	<b>7</b>
<b>DURATION OF LEARNING PROGRAMME:</b>	<b>1 year</b>

#### Statement of the purpose of the qualification:

The purpose of this qualification is to build the necessary knowledge, understanding and skills required for a student's progression towards becoming a competent Practising Engineering Technologist. It is intended to subsequently empower the candidate engineering technologist to demonstrate his/her ability to apply his/her acquired knowledge, understanding, skills, attitudes and values in the South African work environment. The qualification is also designed to add value to the qualifying student in terms of personal enrichment, as well as status and recognition.

A person in possession of this qualification is able to do the following:

- Competently apply an integration of theory, principles, proven techniques, practical experience and appropriate skills towards solving broadly defined problems in the field of Engineering, whilst operating within the relevant standards and codes.
- Demonstrate well-rounded general engineering knowledge, as well as systematic knowledge of the main terms, procedures, principles and operations of one of the disciplines of Engineering.
- Gather evidence from primary sources and journals using advanced retrieval skills, and also organise, synthesise and present the information professionally in a mode appropriate to the audience.



- Apply the acquired knowledge to new situations, both concrete and abstract, in the workplace or community.
- Identify, analyse, conduct and manage a project.
- Make independent decisions/judgements, taking into account the relevant technical, economic, social and environmental factors.
- Work both independently and as a member of a team, and also as a team leader.
- Relate engineering activity to health and safety, as well as environmental, cultural and economic sustainability.
- Meet the requirements for registration with the Engineering Council of South Africa as a Candidate Engineering Technologist (at BTech level).
- Demonstrate the capacity to explore and exploit educational, entrepreneurial and career opportunities, and to engage in professional development.

### Instructional offerings

4 <sup>TH</sup> YEAR		INSTRUCTIONAL OFFERINGS	CREDITS
SEMESTER 1	SEMESTER 2		
<b>January</b>	<b>July</b>		
MAC41AI		Automatic Control IV	15
MSM41AI		Strength of Materials IV	15
MTB41AI		Thermodynamics IV	15
MTU41AI		Turbo Machines IV	15
	MFM42AI	Fluid Mechanics IV	15
	MEM42AI	Mechanics of Machines IV	15
	MRF42AI	Refrigeration & Air Conditioning IV	15
	MSA42AI	Stress Analysis IV	15
MDP40AI		*Engineering Design Project IV	30
<b>Total:</b>			<b>120</b>

### PREREQUISITES

Instructional offerings	Credits	Prerequisite instructional offerings
Automatic Control IV	15	Theory of Machines III
Engineering Design Project IV	30	Mechanical Engineering Design III
Fluid Mechanics IV	15	Hydraulic Machines III
Mechanics of Machines IV	15	Theory of Machines III
Refrigeration & Air Conditioning IV	15	Steam Plant III
Strength of Materials IV	15	Applied Strength of Materials III
Stress Analysis IV	15	Applied Strength of Materials III
Thermodynamics IV	15	Steam Plant III
Turbo Machines IV	15	Hydraulic Machines III

**REMARKS**

Mathematics III is a prerequisite for all the above-mentioned instructional offerings.

\*Compulsory instructional offering: Engineering Design Project IV and any two of the following combinations:

Mechanics of Machines IV and Automatic Control IV **or** Strength of Materials IV and Stress Analysis IV **or** Thermodynamics IV and Refrigeration & Air Conditioning IV **or** Fluid Mechanics IV and Turbo Machines IV.

The total credit value of fourth-level instructional offerings is 120 credits.

The degree is bestowed as soon as 120 formal credits have been earned.

Work-integrated Learning does not form part of the instructional offerings presented from any other approved Engineering programme.

A student must already be in possession of the National Diploma: Engineering: Mechanical, with the specific prescribed instructional offerings as stipulated in the CUT Calendar. Enquiries may be directed to the Head of Department: Mechanical and Mechatronic Engineering.

After successful completion of this qualification, a Baccalaureus Technologiae Degree will be awarded during an official graduation ceremony of CUT.

**33.5 BACCALAUREUS TECHNOLOGIAE: INFORMATION TECHNOLOGY  
(SOFTWARE DEVELOPMENT) BCBTIW  
(WEB AND APPLICATION DEVELOPMENT) BCBTIP**

*This learning programme will be offered in Bloemfontein.*

**SAQA CREDITS: 120**  
**MINIMUM CREDITS REQUIRED: 120**  
**NQF LEVEL: 7**  
**DURATION OF LEARNING PROGRAMME: 1 year**

**Instructional offerings**

<b>4<sup>TH</sup> YEAR</b>		<b>INSTRUCTIONAL OFFERINGS</b>	<b>CREDITS</b>
<b>SEMESTER 1</b>	<b>SEMESTER 2</b>		
CMN41AB		Communication Networks IV	12
CSY41AB		Computer Security IV	12
DBS41AB		Database Systems IV	12
IPE41AB		Internet Programming & e-Commerce IV	12
NMT11AB		Research Methodology	12
OPG41AB		Development Software IV	12
ITM41AB		Information & Technology Management IV	12

4 <sup>TH</sup> YEAR		INSTRUCTIONAL OFFERINGS	CREDITS
SEMESTER 1	SEMESTER 2		
	ACN42AB	Advanced Communication Networks IV	12
	ADS42AB	Advanced Development Software IV	12
	APE42AB	Advanced Internet Programming & e-Commerce IV	12
	BSL42AB	Operating Systems IV	12
	PIO42AB	Software Engineering & Design IV	12
	TPG42AB	Technical Programming IV	12
	USR42AB	User Interfaces Design IV	12
	CRA42AB	Computer Architecture IV	12
PRJ40AB		Project IV	24
		<b>Total:</b>	<b>120</b>

**Instructional offerings are presented on demand, depending on the number of students enrolling for such instructional offerings. There is a possibility that a particular instructional offering will not be presented during a specific year.**

### REMARKS

At least ten instructional offerings must be taken (Project IV represents two instructional offerings).

Instructional offerings may only be taken during one of the two semesters, with the Department in question determining the instructional offerings for the semester. The student must consult with the relevant Department before finalising his/her instructional offerings.

After successful completion of this qualification, a Baccalaureus Technologiae Degree will be awarded during an official graduation ceremony of CUT.

### Admission requirements

An average mark of at least 65% for the final-year subject of the National Diploma: Information Technology **or** equivalent qualification.

Candidates seeking admission to this learning programme are subject to selection.

### Optional instructional offerings

The student should discuss this matter with the relevant Department.

### PREREQUISITES

Refer to the heading “General” – point 12 of this chapter.

Instructional offerings	Credits	Prerequisite instructional offerings
Communication Networks IV	12	System Software II (Semester II)
Computer Security IV	12	National Diploma: Information Technology
Database Systems IV	12	Information Systems III
Internet Programming & e-Commerce IV	12	Internet Programming III

Research Methodology	12	National Diploma: Information Technology
Development Software IV	12	Development Software III
Information & Technology Management IV	12	Information Systems III
Advanced Communication Networks IV	12	Communication Networks IV
Advanced Development Software IV	12	Development Software IV
Advanced Internet Programming & e-Commerce IV	12	Internet Programming & e-Commerce IV
Operating Systems IV	12	National Diploma: Information Technology
Software Engineering & Design IV	12	National Diploma: Information Technology
Technical Programming IV		Technical Programming II
User Interfaces Design IV	12	National Diploma: Information Technology
Computer Architecture IV	12	National Diploma: Information Technology
Project IV	24	National Diploma: Information Technology
<b>Compulsory instructional offerings for the fourth year:</b>		
<b>Software Development</b>		<b>Web &amp; Application Development</b>
Development Software IV		Internet Programming & e-Commerce IV
Advanced Development Software IV		Advanced Internet Programming & e-Commerce IV
Information & Technology Management IV		Information & Technology Management IV

### 33.6 BACCALAUREUS TECHNOLOGIAE: QUANTITY SURVEYING ISBTQG

*This learning programme will be offered in Bloemfontein.*

<b>SAQA CREDITS:</b>	<b>120</b>
<b>MINIMUM CREDITS REQUIRED:</b>	<b>120</b>
<b>NQF LEVEL:</b>	<b>7</b>
<b>DURATION OF LEARNING PROGRAMME:</b>	<b>2-year block release 1 year full-time or two years part-time block release</b>

#### Instructional offerings

4 <sup>TH</sup> YEAR	INSTRUCTIONAL OFFERINGS	CREDITS
BEP40AI	*Building Entrepreneurship IV	20
COE40AI	*Construction Economics IV	20
CLP40AI	*Construction Law & Procedures IV	20
DEM40AI	Development Management IV	20
MVA40AI	Market Valuations IV	20
BRK40AI	*Quantity Surveying IV	20
PRO40AI	Real Estate Management IV	20
NMD10AI	*Research Methodology I	20
<b>Total:</b>		<b>120</b>

**PREREQUISITES**

<b>Instructional offerings</b>	<b>Credits</b>	<b>Prerequisite instructional offerings **</b>
Building Entrepreneurship IV	20	Construction Accounting III
Construction Economics IV	20	Price Analysis & Estimating III
Construction Law & Procedures IV	20	National Diploma
Development Management IV	20	National Diploma
Market Valuations IV	20	Price Analysis & Estimating III
Quantity Surveying IV	20	Quantity Surveying III
Real Estate Management IV	20	National Diploma
Research Methodology I	20	National Diploma

**REMARKS**

\* Compulsory instructional offerings.

The total credit value of fourth-level instructional offerings is 120.

Six instructional offerings must be taken at level IV, one of which must be selected from the list above.

\*\*The student must already be in possession of the National Diploma: Building, with the specific prescribed instructional offerings as stipulated in the CUT Calendar. Enquiries may be directed to the Head: Department of Built Environment. A 60% average for the diploma and a 60% average for Quantity Surveying III.

After successful completion of this qualification, a Baccalaureus Technologiae Degree will be awarded during an official graduation ceremony of CUT.

Students following the part-time programme may not be enrolled for more than three subjects in any year of study.

### 34. BACHELOR OF SCIENCE

#### 34.1 BACHELOR OF SCIENCE IN HYDROLOGY AND WATER RESOURCES MANAGEMENT BSHWRM

*This learning programme will be offered in Bloemfontein.*

SAQA CREDITS: 360  
 MINIMUM CREDITS REQUIRED: 366  
 NQF LEVEL: 7  
 DURATION OF LEARNING PROGRAMME: 3 years

#### Instructional offerings

1 <sup>ST</sup> YEAR		INSTRUCTIONAL OFFERINGS	CREDITS
SEMESTER 1	SEMESTER 2		
LCS5011	LCS5012	Academic Literacy and Communication Studies	12
DLC5001		Digital Literacy	6
NMR5111		Numeracy	6
CHE5011		Chemistry	12
PYC5011		Physics	12
	AMM5012	Applied Mathematics	12
	HYD5012	Hydrology I	12
	WTM5012	Water Resources Management I	12
	EVS5012	Environmental Science	12
<b>Total:</b>			<b>96</b>

2 <sup>ND</sup> YEAR		INSTRUCTIONAL OFFERINGS	CREDITS
SEMESTER 1	SEMESTER 2		
HDC6000		Hydro Chemistry*	24
GHR6000		Geo-hydrology*	24
HYD6000		Hydrology II*	30
WTM6000		Water Resources Management II*	30
	EVM6022	Environmental Engineering	18
	WIL6022	Work-integrated Learning (general)	10
<b>Total:</b>			<b>136</b>

3 <sup>RD</sup> YEAR		INSTRUCTIONAL OFFERINGS	CREDITS
SEMESTER 1	SEMESTER 2		
HYD7000		Hydrology III*	30
WTM7000		Water Resources Management III*	30
AWT7000		Advanced Water and Waste Water Treatment Technology*	24
WIL7000		Work-integrated Learning (in elective)	20
WTC7000		Water Pollution Control# or	30 <sup>#</sup>
RDM7000		Reticulation Design and Management#	
<b>Total:</b>			<b>134</b>

\* Year subjects

# Elective: Students are required to take one of the two electives.

## REMARKS

- Only one intake per year, in January.
- All instructional offerings indicated with \* are year subjects, whilst those indicated with # are electives.

### Admission requirements

Admission to this learning programme is subject to selection.

#### For candidates who matriculated in 2007 and before:

In addition to the general admission requirements, a minimum mark of 50% on SG or 40% on HG in Biology/Physiology, Mathematics and Physical Sciences is required. A minimum admission point score (APS) of 28 points on the CUT scale of notation is also required.

#### For candidates who completed the NSC in 2008 and thereafter:

In addition to the general admission requirements, the candidate must be in possession of the NCS with endorsement for a bachelor's degree. A minimum mark of 50% in Life Sciences/Physiology, Mathematics and Physical Sciences is required. A minimum APS of 28 points on the CUT scale of notation is also required.

Applicants in possession of the National Certificate Vocational (NCV) will be selected according to the selection requirements as approved by Senate.

## PREREQUISITES

Refer to the heading “General” – point 12 of this chapter.

Academic Literacy and Communication Studies requires the successful completion of two instructional offerings, A and B, in this specific order.

<b>Instructional offerings</b>	<b>Credits</b>	<b>Prerequisite instructional offerings</b>
Environmental Engineering	12	Environmental Science
Geo-hydrology	12	Hydrology I
Hydro Chemistry	12	Chemistry
Hydrology II	12	Hydrology I
Hydrology III	30	Hydrology II
Water Resources Management II	12	Water Resources Management I
Water Resources Management III	30	Water Resources Management II

<b>35. MAGISTER TECHNOLOGIAE DEGREES</b>
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**SAQA CREDITS: 120**

**NQF LEVEL: 9**

<b>PROGRAMME CODE</b>	<b>MAGISTER TECHNOLOGIAE</b>	<b>MAIN CODE</b>	<b>INSTRUCTIONAL OFFERINGS</b>
ISMTEA	Engineering: Civil <i>Offered at: Bloemfontein</i> <b>NO INTAKE IN 2017</b>	VER50AI	Dissertation
IEMTEA	Engineering: Electrical <i>Offered at: Bloemfontein</i> <b>NO INTAKE IN 2017</b>	VHA50AI	Dissertation
IMMTMF	Engineering: Mechanical <i>Offered at: Bloemfontein</i> <b>NO INTAKE IN 2017</b>	VHD50AI	Dissertation
BCMTIG	Information Technology <i>Offered at: Bloemfontein</i> <b>NO INTAKE IN 2017</b>	VER50AB	Dissertation

**REMARKS**

After successful completion of this qualification, a Magister Technologiae degree will be awarded during an official graduation ceremony of CUT.

**Admission requirements**

Research follows specialisation at Baccalaureus Technologiae level or equivalent.  
Excellent assessment results at Baccalaureus Technologiae level or equivalent, as required.



### 36. MASTER'S DEGREES

**SAQA CREDITS: 180**

**NQF LEVEL: 9**

PROGRAMME CODE	MASTER'S DEGREE	MAIN CODE	INSTRUCTIONAL OFFERINGS
M_ENGC	Master of Engineering in Civil Engineering <i>Offered at: Bloemfontein</i>	VER50AI	Dissertation
M_ENGE	Master of Engineering in Electrical Engineering <i>Offered at: Bloemfontein</i>	VHA50AI	Dissertation
M_ENGM	Master of Engineering in Mechanical Engineering <i>Offered at: Bloemfontein</i>	VHD50AI	Dissertation
M_ITEC	Master in Information Technology <i>Offered at: Bloemfontein</i>	VER50AB	Dissertation

#### REMARKS

After successful completion of this qualification, a master's degree will be awarded during an official graduation ceremony of CUT.

#### Admission requirements

Research follows specialisation at Baccalaureus Technologiae level or equivalent.  
Excellent assessment results at Baccalaureus Technologiae level or equivalent, as required.

### 37. DOCTOR TECHNOLOGIAE DEGREES

**SAQA CREDITS: 240**

**NQF LEVEL: 10**

PROGRAMME CODE	DOCTOR TECHNOLOGIAE	MAIN CODE	INSTRUCTIONAL OFFERINGS
ISDTSB	Engineering: Civil <i>Offered at: Bloemfontein</i> <b>NO INTAKE IN 2017</b>	GVN90AI	Advanced research project and thesis
IEDTEK	Engineering: Electrical <i>Offered at: Bloemfontein</i> <b>NO INTAKE IN 2017</b>	NAV90AI	Advanced research project and thesis
IMDTMJ	Engineering: Mechanical <i>Offered at: Bloemfontein</i> <b>NO INTAKE IN 2017</b>	GNA90AI	Advanced research project and thesis
BCDTTG	Information Technology <i>Offered at: Bloemfontein</i> <b>NO INTAKE IN 2017</b>	ARD90AB	Advanced research project and thesis

**REMARKS**

After successful completion of this qualification, a Doctor Technologiae degree will be awarded during an official graduation ceremony of CUT.

**Admission requirements**

Research follows specialisation at Magister Technologiae level or equivalent.  
Excellent assessment results at Magister Technologiae level or equivalent, as required.

**38. DOCTORATES**

**SAQA CREDITS: 240**

**NQF LEVEL: 10**

<b>PROGRAMME CODE</b>	<b>DOCTORATE</b>	<b>MAIN CODE</b>	<b>INSTRUCTIONAL OFFERINGS</b>
D_ENGC	Doctor of Engineering in Civil Engineering <i>Offered at: Bloemfontein</i>	GVN90AI	Advanced research project and thesis
D_ENGE	Doctor of Engineering in Electrical Engineering <i>Offered at: Bloemfontein</i>	NAV90AI	Advanced research project and thesis
D_ENGM	Doctor of Engineering in Mechanical Engineering <i>Offered at: Bloemfontein</i>	GNA90AI	Advanced research project and thesis

**REMARKS**

After successful completion of this qualification, a doctorate will be awarded during an official graduation ceremony of CUT.

**Admission requirements**

Research follows specialisation at Magister Technologiae level or equivalent.  
Excellent assessment results at Magister Technologiae level or equivalent, as required.

### 39. DOCTOR OF PHILOSOPHY

**SAQA CREDITS: 240**  
**NQF LEVEL: 10**

PROGRAMME CODE	DOCTORATE	MAIN CODE	INSTRUCTIONAL OFFERINGS
D_ITEC	Doctor of Philosophy in Information Technology <i>Offered at: Bloemfontein</i>	ARD90AB	Advanced research project and thesis

### 40. POSTDOCTORAL STUDIES

PROGRAMME CODE	POSTDOCTORAL STUDIES	MAIN CODE	INSTRUCTIONAL OFFERING
POSTDH	Postdoctoral Studies <i>Offered at: Bloemfontein</i>	RESENGI	Research Engineering

### 41. REGISTRATION AS PROFESSIONAL TECHNICIAN AND/OR TECHNOLOGIST WITH THE ENGINEERING COUNCIL OF SOUTH AFRICA (ECSA)

ECSA is a statutory body established by an Act of Parliament, and is responsible for setting and controlling the standards of education, training and conduct of engineering professionals.

Graduate students of CUT may register for the following titles, according to qualifications attained and specified years of suitable experience in the field of Engineering:

- \* Professional Engineering Technician (PrEngTech)
- \* Professional Engineering Technologist (PrTechEng)

For further information in this regard, contact:

Engineering Council of South Africa  
 Water View Corner Building  
 2 Ernest Oppenheimer Avenue  
 Bruma Lake Office Park  
 BRUMA  
 2198

Telephone number (direct): (011) 607 9500  
 Fax number: (011) 607 9589

**42. REGISTRATION AS PROFESSIONAL QUANTITY SURVEYOR OR CONSTRUCTION MANAGER WITH THE RELEVANT PROFESSIONAL BODY**

Statutory bodies established by an Act of Parliament are responsible for setting and controlling standards of education, training and conduct of Quantity Surveyors and Construction Managers, respectively, for both professions.

Further information on the registration process is available from the respective professional bodies.