



# UNIVERSITY OF JOHANNESBURG

## DEPARTMENT OF ELECTRICAL AND ELECTRONIC ENGINEERING TECHNOLOGY (DEEET)

### 2021 UNDERGRADUATE AND HONOURS BROCHURE

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*DEEET Home Page*

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# 1. GENERAL INFORMATION

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## Head of Department and Program Chair:

**Professor Pitshou N. Bokoro**, PhD (*University of the Witwatersrand*)

**Departmental Secretary:** Ms. M van der Voorden - Bester

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## 1.1 Departmental Staff List:

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<b>Ms B. Hlatshwayo</b> , B.Tech <i>Johannesburg</i>	<i>Technician</i>	bhlatshwayo@uj.ac.za
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## 2. DEPARTMENTAL PROGRAMME DESCRIPTION FOR PROSPECTIVE STUDENTS

The Department of Electrical and Electronic Engineering Technology (DEEET) offers exciting opportunities with the offering of exit-level programmes, which specifically address engineering challenges posed by the advent of the fourth industrial revolution. Our programmes offer graduates the needed professional skills and knowledge required to excel in industrial frontiers related to the areas of power engineering, telecommunication engineering and information technology. To this end, two separate programmes – the Bachelor of Engineering Technology, **B.EngTech**, and the Bachelor of Engineering Technology Honours, **B.EngTech (Hons) in Electrical Engineering** – are well tailored to suit the needs of prospective candidates and industrial engagements. A short description of our programme offering are further discussed.

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### 2.1 Bachelor of Engineering Technology, *B.EngTech*, in Electrical Engineering

#### What is it?

The B.EngTech in Electrical Engineering, is a *three* year programme offering a unique opportunity to candidates interested in acquiring sound theoretical knowledge and technical skills while preparing you for onward professional engineering service.

#### What can you do with this programme?

You can gain the necessary foundation experience required to become an electrical or Electronic engineer. With your University training, you can work in exciting future roles as power systems engineer, telecommunication engineers, system analyst, engineering managers, system designers *e.t.c.* and even as research and development (R and D) engineers!

#### Are you interested in?

1. Learning how smart electronic and electrical designs can make lives better?
2. Understanding how software systems can make devices do exciting and incredible things?
3. Learning how communication systems can enhance human interactions?

If you are interested in these and many more applications, then, this programme is the most ideal for you!

#### Minimum Entry Requirements

As per Faculty Regulations (attached as Appendix 1) for B.EngTech Admissions:

- (a) **Senior Certificate (SC)** with complete or conditional exemption.
- (b) National Senior Certificate (NSC) with admission to a bachelor's degree endorsement, (**APS Score of 30 or higher**)
- (c) **Technical and Vocational Education or Training (TVET) qualifications** i.e. National Technical N certificates/diplomas. Students are enrolled into the extended programme.
- (d) Students holding a **National Diploma (NQF6)** are credited for the first year of the BEngTech programme.

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## 2.2 Bachelor of Engineering Technology (Honours), *B.EngTech (Hons)*, in Electrical Engineering

### What is it?

The B.EngTech(Hons) in Electrical Engineering, is a *one* year honours programme offering a unique avenue to candidates interested in consolidating their acquired knowledge and technical skills, in the area of Electrical and Electronic Engineering, for onward professional engineering service.

### What can you do with this programme?

You can gain advanced knowledge and experience with specialization in niche areas of Electrical and Electronic engineering. On completing your University training, you will be well-positioned for exciting future roles as power systems engineer, telecommunication engineers, system analyst, engineering managers, system designers, *e.t.c.* and even as, research and development (R and D) engineers.

### Are you interested in?

1. Advancing your foundation knowledge in electrical and electronic system design?
2. Growing your potentials in specific areas of Electrical and Electronic Engineering?
3. Positioning yourself for future competitive postgraduate positions?

If you are interested in these and many more applications, then, this programme is the most ideal for you!

### Minimum Entry Requirements

As per Faculty Regulations for B.EngTech (Hons) admissions:

- (a) B.EngTech or Equivalent **NQF 7**.
- (b) B.Tech degree or Equivalent degree.

### 3. Descriptive Module Information for Current Students

This section deals with a description of the modules offered across our departmental programmes: **B.EngTech** and **B.EngTech (Hons)**. The B.EngTech programmes has a graduation cycle of three (3) years or six semesters in total, all of which count towards graduation. However, the B.EngTech programme has a graduation cycle of one year or two semesters, both of which count towards degree completion. In addition to students satisfying the graduation requirements of completing the required **total NQF credits**, all **ECSA Graduate Attribute (GA)** requirements\* must have been met by each candidate. In other words, all modules are compulsory and count towards the exit-level outcome of graduation.

#### 3.1 Bachelor of Engineering Technology Programme (B6EL1Q/B6L1XQ; NQF 7)

**Graduation Requirements:** *Completion of a total of 443.2 NQF credits, in addition to completing all ECSA GA requirements\* for the as stipulated.*

**FIRST YEAR** (Total NQF credits to be completed in the **FIRST** year = 154.2)

**SEMESTER ONE (S1): 70.9 NQF Credits**

CODE	MODULE NAME	NQF Credits	HESQF LEVEL
<b>ALGELA1</b>	Algorithms/Programming 1A	7	5
<b>ELTENA1 or ELTELA1</b>	Electrical Engineering 1A (Electrotechnology 1A)	14.1	5
<b>CETE1A1</b>	Engineering Chemistry (Chemical) 1A	14.6	5
<b>MATE1A1</b>	Engineering Mathematics 1A	14.1	5
<b>PHYE1A1</b>	Engineering Physics 1A	14.1	5
<b>WIKSELA1 or WKSELA1</b>	Workshop Skills 1A	7	5
<b>TOTAL</b>		<b>70.9</b>	

**SEMESTER TWO (S2): 83.3 NQF Credits**

CODE	MODULE NAME	NQF Credits	HESQF LEVEL
<b>ALGELB1</b>	Algorithms/Programming 1B	7	6
<b>DIGSTB1 or DIGELB1</b>	Digital Systems 1B (Digital Technology 1B)	13.9	5
<b>ELCELB1</b>	Electronic Circuits 1B	14.1	6
<b>ELTENB1 or ELTELB1</b>	Electrical Engineering 1B (Electrotechnology 1B)	14.1	6
<b>MATE1B1</b>	Engineering Mathematics 1B	13.1	6
<b>PHYSCB1</b>	Engineering Physics (Electrical) 1B	14.1	6
<b>WIKSELB1 or WKSELB1</b>	Workshop Skills 1B	7	6
<b>TOTAL</b>		<b>83.3</b>	

\*<https://www.ecsa.co.za/education/EducationDocs/E-08-PN.pdf>

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**SECOND YEAR** (Total NQF credits to be completed in the SECOND year = 141.8)**SEMESTER THREE (S3): 77.5 NQF Credits**

CODE	MODULE NAME	NQF Credits	HESQF LEVEL
DIGSTA2 or DIGELA2	Digital Systems 2A (Digital Technology 2A)	14.1	6
ELCELA2	Electronic Circuits 2A	14.1	6
MATE2A2	Engineering Mathematics 2A	14.2	7
SENELA2	Sensors And Devices 2A	7	6
SWEELA2	Software Engineering 2A	14.1	6
SIGSTA2 or WSTELA2	Signals & Systems 2A (Wave & Signal Technology 2A)	14	6
<b>TOTAL</b>		<b>77.5</b>	

**SEMESTER FOUR (S4): 64.3 NQF Credits**

CODE	MODULE NAME	NQF Credits	HESQF LEVEL
AFINSA1	African Insights	15	6
DIGSTB2 or DIGELB2	Digital Systems 2B (Digital Technology 2B)	14.1	7
PJEELB2	Electrical Project 2B	7	7
MCCELB2	Mechatronics & Control 2B	14.1	7
NETELB2	Networks 2B	14.1	7
<b>TOTAL</b>		<b>64.3</b>	

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**THIRD YEAR** (Total NQF credits to be completed in the THIRD year = 147.2)**SEMESTER FIVE (S5): 77 NQF Credits**

CODE	MODULE NAME	NQF Credits	HESQF LEVEL
INCEL3A	Instrumentation and Control 3A (Only 2023)	14	7
AUTELA3	Automation 3A (phasing out with INCEL3A in 2023)	7	7
CPS3AA3	Complementary Studies 3A	6.7	7
PJEELA3	Electrical Project 3A	7	7
EMAELA3	Machines 3A	14.1	7
POWSTA3 or POWELA3	Power Systems 3A (Power Technology 3A)	14.2	7
PCAELA3	Process Automation 3A (phasing out with INCEL3A)	7	7
PJMELA3	Project Management (Electrical) 3A	7	7
SIGSTA3 or WSTELA3	Signals & Systems 3A (Wave & Signal Technology 3A)	14	7
		<b>77</b>	

## SEMESTER SIX (S6): 70.2 NQF Credits

SUBJECT CODE	MODULE NAME	NQF Credits	HESQF LEVEL
CSTELB3 or CTLELB3	Control Systems 3B (Control Systems Engineering 3B)	14.1	7
PJEELB3	Electrical Project 3B	28	7
POWERB3 or POWELB3	Power Electronics 3B (Power Technology 3B)	14.1	7
TMGELB3	Technology Management 3B	14	7
		70.2	

## 3.2 Bachelor of Engineering Technology Honours Programme (H6EL0Q; NQF 8)

**Graduation Requirements:** Completion of a total of 154 NQF credits, in addition to completing all ECSA GA requirements\* for the as stipulated. Unlike the B.EngTech programme, there are two sets of modules that count towards graduation: Compulsory modules and elective/specialized modules as thus described:

**Compulsory Modules** – These are compulsory modules, which by departmental standards, must be undertaken by all Honours student. These modules cover important areas of advanced engineering Mathematics, computing, electronics, research methods and project design.

**Elective/Specialised Modules** – These are optional modules deal with distinct fields of Electrical and Electronic Engineering including **Power** (power systems and machineries) and **Light Current** (telecommunication and signal processing). The student must compulsorily select ONLY one of these two fields and take the offered modules therein. These two selected modules result in a total of 28 credits.

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## SEMESTER ONE (S1): TOTAL OF 80 NQF Credits (Compulsory + Elective Modules)

### Compulsory Modules – 52 NQF Credits

CODE	MODULE NAME	NQF Credits	HESQF Level
AEMC8X01	Mathematics and Computing	14	8
PHE8X80	Energy Physics	14	8
ERM8X01	Research Methodology	14	8
ERP8X01	Research and Design Projects	10	8
TOTAL		52	

\*<https://www.ecsa.co.za/education/EducationDocs/E-08-PN.pdf>



**Elective Modules – 28 NQF Credits (Any TWO Modules from the related field of interest)**

<b>FIELDS</b>	<b>MODULE NAME</b>		<b>NQF Credits</b>	<b>HESQF Level</b>
<i>POWER SYSTEMS</i>	<b>PHE8X01</b>	Power Systems and High Voltage Engineering (Power)	<b>14</b>	<b>8</b>
	<b>GTE8X01</b>	Generalised Theory of Machines	<b>14</b>	<b>8</b>
<i>LIGHT CURRENT SYSTEMS</i>	<b>ADC8X01</b>	Advanced Communication	<b>14</b>	<b>8</b>
	<b>DSP8X01</b>	Digital Signal Processing	<b>14</b>	<b>8</b>
<b>TOTAL (For TWO selected modules)</b>			<b>28</b>	

**SEMESTER TWO (S2): TOTAL OF 74 NQF Credits (Compulsory + Elective Modules)**

**Compulsory Modules – 52 NQF Credits**

<b>MODULE NAME</b>		<b>NQF Credits</b>	<b>HESQF Level</b>
<b>ERP8X02</b>	Research and Design Projects	<b>32</b>	<b>8</b>
<b>EGS8X02</b>	Engineering and Society	<b>14</b>	<b>8</b>
<b>TOTAL</b>		<b>46</b>	

**Elective Modules – 28 NQF Credits (Any TWO Modules from the related field of interest)**

<b>FIELD</b>	<b>CODE</b>	<b>MODULE NAME</b>	<b>NQF Credits</b>	<b>HESQF Level</b>
<i>POWER SYSTEMS</i>	<b>EFW8X02</b>	Electromagnetic Field Theory and Waves	<b>14</b>	<b>8</b>
	<b>EPE8X02</b>	Power Electronics	<b>14</b>	<b>8</b>
<i>LIGHT CURRENT SYSTEMS</i>	<b>EME8X02</b>	Mechatronics	<b>14</b>	<b>8</b>
	<b>NET8X02</b>	Networks	<b>14</b>	<b>8</b>
<b>TOTAL (For TWO selected modules)</b>			<b>28</b>	

### 3.2.1 ECSA Graduate Attributes (GAs)\*

The following set of graduate attributes will be examined per the listed modules as criteria for completion of B.EngTech (Hons) degree programme.

MODULE NAME	NQF Credits	GA Assessed
Maths and Computing	14	x
Energy Physics	14	x
Research Methodology	14	x
Research and Design Projects	42	1,2,3,4, 5,6, 8
<sup>e</sup> Power Systems and High Voltage Engineering (Power)	14	x
<sup>e</sup> Generalised Theory of Machines (Power)	14	x
<sup>e</sup> Advanced Communication (Light Current)	14	x
<sup>e</sup> Digital Signal Processing (Light Current)	14	x
Engineering And Society	14	7/10
<sup>e</sup> Networks (Light Current)	14	x
<sup>e</sup> Mechatronics (Light Current)	14	9
<sup>e</sup> Electromagnetic Field Theory and Waves (Power)	14	x
<sup>e</sup> Power Electronics (Power)	14	x
<b>TOTAL</b>	<b>140</b>	

\*<https://www.ecsa.co.za/education/EducationDocs/E-08-PN.pdf>