

24.1.1 Purpose of the programme

The purpose of the qualification is to develop an engineering intellectual who can identify, assess and formulate the engineering needs of the society at large, and research and solve the identified engineering problems creatively and innovatively, by applying scientific, mathematical, engineering, economic and other relevant principles and methods. The qualification prepares students for an engineering science, design and project-based career through fundamental understanding, use and appropriate application of engineering methods, skills, tools and information technology. The qualification also provides a platform for lifelong learning.

24.1.2 Outcomes

The student should be able to:

1. Identify, assess, formulate, interpret, analyse and solve engineering problems creatively and innovatively by applying knowledge of mathematics, basic science and engineering sciences from first principles.
2. Plan and manage small engineering projects, demonstrating fundamental knowledge, understanding and insight into the principles, methodologies and concepts that constitute socially responsible (to local and other communities) engineering practice.
3. Work effectively, individually and with others, as a member of a team, group, organisation, and community or in multi-disciplinary environments.
4. Organise and manage him/herself and his/her activities responsibly, effectively, professionally and ethically, accept responsibility within his/her limits of competence and exercise judgment based on knowledge and expertise.
5. Plan and conduct appropriate levels of investigation, research and/or experiments by applying relevant theories and methodologies, and perform appropriate data analysis and interpretation.
6. Communicate effectively, both orally and in writing, with engineering audiences and the community at large, using appropriate structure, style and graphical support.
7. Use and assess appropriate research methods, skills, tools and information technology effectively and critically in engineering practice, and show an understanding and a willingness to accept responsibility for the impact of engineering activities on society and the environment.
8. Perform procedural and non-procedural design and synthesis of components, systems, works, products or processes as a set of related systems and assess their social, legal, health, safety and environmental impact and benefits.
9. Employ various learning strategies and skills to master module outcomes required for preparing him/herself to engage in continuous learning, to keep abreast of knowledge and skills required in the inter-disciplinary field.
10. Participate as a responsible citizen in the life of local, national and global communities by acting professionally and ethically.
11. Demonstrate, where applicable, cultural and aesthetic sensitivity across a range of social contexts in the execution of engineering activities.
12. Explore, where applicable, education and career opportunities.
13. Organise and develop entrepreneurial opportunities through engineering problem-solving, design, technical research and managerial skills.

24.1.3 Admission Requirements and Selection Criteria

Refer to Faculty Regulation E.3 for the minimum admission requirements for this programme. Students are selected on academic merit and a personal interview, if deemed necessary. The number of student enrolments will be limited.

24.1.4 Promotion Requirements

Refer to Faculty Regulations EB4 and EB5, stipulating the promotion requirements for Engineering Sciences programmes and the requirements for awarding a passed with distinction BEng degree.

24 Curriculum.1.5

| CODE | MODULE | CODE | MODULE |
|------|--------|------|--------|
|------|--------|------|--------|

First year

| First semester | | Second semester | |
|----------------|---------------------------------------|-----------------|--------------------------------------|
| APM01A1 | Applied Mathematics 1A (Engineering) | APM01B1 | Applied Mathematics 1B (Engineering) |
| IINEEA1 | Introduction to Engineering Design 1A | PJCEEB1 | Project Communication 1B |
| MATENA1 | Engineering Mathematics 1A | MATENB1 | Engineering Mathematics 1B |
| PHYE01A | Engineering Physics 1A | PHYE0B1 | Engineering Physics 1B |
| CEM01A1 | Chemistry 1A | ETNEEB1 | Electrotechnics 1B |
| EEMEEA1 | Electrical Engineering Methods 1A | | |

Second year

| First semester | | Second semester | |
|----------------|-----------------------------|-----------------|-----------------------------|
| APM02A2 | Applied Mathematics 2A | APM02B2 | Applied Mathematics 2B |
| ETNEEA2 | Electrotechnics 2A | ETNEEB2 | Electrotechnics 2B |
| MATEAA2 | Engineering Mathematics 2A2 | MATEAB2 | Engineering Mathematics 2B2 |

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|---------|-----------------------------|----------|---------------------------------------|
| MATECA2 | Engineering Mathematics 2A1 | MATECB2 | Engineering Mathematics 2B1 |
| PHYE2A2 | Engineering Physics 2A | IEP2BB2 | Engineering Economics and Practice 2B |
| MODEEA2 | Modelling 2A | MTKEEB2 | Science of Materials 2B |
| PJEELA2 | Electrical Projects 2A | TRDMCB 2 | Thermodynamics 2B |

Third year

| First semester | | Second semester | |
|----------------|-----------------------------------|-----------------|-------------------------------------|
| AMDEEA3 | Advanced Modelling 3A | BHSEEB3 | Control Systems 3B |
| EMNEEA3 | Electromagnetics 3A | EKAEEB3 | Electronics 3B |
| KRLEEA3 | Power Systems 3A | EEPEEB3 | Electrical Engineering Practical 3B |
| STAE0A3 | Statistics for Engineers 3A | PJBEEB3 | Project Management 3B |
| SSTEEA3 | Signals and Systems 3A | RKEEE3B | Computer Systems 3B |
| AFINSA1 | African Insights | SIGEEB3 | Signal Processing 3B |
| SIOEEA3 | Systems Engineering and Design 3A | SIOEEB3 | Systems Engineering and Design 3B |
| | | TELEEB3 | Telecommunications 3B |

Fourth year

| First semester | | Second semester | |
|----------------|-------------------------------------|-----------------|---|
| BHSEEA4 | Control Systems 4A | EMNEEB4 | Electromagnetics 4B |
| RKEEEA4 | Computer Systems 4A | EMAEEB4 | Electrical Machines 4B |
| HSEEEA4 | High Speed Electronics 4A | KRLEEB4 | Power Systems 4B |
| PWEEA4 | Power Electronics 4A | OTSEEB4 | Optical Systems 4B |
| EEPEEA4 | Electrical Engineering Practical 4A | RTIENB4 | Legal Applications in Engineering Practice 4B |

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|---------|--|---------|--|
| PJEEEA4 | Project Investigation (Electrical) 4A | PJEEEB4 | Project Investigation (Electrical) 4B |
| SIGEEA4 | Signal Processing 4A | | |
| TELEEA4 | Telecommunications 4A | | |