

## MODULE DESCRIPTOR

### Module Title

Introduction to Electronics and Electrical Engineering

|           |             |             |        |
|-----------|-------------|-------------|--------|
| Reference | EN1560      | Version     | 7      |
| Created   | March 2023  | SCQF Level  | SCQF 7 |
| Approved  | March 2004  | SCQF Points | 15     |
| Amended   | August 2023 | ECTS Points | 7.5    |

### Aims of Module

To provide the student with the ability to understand electrostatic and electromagnetic concepts and the principles of electric circuit analysis.

### Learning Outcomes for Module

On completion of this module, students are expected to be able to:

- 1 Apply a basic understanding of atomic physics to explain conduction in semiconductor devices.
- 2 Analyse simple electromagnetic and electrostatic systems.
- 3 calculate the motion of charges in simple electric and magnetic fields
- 4 State the basic theory and solve problems in simple electrical engineering systems.
- 5 Use mathematical modelling software to select suitable solutions for simple electromagnetic or electrostatic design problems.

### Indicative Module Content

Basic concepts of electrostatics, electric charge, electric flux, electric field strength, potential and potential difference; Definition of capacitance, parallel plate capacitor. Basic concepts of electromagnetism, magnetic field, magnetic field density, magnetic field strength, Ampere's law, principles of magnetic circuits and inductance of a simple magnetic circuit. Faraday's law of electromagnetic induction. Electric circuits, circuit concepts, voltage and current sources, resistance, current flow and potential distribution. Ohm's and Kirchhoff's laws, Thevenin and Norton Theorem's, superposition, simple circuit analysis using Kirchhoff's laws. Reasons for use of alternating current for light and heavy current applications, choice of sinusoidal waveform. Amplitude, frequency and phase concepts. Inductive capacitive impedance concepts, simple time domain analysis of ac circuits, phasor representation of ac quantities, rms representation of voltage and current.

### Module Delivery

This is a lecture based course supplemented with tutorial sessions, laboratory sessions and directed study.

**Indicative Student Workload**

|                                                                              | Full Time | Part Time |
|------------------------------------------------------------------------------|-----------|-----------|
| Contact Hours                                                                | 50        | 50        |
| Non-Contact Hours                                                            | 100       | 100       |
| Placement/Work-Based Learning Experience [Notional] Hours                    | N/A       | N/A       |
| TOTAL                                                                        | 150       | 150       |
| <i>Actual Placement hours for professional, statutory or regulatory body</i> |           |           |

**ASSESSMENT PLAN**

If a major/minor model is used and box is ticked, % weightings below are indicative only.

**Component 1**

|              |                                |            |      |                    |               |
|--------------|--------------------------------|------------|------|--------------------|---------------|
| Type:        | Coursework                     | Weighting: | 100% | Outcomes Assessed: | 1, 2, 3, 4, 5 |
| Description: | Portfolio of evidence logbook. |            |      |                    |               |

**MODULE PERFORMANCE DESCRIPTOR****Explanatory Text**

Component 1 comprises of 100% of the module grade. To pass the module, a D grade is required.

| Module Grade | Minimum Requirements to achieve Module Grade:                                  |
|--------------|--------------------------------------------------------------------------------|
| <b>A</b>     | A                                                                              |
| <b>B</b>     | B                                                                              |
| <b>C</b>     | C                                                                              |
| <b>D</b>     | D                                                                              |
| <b>E</b>     | E                                                                              |
| <b>F</b>     | F                                                                              |
| <b>NS</b>    | Non-submission of work by published deadline or non-attendance for examination |

**Module Requirements**

|                          |       |
|--------------------------|-------|
| Prerequisites for Module | None. |
| Corequisites for module  | None. |
| Precluded Modules        | None. |

**ADDITIONAL NOTES**

An Indicative Bibliography will normally reference the latest edition of a text. In some cases, older editions are equally useful for students and therefore, those are the editions that may be stocked.

**INDICATIVE BIBLIOGRAPHY**

- 1 BIRD, J.O., 2017. Electrical and Electronic Principles and Technology. 6th ed. Oxford: Routledge.
- 2 STOREY, N., 2017. Electronics - A Systems Approach. 6th ed. Harlow: Pearson.
- 3 MAXFIELD C. et al., 2008. Electrical Engineering: Know it all. Oxford: Newnes.
- 4 MORRIS, N., 1994. Electrical and Electronic Engineering Principles. Harlow: Pearson/Prentice Hall.