**COURSE DETAILS**

**Course Code:** B37EE  
**Full Course Title:** Introduction to Electrical and Electronic Engineering  
**SCQF Level:** 7  
**SCAF Credits:** 15  
**Available as Elective:** No

**DELIVERY LEVEL**

| Undergraduate: | Yes | Postgraduate Taught: | No | Postgraduate Research: | No |

Additional Information:  
Course being delivered at the specified campus(es) and also by Collaborative Partner - Ocean University of China on BEng Robotics Programme.

**COURSE AIMS**

(a) To explain fundamental concepts of Electrical Engineering using modern everyday examples.

(b) To present concepts of energy, power, charge, voltage, current and resistance.

(c) To present basic magnetic field concepts.

(d) To present basic feedback control concepts.

(e) To present different methods for analysing multi-loop circuits.

(f) Circuit simplification theorems.

(g) Introduction to load-line method for circuits with nonlinear elements

(h) To provide an introduction to capacitance and inductance as circuit elements and the properties of such elements.

(i) To introduce students to digital logic design.

(j) To have an understanding of the basics of logic design and be able to perform a variety of different digital logic problems.

**LEARNING OUTCOMES – SUBJECT MASTERY**

SM1i, SM2i, SM1p, SM2p  
To provide an understanding into the basics of electrical engineering circuit concepts in order to be able to solve fairly simple problems.
**B37EE Introduction to Electrical and Electronic Engineering**

**LEARNING OUTCOMES – PERSONAL ABILITIES**

At the end of this module, the student should be able to apply the fundamental and core concepts of the underlying principles of electrical engineering to simple electrical engineering circuits.

**SYLLABUS**

- **EA1p** Identify and solve circuit problems using Ohm's Law
- **EA2p** Understand the principle of superposition. Identify and solve problems using the superposition theorem
- **EA2p** Apply Thevenin and Norton's theorems to simple dc circuits
- **EA3p** Analyse dc networks using source conversion
- **EA3p** Understand and apply node analysis to dc networks
- **EA3p** Understand the concept of maximum power transfer and apply in practice.

**SM1i, SM2i, EA2i, EA3I** Learn to solve digital logic design problems.

**SM1i, SM2i** Students should be able to apply the fundamental and core concepts of the underlying principles of electrical engineering to simple electrical engineering circuits and combinational digital logic systems.

**SM2p** A critical appreciation and awareness of the assumptions and simplifications in circuit analysis.

**SM1fl, SM2fl, SM3fl** Appreciation of the important role of Electrical and Electronic Engineers in industry.
Energy, power, charge, voltage, current and resistance. Calculation of voltage multipliers and current shunts to extend meter operating range. Conductors moving in a magnetic field, force exerted and e.m.f. induced. Introduction to feedback control systems. Illustration of the various roles of engineers in society. The role of the engineer as an entrepreneur. Introduction to network analysis methods – Kirchhoff, mesh and nodal. Thevenin and Norton circuit reduction theorems. Maximum power transfer theorem. Use of superposition in analysing circuits. Introduction to capacitors and inductors and their transient behaviour. Load-line method for analysing circuits. Introduction to Digital Systems ON/Off True/False logic systems, Basic Logic Constructs (AND OR NOT). Number Systems in Electronic Engineering; Single Base Number Systems, Decimal, Binary, Hexadecimal; Column Weights, Binary: Bits, Bytes, Hexadecimal, Base Conversion; Binary Arithmetic, Addition, Subtraction/Twos complement; ther Coding Systems, Binary coded decimal (BCD), ASCII

Boolean Logic: Representations of Boolean Functions, Logic Constructs, Boolean Notation; Truth Tables; Manipulation of Logic Equations, Zero, One and complement rules, Commutative, Distributive and Associative rules, De Morgan’s Theorem, Proof of some Boolean Identities

Logic Gates – Building Blocks for Digital Circuits; Switches; Logic Gates, AND, OR, NOT and Exclusive OR; Combinational Logic Design Process: Specification of Truth Table; Derivation of Boolean Expression From Truth Table, ‘Sum of Products Expressions; Combinational Logic Optimizations and Tradeoffs, Boolean Reduction, simple Karnaugh maps

COURSE RELATIONSHIPS

N/A

LOCATION AND ASSESSMENT METHODS

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