

MODULE CODE: M4X01510
TITLE: Introduction to Electronics
DATED: 04/06/2015

LEVEL: 4
CREDITS: 20

JACS CODE: H610

AIM(S)

- To provide an essential understanding of electrical and electronic concepts considered necessary as a foundation for an engineering degree courses and to show the relevance of those concepts in everyday applications

LEARNING OUTCOMES

Upon the successful completion of this module, the student should be able to demonstrate the ability to:

1. Demonstrate a sound grasp of basic electrical and electronic principles in analysing simple problems
2. Explain and evaluate the operation of simple Electrical/Electronic networks

INDICATIVE CONTENT

- DC Electrical Circuit: Electrical current/voltage. Mechanical analogies. Resistors in series and parallel. Heating effect of current, variation of resistance with temperature incandescent lamp. Voltage divider and current divider. Simple circuit calculations, use of Ohm's law and Kirchhoff's laws
- Signals: DC, sinusoid, square wave. Period and frequency. Use of oscilloscope. Peak, mean and rms.
- AC circuits: Capacitors and inductors. Rate of change of current and voltage, C R and L R behaviour to sine and step voltages
- Diodes and Rectifiers: Simple ideas of semiconductors. Simple half wave rectifiers.
- Transistor Amplifiers/Switches: What is a transistor? Design of simple amplifiers.
- Operational Amplifiers: What is an op. Amp? Design of simple inverting and non-inverting amplifiers.
- Digital Circuits: Representation of information by logic levels. Basic gates, AND, OR, NAND, NOR, NOT, XOR. Simple combinational logic.

LEARNING AND TEACHING STRATEGY

Lectures will be backed up by directed reading of books, together with problems sheets and CAL packages and discussed in tutorials.

Practical work will be laboratory based and consist of basic laboratory experiments to illustrate the principles, together with mini projects of a design and construction nature to generate interest and a sense of achievement.

The allocation of teaching to deliver the module is:

Activity type	Hours	Percentage
Scheduled learning	60	30%
Independent learning	140	70%
Placement learning	0	0%
TOTAL	200	100%

ASSESSMENT

Assessment Component 1 – Coursework - 50%

Develop electrical and electronic circuits to well-defined scenarios/problems. This may take the form of a number of exercises presented in a single assignment or multiple worksheets to undertaken throughout the course. (1500 words)

Exemplar: Develop a circuit that counts from one to ten when a button is pressed and display the result using LEDs.

Assessment Component 2 – Written exam - 50%

Students will be required to sit an exam to assess their understanding of the electrical and electronic principles covered during the course. (1 hour)

Assessment Summary

Activity type	Percentage
Written exam	50%
Coursework	50%
Practical	0%
TOTAL	100%

EDUCATION FOR SUSTAINABLE DEVELOPMENT (ESD)

Does the module contribute to ESD?	Yes
	No ✓
If yes please provide brief details (no more than 100 words):	

BIBLIOGRAPHY

Essential

Bird, J (2013) *Electrical circuit Theory and Technology*, Routledge,

Floyd, T L (2012) *DC/AC Fundamentals: A Systems Approach*, Prentice Hall

Background

Sinclair, I., Dutton, J (2006) *Practical Electronics Handbook*, Newnes

Journals

Elektor

Electronics World

Websites

<http://vl.fmnet.info/safety/>

<http://mingo.info-science.uiowa.edu/soft-eng/>

<http://www.fmeurope.org/>