UNIVERSITY of BRADFORD

Module Descriptor

Practical Electronics

Module Code:	ELE4012-B
Academic Year:	2018-19
Credit Rating:	20
School:	Department of Biomedical and Electronics Engineering
Subject Area:	Electrical Engineering
FHEQ Level:	FHEQ Level 4

Pre-requisites:

Co-requisites:

Contact Hours

Type	Hours
Lectures	3
Laboratory	68
Directed Study	129

Availability Periods

Occurrence	Location/Period
NLA	Namal College / Semester 1 (Sep - Jan)
BDA	University of Bradford / Semester 1 (Sep - Jan)

Module Aims

To develop practical electronics knowledge & skills, including; reading & creating circuit diagrams, understanding the function of components, designing PCBs using CAD & developing lab documentation & soldering skills. To enable students to develop sufficient knowledge of electrical components & circuits & the practical electronics skills necessary to fabricate & test given electronic circuit designs, PCB & enclosure design, to assembly, soldering, testing & CAD documentation of their work and the completed circuit. To give students an appreciation of electrical safety & good working practice.

Outline Syllabus

An introduction to voltage, current, Ohm's law, statement of what a resistor, capacitor and inductor is, how to apply formula for series and parallel and rule for resistive potential dividers. Understanding the role, function, identification and packaging of common passive and active devices and common connectors.
Safe use and familiarity with test Equipment: DVM, Oscilloscope, power supplies and signal generators.
Electronic skills, tools and techniques: wiring; soldering and de-soldering: component recognition, identification and selection; data books, application notes and suppliers catalogues. Make and test project 1: construction and testing of a small electronic unit. Make and test project 2 and 3: further exercises in the design, construction and testing of a small electronic systems, one digital and one analogue. During the course of these projects, students will be introduced to the following software package: Proteus - PCB schematic design and capture, manual and automatic track layout. Students will be introduced to Surface Mount Technology. The importance of sustainability in electronic manufacture will be introduced, including: the WEEE Directive, the RoHS Directive and whole life sustainability factors. The students will be introduced to some of the ethical aspects of electronic manufacturing by considering such issues as ethical sourcing of raw materials and the ethical implications of offshore manufacturing.

Module Learning Outcomes

On successful completion of this module, students will be able to...

1 Demonstrate broad knowledge of electronic components: their construction, function and application in an electronic circuit, and also have the ability to build a working electronic circuit using these components, from a given design.

2 Demonstrate the ability to design, build and test a printed circuit board based on knowledge of component function and competent use of CAD software and established design rules.

3 Demonstrate the ability to accurately present the outcomes of an experiment through the use of a laboratory logbook.

Learning, Teaching and Assessment Strategy

This is a laboratory based module comprising mostly of practical work with students working individually and in pairs. There is only one formal lecture, the Electrical Safety Lecture, which is assessed by the MCQ (LO1). The pre-planned practical work takes place in the laboratory sessions and students are expected to spend time outside the session (in directed study) reviewing the extra material both on Blackboard and in the recommended text, to support their learning. The first phase of experiments are designed to help students understand the properties and application of electronic components and is assessed by submitted coursework and practical demonstrations, (LO1). The second phase of experimental work is designed to help students understand the principles of electronic circuit design by construction of pre-designed circuit boards (LO1) and by utilising CAD software (LO2) to design their own circuit boards.
Laboratory worksheets are completed to help students understand the basic electronic principles, which also provide an opportunity for formative and summative assessment. Practical work is formatively assessed regularly by evaluation of their printed circuit board function and by the submission of a laboratory logbook, on which they receive detailed

feedback (LO3). There are 3 submissions of the logbook allowing students to improve their submission each time. For the final project, students are expected to do detailed calculations using a spreadsheet as directed study to allow them to complete the SMT keyboard in the laboratory session, (LO2 & LO3). The MCQ at the end of the semester is a general test on all aspects of the material covered in the module (LO1).

Mode of Assessment

Type	Method	Description	Length	Weighting	Final Assess'
Summative	Laboratory Report	Portfolio of written work including lab sheets, lab report and handwritten logbook	0 hours	40%	No
Summative	Examination - practical/laboratory	Portfolio of practical work assessed in laboratory session		50%	No
Summative	Classroom test	Computer based MCQ		10%	No

Legacy Code (if applicable)

CM-0134D

Reading List

To view Reading List, please go to **rebus:list**.