

Module Details	
Module Title:	Electronics for Bio-Sensing
Module Code:	MHT5012-B
Academic Year:	2019-20
Credit Rating:	20
School:	Department of Biomedical and Electronics Engineering
Subject Area:	Medical and Healthcare Technology
FHEQ Level:	FHEQ Level 5
Pre-requisites:	
Co-requisites:	

Contact Hours	
Type	Hours
Lectures	24
Laboratory	48
Directed Study	128

Availability	
Occurrence	Location / Period
BDA	University of Bradford / Semester 1 (Sep - Jan)

Module Aims
To equip students with the skills and understanding relevant to the use of modern electronic systems for biomedical signal detection, storage and analysis.

Outline Syllabus
1) Introduction to Arduino hardware and software development. 2) Analogue systems for signal acquisition and processing - operational amplifier applications. 3) Characteristics of sensor systems: sensor types and physical design. 4) Requirements and techniques for signal sampling, analogue to digital conversion and analysis.

- 5) Computer methods for signal capture and display: Arduino (or equivalent) and MATLAB interfacing.
- 6) Essential characteristics of digital systems, computer structure and hardware; elements of logic design for interface development, software for processing and information display.
- 7) Practical experience with analogue and digital circuit construction, sensor interfacing, conditioning and calibration methods and instrumentation for testing.

Learning Outcomes

1	Demonstrate broad knowledge of modern techniques and analytical methods for the acquisition, processing and characterisation of biomedical signals
2	Demonstrate the ability to design, build, interface and test sensors for the acquisition, storage, display and analysis of biomedical data.
3	Demonstrate the ability to present the outcomes of design, experimentation and analysis through the use of a laboratory logbook

Learning, Teaching and Assessment Strategy

Essential backbone of interactive lectures with tutorials to evaluate theory and practice. Largely lab-based work, both hands-on and computer-based design, simulation and analysis.

Coursework portfolio of lab work, results and analysis, with one class test at the end of the year.

This module satisfies the below Learning Outcomes as specified by the Accreditation of Higher Education Programmes: Third Edition (AHEP3) as published by The Engineering Council in-line with the UK Standard for Professional Engineering Competence (UK-SPEC). These outcomes specify six key areas of learning: Science and Mathematics (SM), Engineering Analysis (EA), Design (D), Economic, Legal, Social, Ethical and Environmental Context (EL), Engineering Practice (P) and Additional General Skills (G).

SM1b, SM2b, EA1b, EA2, EA3b, EA4b, P2, P3, P4, G1, G2, SM1m, SM4m, SM5m, EA1m, EA5m, P9m.

Further details of these learning outcomes can be found at <https://www.engc.org.uk/>.

Mode of Assessment

Type	Method	Description	Length	Weighting
Summative	Laboratory Report	Portfolio of reports: summaries and analyses of mini-projects.		50%
Summative	Examination - practical/laboratory	Portfolio of practical work assessed in semester 2 laboratory sessions		40%
Summative	Classroom test	Classroom test	2 hours	10%

Reading List

To access the reading list for this module, please visit <https://bradford.rl.talis.com/index.html>.

Please note:

This module descriptor has been published in advance of the academic year to which it applies. Every effort has been made to ensure that the information is accurate at the time of publication, but minor changes may occur given the interval between publishing and commencement of teaching. Upon commencement of the module, students will receive a handbook with further detail about the module and any changes will be discussed and/or communicated at this point.