

Module Details	
Module Title:	Clinical Diagnostics
Module Code:	MHT7014-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 7 (Masters)
Pre-requisites:	
Co-requisites:	

Contact Hours	
Type	Hours
Lectures	48
Tutorials	12
Laboratory	9
Directed Study	131

Availability	
Occurrence	Location / Period
BDA	University of Bradford / Semester 2 (Feb - May)

Module Aims
This module aims to engender specialist knowledge and understanding of clinical signals measurements and analysis both in theory and in practice. It also aims to develop mathematical and software skills in relation to clinical signals and an understanding of the body as an electrical machine.

Outline Syllabus
The body as an electrical machine. The physiological origin of electrical activity. Electromyography (EMG). Electrical activity in the musculo-skeletal system. EMG Laboratory.

The electrocardiogram (ECG). Electrical activity of the heart. ECG Laboratory.
 ECG as an inverse Thompson problem.
 The electroencephalogram (EEG). Electrical activity in the brain. EEG Laboratory.
 Temperature measurement.
 Electrical measurement techniques.
 Clinical data as non-linear time series.
 Case study: separation of maternal and foetal ECG.

Learning Outcomes

1	Measure and analyse clinical signals from a diagnostic perspective
2	Describe the principles and techniques underlying the analysis
3	Understand the physiological basis and clinical relevance of various signal types
4	Critical evaluate data in a clinical context
5	Analyse and critically evaluate the clinical significance of electrical signals arising from physiological processes
6	Solve problems of clinical data analysis in a coherent and systematic manner.

Learning, Teaching and Assessment Strategy

The factual basis, concepts and principles of the subject are introduced through interactive lectures in which routine analysis will be demonstrated.

The material is reinforced through whole-group laboratory sessions in which actual clinical practice of clinical diagnostics is undertaken with students acting as both practitioners and as patients. Written reflection of the laboratory sessions enables students to consolidate what they have learned.

In the remaining time, students have the opportunity to reflect on, explore and extend their knowledge and understanding and to prepare for the formal assessment that assesses their understanding of the subject.

100% Coursework portfolio of lab work, results and analysis together with an individual mini-project.

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).

SM1m, SM2m, SM3m, SM5m, SM6m, EA1m, EA2, EA3m, EA4m, EA6m.

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

Mode of Assessment

Type	Method	Description	Length	Weighting
Summative	Coursework	Mini project on an aspect of clinical diagnostics approved by the lecturer		30%

Summative	Coursework	Report including results, analysis and discussion on the lab sessions		70%
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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.