

Liverpool John Moores University

Title: INTRODUCTION TO BIOMEDICAL ENGINEERING
Status: Definitive
Code: **4501ICBTBE** (127036)
Version Start Date: 01-08-2021

Owning School/Faculty: Pharmacy & Biomolecular Sciences
Teaching School/Faculty: ICBT, Colombo

Team	Leader
Alison Cotgrave	Y

Academic Level: FHEQ4
Credit Value: 15
Total Delivered Hours: 68
Total Learning Hours: 150
Private Study: 82

Delivery Options

Course typically offered: Semester 1

Component	Contact Hours
Lecture	45
Off Site	6
Practical	9
Seminar	6

Grading Basis: 40 %

Assessment Details

Category	Short Description	Description	Weighting (%)	Exam Duration
Exam	Exam	Formal written exam	70	2
Report	Report	1500 word written assignment	30	

Aims

This module is intended to provide learners about the basic biomedical concepts used in the field of biomedical Engineering. Biomedical Engineering is the application of engineering principles and design concepts to medicine and biology. This field seeks to close the gap between engineering and medicine: It combines the design and problem solving skills of engineering with medical and biological sciences to

improve healthcare diagnosis, monitoring and therapy.

Learning Outcomes

After completing the module the student should be able to:

- 1 Identify the divisions of biomedical engineering and the importance of biomedical engineers in the healthcare industry, demonstrating an understanding of professional and ethical conduct.
- 2 Evaluate anatomical and physiological divisions of the human body.
- 3 Explain the basic fundamentals of biomedical instrumentation.
- 4 Investigate the working principle of different types of transducers used in medical devices.

Learning Outcomes of Assessments

The assessment item list is assessed via the learning outcomes listed:

Formal Written Exam	2	3	4
Written assignment	1		

Outline Syllabus

- 1. Overview of Biomedical Engineering: Divisions of biomedical engineering, activities of biomedical engineers, ethical issues in biomedical engineering.*
- 2. Overview of the Human Physiological Systems: Brief description of anatomical and physiological divisions of the human body, Human Cell structure and function Resting and Action Potentials, Bio electric Potentials, Source of Biomedical signals*
- 3. Fundamentals of Biomedical Instrumentation: Basic Biomedical Instrument, Performance requirements of Medical Instrumentation systems, General constraints in design of Medical Instrumentation systems*
- 4. Bioelectric signals and Electrodes: Recording Electrodes, Silver-silver Chloride Electrodes, Electrodes for ECG, Electrodes for EEG, Electrodes for EMG, Electrical Conductivity of Electrode Jellies and Creams, Microelectrodes*
- 5. Basic Transducer and principles: Classification of Transducers, Performance Characteristics of Transducers, Displacement, Position and Motion Transducers, Pressure Transducers, Transducers for Body Temperature Measurement, Photoelectric Transducers, Optical Fibre Sensors, Biosensors, Smart Sensors*

Learning Activities

Students will be supported in their learning, to achieve the above learning outcomes, in the following ways:

- By a series of lectures and tutorials and through participation within practical sessions for problem solving.
- Self-managed investigative study to analyse cases related to the industry
- In-class participation and case studies are key features of this module.
- A recommended resource list - indicating key reading, internet support and physical learning assistance, is provided to help enable students to undertake self-directed study.

Notes

Learners will need access to appropriate laboratory, library and IT facilities.