

## Liverpool John Moores University

Title: BIOMEDICAL SIGNAL PROCESSING  
Status: Definitive  
Code: **5503ICBTBE** (127050)  
Version Start Date: 01-08-2021

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

Team	Leader
Alison Cotgrave	Y

**Academic Level:** FHEQ5  
**Credit Value:** 15  
**Total Delivered Hours:** 71  
**Total Learning Hours:** 150  
**Private Study:** 79

### Delivery Options

Course typically offered: S2 and Non Std S2 (S2 for Jan)

Component	Contact Hours
Lecture	45
Practical	9
Tutorial	15

**Grading Basis:** 40 %

### Assessment Details

Category	Short Description	Description	Weighting (%)	Exam Duration
Exam	Exam	Formal written exam	70	2
Report	Report	Practical report (1500 words)	30	

### Aims

*Aims of this module is to provide a good understanding of Biosignals and applying signal processing techniques to the Biosignals for practical applications.*

### Learning Outcomes

After completing the module the student should be able to:

- 1 Apply methods to extract relevant information from biomedical signal measurements.
- 2 Discuss artificial intelligence techniques for biosignals.
- 3 Use computer software for design and development of bio amplifiers and implement the hardware.
- 4 Apply primary and secondary research methods to improve bio signal processing techniques and communicate findings.

### **Learning Outcomes of Assessments**

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

Formal Written Exam	1	2
Practical Report	3	4

### **Outline Syllabus**

- *Introduction of Biosignals*
- *Physiological origin of Biosignals*
- *Characteristics of Biosignals*
- *Signal Acquisition*
- *Frequency domain representation of Biosignals*
- *Linear systems*
- *Signal averaging*
- *The wavelet transform and the short time Fourier transform*
- *Artificial intelligence*

### **Learning Activities**

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

- Biomedical signal processing theory acquired through lectures, seminars, tutorials.
- Design and apply filters, AI techniques using engineering simulation software (e.g. MATLAB) based laboratory classes.

### **Notes**

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