

3Bio3 Quantitative Physiology [5 credits]

Lecturers: Professor Richard Reilly, School of Medicine and School of Engineering

Semester: 2

Module Organisation

The module runs for 12 weeks of the academic year and comprises three lectures per week. Total contact time is 36 hours along with 2 laboratories.

Module Description

To provide students with knowledge of the theory, principles of physiology from a quantitative viewpoint. To be able to apply analysis in the measurement of physiology.

Prerequisites: 3BIO1

Learning Outcomes

At the end of this module it is anticipated that students will have obtained:

1. A theoretical understanding of the concepts involved in the generation of electrophysiological cardiovascular signals.
2. Ability to perform quantitative analysis of electrophysiological cardiovascular data.
3. Ability to design and implement signal processing algorithms to critical physiological data
4. Explain the use of biomedical signal processing to aid clinical interpretation of data.
5. Ability to design and conduct experiments, as well as to measure, analyse and interpret data from living systems.
6. Ability to identify, formulate and adapt engineering solutions to unmet biological needs
7. Ability to model and analyze biological systems as engineering systems
8. Ethical issues and considerations for physiological measurement

Module Content

- Overview of quantitative physiology.
- Cardiology-Blood Pressure.
- Cardiology-Electrocardiography.
- Radiology CT Imaging
- Pulmonology-Respiration
- Quantitative physiology applied to ageing
- Measurements of kinematics and cognitive function
- Quantitative physiology in the context of connected health
- Challenges and opportunities for quantitative physiology in global health

Module Notes

Provided via Blackboard

Teaching Strategies

The module is taught using a combination of lectures, laboratories and study assignment. Each student is given an independent learning assignment, which introduces the student to research skills necessary for life-long learning.

Assessment Modes

Written Exam (70%), laboratory experiment (10%) and individual learning assignments (20%).

Recommended Texts

Quantitative Human Physiology	Feher
The Physiological Measurement Handbook	Webster (Ed)
Bioelectricity: a quantitative approach	Plonsey, Barr
Applied Bioelectricity	Reilly