5BIO4 PHYSIOLOGICAL MEASUREMENT AND DATA ANALYSIS [5 credits]

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

Semester: 1

Module Organisation

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

Module Description

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

Prerequisites: 3BIO1

Learning Outcomes

At the end of this module it is anticipated that students will have obtained:
  a) Understanding of the concepts involved in instrumentation design.
  b) Ability to perform quantitative analysis of medical instrumentation.
  c) Ability to apply design methodologies for medical instrumentation.
  d) Ability to design and implement signal processing algorithms to critically physiological data
  e) Explain the use of biomedical signal processing to aid clinical interpretation of data.
  f) Ability to design and conduct experiments, as well as to measure, analyse and interpret data from living systems.
  g) Ability to function on multidisciplinary teams
  h) Ability to identify, formulate and adapt engineering solutions to unmet biological needs
  i) Ability to model and analyze biological systems as engineering systems
  j) Knowledge of the commercial market and understanding of the regulatory hurdles in medical devices
  k) Ethical issues and considerations for physiological measurement

Module Content

- Overview of Physiological Measurement.
- Cardiology-Blood Pressure.
- Cardiology-Electrocardiography.
- Radiology CT Imaging
• Radiology MRI Imaging
• Pulmonology-Respiration
• Physiological measurement applied to ageing
• Measurements of kinematics and cognitive function
• Connected Health
• Challenges and opportunities in wireless and 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 (15%) and individual learning assignment (15%).

Recommended Texts

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