<table>
<thead>
<tr>
<th>Module Code</th>
<th>5BIO8</th>
</tr>
</thead>
<tbody>
<tr>
<td>Module Name</td>
<td>Active Implanted Devices and Systems</td>
</tr>
<tr>
<td>ECTS Weighting</td>
<td>10 ECTS</td>
</tr>
<tr>
<td>Semester taught</td>
<td>Semester 2</td>
</tr>
<tr>
<td>Module Coordinator/s</td>
<td>Prof Richard Reilly</td>
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**Module Learning Outcomes** with reference to the Graduate Attributes and how they are developed in discipline

On successful completion of this module, students should be able to:

- **LO1** Understand the concepts involved in implanted devices and systems.
- **LO2** Be able to perform quantitative analysis of data from implanted systems.
- **LO3** Be able to design and implement signal processing algorithms for chronically implanted systems.
- **LO4** Be able to identify, formulate and adapt engineering solutions to unmet biological needs.

**Graduate Attributes: levels of attainment**
- To act responsibly - Enhanced
- To think independently - Enhanced
- To develop continuously - Enhanced
- To communicate effectively - Attained

**Module Content**

The objective of this module is to provide a quantitative background to implanted neural systems. Focus will also be placed on the neuromodulation effects of electrical stimulation and on the goals of real time, objective, closed loop control of implanted system. The module will be based around a **substantial** individual assignment (grant proposal) and lectures based on state-of-the-art publications.

Section 1 Fundamental of Recording:
- Principles of Recording neural activity
- Recording neural activity in freely moving animals
- Neural Spike trains and Analysis

Section 2 Computational and Mathematical Modelling of Neural Systems
Teaching and Learning Methods

The module will be based on the combination of podium lectures, group discussion, a substantial individual assignment and student presentations.
### Assessment Details

Please include the following:
- Assessment Component
- Assessment description
- Learning Outcome(s) addressed
- % of total
- Assessment due date

<table>
<thead>
<tr>
<th>Assessment Component</th>
<th>Assessment Description</th>
<th>LO Addressed</th>
<th>% of total</th>
<th>Week due</th>
</tr>
</thead>
<tbody>
<tr>
<td>Individual assignment</td>
<td>Submission of a proposed new implanted device or system. Due end of semester</td>
<td>L01-L04</td>
<td>75</td>
<td>32</td>
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<tr>
<td>Examination</td>
<td></td>
<td>L01-L04</td>
<td>25</td>
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### Reassessment Requirements

**Contact Hours and Indicative Student Workload**

- **Contact hours:** 33
  - Independent Study (preparation for course and review of materials): 66 hours: Researching journals, reviewing lecture material and class notes.
  - Independent Study (preparation for assessment, incl. completion of assessment): 66 hours. Searching, locating, retrieving, analysing, synthesising, discussing research literature related to the chosen topic for the project assignment. Writing of the project report in the form of a research proposal to a funding agency. Preparation of 10min presentation.

### Recommended Reading List

- 3BIO1 Anatomy and Physiology, 4C5 Digital Signal Processing

### Module Website

- Blackboard

### Are other Schools/Departments involved in the delivery of this module?

- **NO**