<table>
<thead>
<tr>
<th>Module Code</th>
<th>MEU33BM2</th>
</tr>
</thead>
<tbody>
<tr>
<td>Module Name</td>
<td>Biomedical Design Project</td>
</tr>
<tr>
<td>ECTS Weighting</td>
<td>5 ECTS</td>
</tr>
<tr>
<td>Semester taught</td>
<td>Semester 2</td>
</tr>
<tr>
<td>Module Coordinator/s</td>
<td>Prof. Caitríona Lally</td>
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### Module Learning Outcomes

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

- **LO1.** Critically evaluate a number of different design processes and apply an appropriate design method to need find, generate ideas and evaluate design concepts.
- **LO2.** Correctly use CAD (Solidworks) to draw and model parts and assemblies and to create a 3D prototype.
- **LO3.** Analytically analyse a designed component and optimise a product.
- **LO4.** Be able to work effectively as part of a multidisciplinary project team.
- **LO5.** Write and present a technical report documenting the design process in a professional manner.

### Graduate Attributes: levels of attainment

- To act responsibly - Enhanced
- To think independently - Enhanced
- To develop continuously - Enhanced
- To communicate effectively - **Enhanced**
<table>
<thead>
<tr>
<th>Module Content</th>
<th>This module aims to develop design skills according to the Conceive-Design-Implement-Operate (CDIO) methodology. It provides students with the theory, methods and practise to develop safe, effective and efficient medical devices, optimised for specific functional requirements. The theory of different design approaches, relevant to medical device design is reviewed and discussed. Focussing on the CDIO design methodology, students define the product/technology need and develop the design concept. The student then focuses on creating the design, i.e., the plans, drawings and 3D model which will define what will be implemented. The design is then transformed into a product prototype using 3D printing or other suitable 3D modelling capability. In the final stage, Operate, the product is analytically evaluated and mechanically tested to determine if it has met its design objectives. Within the module, students learn the use of 3D CAD (Solidworks) and use the software to design their prototype product. The module provides students with an introduction to multidisciplinary project teams and the opportunity to apply learned knowledge to a real-world problem within group project work. The module structure is based on project-based learning. Each week students are introduced to new content, which they learn to apply by engaging in activities, practical implementation and discussion. The design project is based on a real-world problem.</th>
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</thead>
<tbody>
<tr>
<td>Teaching and Learning Methods</td>
<td>The module structure is based on project-based learning, with students having the opportunity to immediately apply learned theory in practice in their design project. The module includes (i) podium-based lectures, where design methods are introduced, (ii) laboratory sessions for instruction in CAD and 3D printing, and (iii) design clinics for hands-on instruction and discussion of design prototypes. The students are required to do background reading which is outlined and facilitated by the use of blackboard. Students also use discussion groups/forums for learning and assessment.</td>
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### 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>Idea/design concept presentation</td>
<td>Report and short presentation</td>
<td>LO1</td>
<td>10%</td>
<td>Week 2</td>
</tr>
<tr>
<td>Solidworks assignment</td>
<td>CAD model</td>
<td>LO2</td>
<td>25%</td>
<td>Week 6</td>
</tr>
<tr>
<td>Continuous assessment which includes bimonthly project reviews between the design teams and design process diary</td>
<td>Design diary and progress meetings</td>
<td>LO3 LO4 LO5</td>
<td>15%</td>
<td>Continuous</td>
</tr>
<tr>
<td>Final project report</td>
<td>Report (20 pages approx.)</td>
<td>LO3 LO4 LO5</td>
<td>40%</td>
<td>Week 12</td>
</tr>
<tr>
<td>Final project presentation</td>
<td>Presentation</td>
<td>LO3 LO4 LO5</td>
<td>10%</td>
<td>Week 12</td>
</tr>
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### Reassessment Requirements

Any module element failed can be re-submitted over the summer provided the student has attended the module and taken part in the group design project.

### Contact Hours and Indicative Student Workload

- **Contact hours:**
  44 hours
- **Independent Study (preparation for course and review of materials):**
  10 hours
- **Independent Study (preparation for assessment, incl. completion of assessment):**
  70 hours

### Recommended Reading List

1. **Design of Biomedical Devices and Systems**
Supplemental Texts

1. Biodesign: The Process of Innovating Medical Technologies
   by Stefanos Zenios, Josh Makower and Paul Yock.

2. Engineering Design: A Systematic Approach

3. Handbook of Human Factors in Medical Device Design
   by Matthew Weinger
   (https://books.google.ie/books?id=jAemLm2zu_oC&printsec=frontcover#v=onepage&q&f=false)

Module Pre-requisite
A basic knowledge of human anatomy and physiology is required.

Module Co-requisite
None

Module Website
None

Are other Schools/Departments involved in the delivery of this module? If yes, please provide details.
No

Module Approval Date

Approved by

Academic Start Year

Academic Year of Date