Module Code	MEU33EM3
Module Name	Design II
ECTS credit weighting	10 ECTS
Semester taught	Semester 1 & 2
Module Coordinator/s	Dr Adam Coyne (adam.coyne@tcd.ie)
Module Learning Outcomes with embedded Graduate Attributes	On successful completion of this module, students should be able to: 1. Carry out detailed engineering design, to include the selection and use of standard components where appropriate. 2. Communicate their design through presentations, written reports, and engineering drawings. 3. Carry out a prototyping process to assess their designs for functionality, form, and fit, as appropriate. 4. Manufacture prototype components using additive manufacturing. 5. Read sensors and control actuators using a micro-controller. 6. Incorporate micro-controllers and sensors into their designs, and program the microcontroller to control the behaviour of a system. 7. Write software to control various elements of a mechatronic system. 8. Know how to solder, and best principles for wiring DC mechatronic systems. 9. Learn to critically think about how things are designed and fabricated. Develop skills in ideation and early-stage concept development. 10. Reflect upon their own performance and that of their group, and use this reflection to enhance their own learning. **Graduate Attributes: levels of attainment** To act responsibly - Introduced To think independently - Introduced To develop continuously - Introduced To communicate effectively- Enhanced
Module Content	- Microprocessor programming - Actuators and sensors - Introduction to control - Batteries and power systems - Actuators and sensors

- Standard components (bearings, gears, springs, fasteners etc.)
- Geometric dimensioning and tolerancing
- Additive manufacturing for prototyping
- Group design project

This module presents an integrated approach to mechanical system design. Building upon theoretical knowledge developed in Manufacturing Engineering Design I (MEU22EM3), the primary aim of the module is to develop expertise and experience in applying systematic design principles towards a real design project involving mechanical, electronics, and software components. The core element of the module focuses on a group-based design project. Using a problem-based learning approach, groups are presented with a challenge which they must develop a solution to address. Each group will be responsible for the development of their design from concept through embodiment design resulting in a high-resolution prototype.

Teaching and Learning Methods

The module is taught using a combination of lectures, structured labs, and project feedback sessions at which teaching team members and/or teaching assistants interact with the project teams. Weekly scheduled sessions will provide the opportunity for one-on-one and group feedback to be provided. Students are also expected to engage in self-directed learning throughout the module, with appropriate guidance and feedback from the teaching team. Elements of self-assessment and peer assessment will be incorporated into assessment to support group-based learning outcomes.

Assessment Details[1]
Please include the following:

- **Assessment Component**
- **Assessment description**
- **Learning Outcome(s) addressed**
- **% of total**
- **Assessment due date**

Assessment Component	Assessment Description	Learning Outcome Addressed	% of total	Week due
Exam	Mid-term exam	5-9	15%	W8
Assignment	Semester 1 Assignment	1-10	15%	W11

[1] https://www.tcd.ie/CAPSL/resources/assessment

	Exam	End of semester exam	5-9	20%	W12
	Assignment	Mid-term assignment	1-10	15%	W16
	Presentation	Design presentation	2	10%	W22
	Assignment	Final Design Assignment	1-10	25%	W24

Reassessment Requirements	1. An individual design project, carried out over the summer months 2. Submission of a design diary on a bi-monthly basis over the summer months
Contact Hours and Indicative Student Workload[2]	**Contact hours:** 66 Hours **Independent Study (preparation for course and review of materials):** 10 Hours **Independent Study (preparation for assessment, incl. completion of assessment):** 72 Hours
Recommended Reading List	There is currently no recommended textbook for the course. Lecture notes are provided electronically, and all recommended reading lists are given out where appropriate in advance of classes.
Module Pre-requisite	MEU22EM3
Module Co-requisite	N/A
Module Website	N/A
Are other Schools/Departments involved in the delivery of this module? If yes, please provide details.	

[2] TEP Guidelines on Workload and Assessment