

DESIGN, MAKE AND EVALUATE - 2024/5

Module code: ENG2136

Module Overview

This module extends and applies learning from the design skills module in semester 1, as well as the basic CAE skills generated in year 1. The project provides an opportunity for students to work on a group-based project and apply the engineering knowledge they have learnt to the design and manufacture of a customer specified product/system. Students will be given a design brief, a set of stock components and access to the workshop. Students will develop their project under supervision by an academic, working towards a contest/evaluation day at the end of the semester.

Module provider

Mechanical Engineering Sciences

Module Leader

HILDITCH Mary (Mech Eng Sci)

Number of Credits: 15

ECTS Credits: 7.5

Framework: FHEQ Level 5

Module cap (Maximum number of students): N/A

Overall student workload

Workshop Hours: 32

Independent Learning Hours: 76

Lecture Hours: 1

Guided Learning: 42

Captured Content: 3

Module Availability

Semester 2

Prerequisites / Co-requisites

n/a

Module content

Working as a group, students will be assigned a project relating to their programme. Overseen by academic supervisors, the groups will develop a specification for the DME exercise, undertake a concept evaluation, and present their design process in an assessed presentation to other groups/academics mid-way through the semester. After the presentation, the groups will produce manufacturing drawings, carry out a risk assessment, manufacture their product and then test it against key criteria including the original specification and environmental impact. Groups will also produce a final report, a poster and display their finished design.

Assessment pattern

Assessment type	Unit of assessment	Weighting
Oral exam or presentation	Interim presentation covering design phase	20
Coursework	Final written report	60
Coursework	Design Performance Evaluation	10
Oral exam or presentation	Exhibition Poster	10

Alternative Assessment

n/a

Assessment Strategy

DME comprises a major group activity which allows application of design skills taught in short projects during semester 1, now applied to a semester-long project.

The major assessment is an individual written report submitted at the end of the project, but the project is also assessed through group marks awarded for a mid-semester oral presentation, the performance of the fabricated design and a poster displayed in an exhibition.

Thus, the summative assessment for this module consists of:

Interim Presentation, covering design phase [Learning outcomes 1, 2, 4]

Final Assessment:

Written Report [Learning outcomes 1, 2, 3]

Design Performance Evaluation [Learning outcomes 1, 2, 3, 4]

Exhibition Poster [Learning outcomes 1, 2, 3, 4]

Formative assessment and feedback:

Formative feedback is given in supervised group meetings, as well as during drop-in sessions and workshop time. Students will receive regular feedback in their group meetings, as well as feedback both from examiners and peers during the mid-semester presentation seminar.

Module aims

- Develop further the understanding of the design process
- Allow students to understand the place of finite element stress analysis in the design process
- Enable students to explore the complete engineering product development process from requirements capture through to end-of-life
- Provide experience of team working, which will provide students with the opportunity to collaborate with peers, develop ideas and co-create required outputs

Learning outcomes

		Attributes Developed
001	Demonstrate an analytical approach to the design activity and participate in a professional manner	CKP
002	Analyse product design requirements and apply engineering science to their selected designs	CK
003	Select manufacturing methods and materials and evaluate the final product and design procedures adopted	CKP
004	Provide experience of team working, which will provide students with the opportunity to collaborate with peers, develop ideas and co-create required outputs	CKT

Attributes Developed

C - Cognitive/analytical

K - Subject knowledge

T - Transferable skills

P - Professional/Practical skills

Methods of Teaching / Learning

Design, Make & Evaluate is undertaken as a group activity with weekly supervised meetings monitoring progress leading to CAD, purchase of materials and components followed by manufacture in the workshop and subsequent product development and testing.

The learning and teaching methods include:

Supervised group sessions

CAD computer lab tutorial

Workshop sessions

Indicated Lecture Hours (which may also include seminars, tutorials, workshops and other contact time) are approximate and may include in-class tests where one or more of these are an assessment on the module. In-class tests are scheduled/organised separately to taught content and will be published on to student personal timetables, where they apply to taken modules, as soon as they are finalised by central administration. This will usually be after the initial publication of the teaching timetable for the relevant semester.

Reading list

<https://readinglists.surrey.ac.uk>

Upon accessing the reading list, please search for the module using the module code: **ENG2136**

Other information

The School of Mechanical Engineering Sciences is committed to developing graduates with strengths in Employability, Digital Capabilities, Global and Cultural Capabilities, Sustainability and Resourcefulness and Resilience. This module is designed to allow students to develop knowledge, skills and capabilities in the following areas; Employability: This module provides students with working knowledge of key engineering software; FEA and project management software such as Gantt charts, software often used within engineering companies. Students will actively assign roles and responsibilities in order to ensure tasks are planned well and targets are met. Students will engage in real world design problems and work collaboratively to develop solutions. Digital capabilities: Students will further develop their FEA to visualize stresses and strains and apply to engineering problems. Students will further develop their skills from the L4 module in CAD by designing solutions using CAD software. Students will also use project management tools to help them monitor progress within their team. They will use Teams in order to work effectively in a group and to aid them with their collaborative work. Global and Cultural Capabilities: Students work in groups randomly assigned. This will require students to engage effectively with people from different backgrounds in ways that respect the interests of cultural groups. Students will work together within these groups to perform decision making tasks. This provides an opportunity to interact, communicate and build relationships with people from different backgrounds. Peer assessment will encourage students to value and recognize the contribution of each team member. In group tutorials, students are encouraged to learn and share from each others personal and cultural knowledge and perspectives. Sustainability: Students are given design briefs that ask them to consider ways in which engineering can be used to improve sustainability, and are asked to consider the environmental impact of their chosen materials / power sources as part of a conceptual design exercise. Resourcefulness and resilience: Students will need to develop resourcefulness, be able to share ideas and experiences both individually and collectively, appreciate potential barriers and challenges faced by others and provide support and show empathy towards each other in working towards achieving successful outcomes and responding to problem-based task requirements.

Programmes this module appears in

Programme	Semester	Classification	Qualifying conditions
Aerospace Engineering BEng (Hons)	2	Compulsory	A weighted aggregate mark of 40% is required to pass the module
Aerospace Engineering MEng	2	Compulsory	A weighted aggregate mark of 40% is required to pass the module
Automotive Engineering BEng (Hons)	2	Compulsory	A weighted aggregate mark of 40% is required to pass the module
Automotive Engineering MEng	2	Compulsory	A weighted aggregate mark of 40% is required to pass the module
Biomedical Engineering BEng (Hons)	2	Compulsory	A weighted aggregate mark of 40% is required to pass the module
Biomedical Engineering MEng	2	Compulsory	A weighted aggregate mark of 40% is required to pass the module
Mechanical Engineering BEng (Hons)	2	Compulsory	A weighted aggregate mark of 40% is required to pass the module
Mechanical Engineering MEng	2	Compulsory	A weighted aggregate mark of 40% is required to pass the module

Please note that the information detailed within this record is accurate at the time of publishing and may be subject to change. This record contains information for the most up to date version of the programme / module for the 2024/5 academic year.