ENGINEERING PROFESSIONAL STUDIES - 2024/5

Module code: EEE3035

Module Overview

Expected prior learning: This module is a follow-up to some of the core professional development activities in Year 2.

Module purpose: This module is a professional development module that is compulsory on all undergraduate programmes. The module builds from the team projects performed as part of the professional studies components of the Year 1 and 2 Labs, Design and Professional Studies modules (EEE1026, EEE1027, EEE2036 and EEE2037). The module provides students with competences and hands-on experience of an extended project and professional practice in modern electrical, electronic and computer engineering. The module's focus is a student-driven team-based product-design project that applies skills and practices addressed in the syllabus. In addition, it provides a skillset for successful management of individual projects, in particular the Year 3 project, and future group projects, such as the multi-disciplinary design project in MEng Year 4.

Module provider

Computer Science and Electronic Eng

Module Leader

CAREY David (CS & EE)

Number of Credits: 15

ECTS Credits: 7.5

Framework: FHEQ Level 6

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

Overall student workload

Independent Learning Hours: 104

Lecture Hours: 6

Seminar Hours: 5

Laboratory Hours: 15

Guided Learning: 10

Captured Content: 10

Module Availability

Semester 1

Prerequisites / Co-requisites

None.

Module content

Indicative content includes

Systems engineering and Steps in Design Analysis

Prioritization Strategies and Risk Analysis

Sustainability and UN Sustainability Development Goals, circular economy

Leadership styles

Equality, Diversity and Inclusion, and Unconscious Bias

Technology Development including TRLs, Hype curves and Disruptive Technology

Standards ISO9000, ISO9001, and PDCA Cycle

Industry 4.0 and 5.0, Additive Manufacturing, and 'Horizontals and verticals'

Approaches to Manufacturing (including Lean and six sigma)

Group presentation skills

Assessment pattern

Assessment type	Unit of assessment	Weighting
Coursework	OUTLINE DESIGN BRIEF	10
Project (Group/Individual/Dissertation)	FINAL PROJECT REPORT	65
Oral exam or presentation	PROJECT PRESENTATION	25

Alternative Assessment

Students are required to write a 3000 word essay on the role of group work in engineering projects.

Assessment Strategy

The assessment strategy for this module is designed to provide students with the opportunity to demonstrate the skills and knowledge described in the learning outcomes.

The summative assessment for this module consists of:

- Outline Design Brief: concise project design brief (Typically week 5 or week 6)
- Final Project Report: technical report of the project's (group and individual) achievements (end of Week 11)
- Project presentation: group and individual oral presentation and demonstration of implemented product (start of Week 15)

These deadlines are indicative. For confirmation of exact dates and times, please check the Departmental assessment calendar issued to you.

1. The design brief: should outline the group's proposal for the project in the form of a three page or five slide design brief design brief (plus appendices). The design brief should describe (a) an overview of the planned product and its innovation beyond what is currently available, (b) provide a brief technical outline of how students will approach the project objectives, (c) how sustainability can be incorporated into your product and the identification of the relevant UN Sustainability Development Goals (SDGs), and (d) provide an overview of project management (including a diagrammatic work plan), risk analysis and a summary of the estimated costs.

In addition to the design briefs the following need to be included as appendices

a. a completed Self-Assessment for Governance and Ethics - Human and Data Research (SAGE-HDR). Each group member is expected to read the University's policy on Security Sensitive Research as part of the SAGE-HDR ethical review process.

b. an equality impact assessment,

c. a data management plan and

d. A summary of the group's weekly outcomes.

2. The project report (20-25 pages excluding appendices) will assess both group and individual contributions. The group component will assess the discussion of the 'state-of-the-art' and/or the technical landscape as well as the economic benefit that arises from your product, the overall systems engineering approach taken and how the project addresses the UN Sustainability Development Goals.

The individual component will assess the individual student's technical contribution to the project via the design, technical implantation and results aspects of the product associated with the individual or component parts of the project There should be a summary of key findings against objectives, and a group and individual reflection of what went well, what the team would do differently, what advice you would give to another team re-doing this project. You should include a discussion of the risks in the project using a risk assessment matrix and how it different from the original one in the design brief. You should also include a financial plan including costings.

3. The presentation and demonstration will assess the quality of the finalized product, technical achievements and presentation skills of both the group and each individual. The group will be assessed on the overall structure and format, the use visual aids (and audio if relevant) aids and links between speakers and background. The individual student will be assessed in terms of voice, audibility, pace and timing.

Peer marking by the students of their fellow group members will influence the group components of the mark.

Formative assessment and feedback

For the module, students will receive formative assessment/feedback in the following ways.

- During lectures, by question and answer
- During supervised laboratory sessions
- Via the marking of written reports

Module aims

- This module aims to provide students with skills and experience critical to modern engineering through hands-on product design, implementation and presentation in a team-based context. Not only will the module offer students an exciting, innovative and collaborative project that materializes their own ideas, but it will also develop them as future leaders, designers and real engineering professionals.
- It aims to provide an in-depth understanding of the processes involved in engineering design and practice, as well as develop relevant professional skills. This module equips students with experience of independent and group based work, project

management and leadership, while addressing core aspects of modern engineering, such as sustainability, the UN's Sustainable Development Goals (SDGs), security in engineering, engineering ethics and equality, diversity and inclusion.

Learning outcomes

Ref		Attributes Developed	
001	Select and apply appropriate materials, equipment, engineering technologies and processes, recognising their limitations, applying an integrated or systems approach to the solution of complex problems	KCPT	C6, C13
002	Design and evaluate innovative solutions to meet end user requirements, meet a combination of societal, user, business and customer needs as appropriate to include consideration of applicable health & safety, diversity, inclusion, cultural, societal, environmental and commercial matters, codes of practice and industry standards taking into environmental and societal impact and minimising adverse impacts.	KCPT	C5, C7, C11
003	Employ project and risk management skills to identify, evaluate and mitigate risk, including security risk, and employ quality management systems and continuous improvement in the context of complex problems	PT	C9, C10, C14
004	Identify and analyse ethical concerns and make reasoned ethical choices informed by professional codes of conduct	PT	C8
005	Contribute as an individual and as a member of team to the project's goals communicating outcomes in written and oral form	PT	C16, C17
006	Set and reflect personal goals within the project and reflect upon them in written form as a route to CPD	PT	C18

Attributes Developed

C - Cognitive/analytical

K - Subject knowledge

T - Transferable skills

P - Professional/Practical skills

Methods of Teaching / Learning

The learning and teaching strategy is designed to achieve the following aims.

- Help develop students as engineering professionals by allowing them to come up with innovative designs on a problem of their choosing
- Develop independent research, design and development skills via students working as part of team in all aspects of design, build and test (verification and validation)
- Develop leadership and team working skills within a customer/client relationship whereby they should seek clarification from the customer/client about the progress of their project

- Develop professional communication skills in both a group written report and their allocation of sections, and in group-based presentation.

Learning and teaching methods include the following:

- Taught lectures in which students will be encouraged to discuss to the whole class and within a group setting
- Supervised laboratories in which students will build and test the hardware aspect of their project
- Independent learning as part of a group where students in their group will research into the problem, chosen approach to design,
- Guided learning
- Captured content in which selected topics in sustainability and other topics will be discussed; students will need to consider sustainability and circular economy in their design

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: EEE3035

Other information

This module will provide an in-depth understanding and experience of the processes involved in engineering design and practice. This module equips students with experience of independent and group-based work, project management and leadership which will improve the employability.

Recognising the importance of societal aspects of engineering, the project places high regard to sustainability in an engineering content and the relationship to the UN Sustainability Development goals.

Students' resourcefulness and resilience will be enhanced via working as part of a team and understanding the different personal dynamics in a team via collaborative working, and different approaches to problem solving and presentation skills. Their resourcefulness and resilience will also be enhanced as the they will need to plan the design, ordering and testing of the components as described in a diagrammatic workplan. In addition, the students will identify via a Risk Assessment Matrix the risks to the project and put in place the associated mitigation.

The module also places high regard to global and cultural capabilities via the students' requirement to complete a project Self-Assessment for Governance and Ethics for Human and Data research, and an Equality Impact Assessment for equality, diversity and inclusion.

The student's digital capabilities will be enhanced via the requirement to interface hardware and software, data security via completion of a Data Management Plan, design of a website or an app. Students will also need to present their findings in the form of a group-based presentation.

Programmes this module appears in

Programme	Semester	Classification	Qualifying conditions
Computer and Internet Engineering BEng (Hons)	1	Compulsory	A weighted aggregate mark of 40% is required to pass the module
Computer and Internet Engineering MEng	1	Compulsory	A weighted aggregate mark of 40% is required to pass the module
Electrical and Electronic Engineering BEng (Hons)	1	Compulsory	A weighted aggregate mark of 40% is required to pass the module
Electrical and Electronic Engineering MEng	1	Compulsory	A weighted aggregate mark of 40% is required to pass the module
Electronic Engineering BEng (Hons)	1	Compulsory	A weighted aggregate mark of 40% is required to pass the module
Electronic Engineering MEng	1	Compulsory	A weighted aggregate mark of 40% is required to pass the module
Electronic Engineering with Computer Systems BEng (Hons)	1	Compulsory	A weighted aggregate mark of 40% is required to pass the module
Electronic Engineering with Computer Systems MEng	1	Compulsory	A weighted aggregate mark of 40% is required to pass the module
Electronic Engineering with Nanotechnology BEng (Hons)	1	Compulsory	A weighted aggregate mark of 40% is required to pass the module
Electronic Engineering with Nanotechnology MEng	1	Compulsory	A weighted aggregate mark of 40% is required to pass the module
Electronic Engineering with Space Systems BEng (Hons)	1	Compulsory	A weighted aggregate mark of 40% is required to pass the module
Electronic Engineering with Space Systems MEng	1	Compulsory	A weighted aggregate mark of 40% is required to pass the module