The University Of Sheffield.

Electronic & Electrical Engineering.

EEE6600 INDUSTRIAL RESEARCH PROJECT

Credits: 60

Course Description including Aims

To provide a structured individual project to enable the student to carry out practical and/or theoretical work which underpins his/her academic studies and allows for the acquisition and demonstration of a wide range of practical skills.

Outline Syllabus

Time Allocation

12 weeks full time (approximately 480 hours) in the lab and in report writing.

Recommended Previous Courses

All courses studied as part of the MSc.

Assessment

Continuous assessment. Submission of a project report and a combined oral presentation and viva examination in September.

Recommended Books

Objectives

At the end of the project, students should have:-

1. A detailed appreciation of the methodology of application of science or engineering principles to the solution of problems or realisation of systems in a topic related to the subject of the MSc degree.
2. Experience of the effective collection and use of data to evaluate physical principles, making conclusions and developing their own work based on them.
3. The ability effectively to communicate complex technical ideas both orally and in writing.
4. Experience of working at the forefront of knowledge.
5. The experience of project management, record keeping, technical planning and time scheduling.

UK-SPEC/IET Learning Outcomes

Assessed by dissertation, oral presentation, poster presentation and continuous assessment.

Outcome Code	Supporting Statement
SM1m	Projects from all research groups are offered. Significant design and evaluation is required.
SM4m	Literature reviews of project area are required.
SM3p	Projects can have requirements from outside EEE, which can have a major impact on the design solution.
SM6m	Projects can involve a very diverse range of specialisations, which students will have to engage with and apply within their project.
SM1fl	All projects offered require students to acquire an understanding of the research area which will include the fundamental scientific methods appropriate for the topic.
SM2fl	The students are required to undertake a significant literature review which is assessed by a formal report. The review is aimed at critically assessing the state of the art and how it can be applied to their project
SM3fl	Projects offered will have a variety of constraints which are outside of the EEE domain and students are expected to take these into account when developing a solution
EA1p	Projects require a range of fundamental techniques in order to solve the challenges.
EA5m	Projects have research elements, where novel solutions need to be developed.
EA2p	The latest modelling and analysis techniques are employed in developing solutions.
EA3p	Projects develop or use computer simulation or design tools to help achieve the objectives.
EA3m	Simulation tools are validated against measurements to understand limitations and uncertainties.
EA4p	Projects inherently require a systems approach in order for individual aspects to feed in to an overall solution.
EA6m	Projects will have some part that is unfamiliar to the students and require them to find and interpret appropriate literature. Projects use computer based tools in the development of solutions.
EA1fl	Students will undergo a range of modelling, simulation, and measurements to demonstrate how their solution performs and make comparisons between theory and practice.
EA2fl	All projects are related to the supervisors research interests and as such the projects will be investigating emerging topics. The students will be applying concepts taught in the degree and also what is not taught through

	independent learning of the topic of interest.
EA3fl	Students will analyse a solutions for a range of design variables and will be expected to analyse such data. This data may be a combination of modelling, simulation, and measurements which will all have uncertainties associated with them. By analysis of the design data the students are expected to produce the most appropriate solution
D2p	The starting point of all projects is to define a project specification, which includes risk, CoSHH etc.
D1m	Projects have very specific user defined outcomes that must be met.
D1fl	Students are required to apply their knowledge and understanding within their project work. Often the decisions are not clear cut and design variables may need to be explored in order to find a valid solution. This might be done via analysis, modelling, simulation, and experimentation. This is assessed by consideration of the processes that a student has followed to reach a solution or range of solutions.
D2fl	Project students apply processes to design within their projects – across the full range of projects offered in the department. Dependent on the type of project, students will be introduced to a relevant range of methodologies and processes. All projects are unfamiliar to students and they are expected to adapt and apply these methodologies as appropriate. This is assessed by consideration of the processes that a student has followed to reach a solution or range of solutions.
D3fl	The projects require students to generate solutions to problems. These might be products, systems, components, processes, software, etc. Students are expected to produce innovative solutions to problems. This is assessed via the products produced by the projects.
D5p/D5m	Projects have a budget which must be adhered to.
D4i	Projects are set up not to have off the shelf solutions so that innovation is a requirement.
D4p	Full product life cycle planning is a part of projects.
D5p/D5m	This is an inherent part of the project process.
D8m	Projects are research based and require innovation.
ET1fl	Students are aware of the ethical and professional issues that underpin project work. This is addressed in a number of ways: students are given guidance on plagiarism (what it constitutes and how to avoid it); falsifying results. Students are expected to declare that they have not used unfair means and the department vigorously pursues student who do. Additionally, students are expected to keep logbooks detailing project activity.
ET3fl	As part of project work, students are expected to plan and manage their own work, consider project risks and their mitigation/avoidance, produce a viable timing plan (Gantt Chart) and assess progress as the project proceeds.
ET4fl	Projects often require students to consider a range of solutions and to make decisions about the solution chosen for development based on a range of constraints of which sustainability may be one.
ET6fl	Students are asked specifically to consider various kinds of risk within their project: health and safety, issues that might affect the success of the project. Students are expected to complete registers of risk to underpin this aspect.
EP1fl	Students are expected to bring to bear a wider range of knowledge and

	understanding to pursue their project work and this may be expressed via modelling and/or experimentation. The range of materials and components depends on the nature of the project.
EP2fl	Specialised equipment is used in all projects, requiring intimate knowledge. Students begin their project with literature review and these projects are undertaken in a research environment where students will interact with academic staff and researchers allowing them to understand state of the art and future developments.
EP9m	State of the art practices and equipment are employed.
EP2m	All themes of EEE are covered in this.
EP3fl	Projects require the use of practical assessment and characterisation in all themes. Projects are often related to on-going, industrially-related research and external constraints inevitably form the background to project work.
EP4fl	Project work is done by the individual but often takes place within established research teams. Students will interact with other actors within the teams and will often play a role in achieving the teams' objectives.
EP1p/EP1m	This is part of the initial specification and also the final thesis.
EP10	All projects are given constraints.
EP4p/EP4m	Initial literature reviews define possible solutions and are assessed.
EP6p/EP6m	All projects require solutions that conform to industry standards.
EP8p/EP8m	The risk register that students must prepare at an early stage defines strategies for dealing with uncertainty.
EA1m	All projects require the understanding of engineering principles and the ability to apply them to undertake critical analysis of key engineering processes.
EA2m	Projects involve either describing the performance of systems and components through the use of analytical methods to assess and evaluate prototypes or test experimental results against hypotheses, or critical use of modelling techniques.
D5i	Projects involve project planning, risk analysis and evaluation of results against project specifications. A small project budget limit ensures cost drivers for some projects.
D6i	Students give a presentation to their 2nd assessor, who is not a specialist on the given topic. Furthermore, students describe their work to a general audience at a poster session at the end of their project.
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ET6p	students need to fulfil health and safety requirements before commencing a project, including full risk assessment, as well as a project risk analysis and mitigation strategy.