The University Of Sheffield.

Electronic & Electrical Engineering.

EEE371 INDIVIDUAL INVESTIGATIVE PROJECT

Credits: 30

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

18-20 weeks with a minimum of 200 hours in total (the equivalent of 3 to 4 afternoons per week) in the lab plus a further 100 hours background reading and report writing.

Recommended Previous Courses

The first two years of an EEE degree programme

Assessment

Continuous assessment. Submission of a specification of aims and objectives, initial plan and risk assessment at week 4. Submission of an interim report at week 12. Submission of a project report and a 15 minute presentation at the end of the allocated period.

Recommended Books

None

Objectives

At the end of the project, successful students will be able to

1. Methodically apply engineering principles to the solution of problems, realization of electronic devices or systems or investigations into the properties of electronic engineering materials or devices.
2. Extract and critically assess information from a variety of sources.
3. Collect and use experimental data to evaluate physical principles and make conclusions.
4. Manage projects and time when working under time constraints
5. Maintain detailed log books as records of their technical planning, design and experimental work.
6. Communicate complex technical ideas effectively both orally and in writing.
7. Work at the forefront of knowledge, seeking and assimilating new knowledge and ideas as required.

UK-SPEC/IET Learning Outcomes

Outcome Code	Supporting Statement
SM1p	A wide variety of investigative projects are offered broadly falling within the research groupings of Communications, Semiconductor Materials & Devices and Electrical Machines & Drives. The projects reinforce and expand upon scientific principles and methodology, all within an engineering context. The specific details of the principles and methodology will be dependent on the individual project itself.
SM1m	The projects are closely related to work undertaken in specialist research areas and as such require a comprehensive understanding of the relevant scientific principles.
SM4m	Students undertake a literature search which will give an awareness of related developing technologies.
SM2p/SM2m	The projects undertaken involve mathematical principles and computer models. The exact detail will vary from project to project.
SM5m	Projects require modelling at some stage of their evolution. These models need to be thoroughly understood in order to appreciate their limitations.
EA1p / EA1m	Projects will require the students to use engineering principles and apply them as required in their project. For example in semiconductor projects, physical principles and quantitative methods will often be used to develop models for components. In digital projects, number systems may be implemented using combinatorial and sequential logic circuits. In a communications project, antenna theory may be applied to develop an antenna design meeting a predetermined specification, and its measured performance evaluated against simulated results.
EA2p / EA2m	As part of the project, the student must assess the performance of their system and discuss the quality of the result. The methods used will be dependent on the individual project. For example, digital projects often require the determination of speed, area and power dissipation.
EA3p	All investigative projects require the use of software tools and quantitative methods to solve engineering problems.
EA3m	Students are expected to discuss the limitations of their models.
EA4p/EA4m	Project planning and milestone definition enforce a systems approach.
EA5m	The investigative projects are at the boundaries of knowledge and students will be actively investigating new technologies.
EA6m	The investigative projects will be unfamiliar to the students doing them. They are expected to learn how to extract information and use this in formulating the solution to the problem. They will have to use the literature to find ideas and information that will support their effort. The student's ability to extract and evaluate pertinent data and to apply suitable analysis techniques forms part of the thesis assessment.
D2p / D2m	Students produce an initial specification for their project in which they identify any constraints. The extent of these constraints will depend upon the individual nature of the project. For all projects, a risk assessment and a project risk register must be performed.
D4i	There is plenty of scope in the projects for innovative solutions and this is positively encouraged.
D5p / D5m	Students produce an initial plan for their project including a Gantt chart. They also identify and attempt to mitigate risks to the successful completion of their project. At the project mid-point, students produce a report which refines the specification and details any problems encountered. They produce a new Gant chart at this point

	to manage the remainder of the project. A log book is kept throughout the project.
D6p/D6m	At the end of the project, students must give an oral presentation of their work to a technical and non-technical audience, comprising their peers and members of academic staff.
D7m	The investigative project requires students to adapt their design processes and methodology to a new situation.
D8m	Investigative projects will require innovation and are generally aimed at answering new questions.
ET1p / ET1m	Students are told of the importance of acknowledging all sources on which their work builds - and are expected to act on that advice
ET3p/ET3m	Project management techniques: risk register, Gantt charts, log book.
ET6p	All students must complete a suitable risk assessment for their project. Additionally, they must complete a risk register of events that could threaten the success of the project. These provide them with knowledge and understanding of risk issues, risk assessment and risk management techniques.
EP2p / Ep2m	All projects will require competence in engineering skills and knowledge of the characteristics of the related subject matter. Knowledge will be extensive within the specialisation of the project.
EP3p / EP3m	Project management techniques: risk register, Gantt charts, log book All students must complete a suitable risk assessment for their project. Additionally, they must complete a risk register of events that could threaten the success of the project. These provide them with knowledge and understanding of risk issues, risk assessment and risk management techniques.
EP4p / EP4m	Students are required to source and interpret technical literature and documentation.
EP5p / EP5m	Investigative projects work at the boundaries of knowledge and may create IP. Students are made aware of the need to protect and exploit IP.
EP6p / EP6m	All projects will involve written specifications and some may require familiarity with engineering standards.
EP8m/EP8p	All students must compile a risk register of events that could threaten the success of the project. This is one way of dealing with uncertainty.
EP9m	Projects are at the boundaries of knowledge and students will obtain an appreciation of new developments.
EP10m	All projects will have constraints of time and budget; some will have other constraints.