The University Of Sheffield.

Electronic & Electrical Engineering.

EEE471 YEAR 4 GROUP PROJECT

Credits: 30

Course Description including Aims

The project, performed under the supervision of either two academic supervisors, or one academic supervisor and one second external marker from an industrial partner, takes the form of a multidisciplinary investigative or design project usually with a significant industrial input. Students are divided into multidisciplinary teams and presented with the project brief by the industrialists involved. Project activities are based in the research labs of the supervisor(s) although students may also have to make use of other facilities, normally within the Department. Students hold regular minuted progress management meetings with group members rotating their group management responsibilities.

Time Allocation

18 weeks - laboratory sessions at three to four afternoons per week. This amounts to around 200 hours of laboratory time and 100 hours of private study and preparation of dissertations and presentations.

Recommended Previous Courses

EEE221 "Human Resource Management" and in particular the "SHIPS" project in that unit. MEC305 "Engineering Management". Relevant technical material from years 1-3 of the EEE programme.

Assessment

Continuous assessment: Staff assessment though evaluation of the general student performance reported at weeks 12 and 18 and student appraisal of fellow group member's performance on a fortnightly basis via an online peer review assessment.

Reports: report 1: group design specification, initial plan and risk assessment at week 6; report 2: group interim report at week 12 and final group project report (in individual sections) at week 20.

Presentations: Group poster presentation: 15 minute group oral presentation at week 13; 20 minute final group oral presentation and demonstration at week 20 (assessed by staff and M.Eng. students from other groups).

Objectives

By the end of this unit 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. Use their knowledge and understanding creatively to solve unfamiliar problems.
5. Manage projects as part of a team, including specification, procurement and overall cost management to a limited budget, when working under time constraints.
6. Effectively liaise with an external partner, or "customer" as part of the project management.
7. Interact effectively within a team and understand the different roles played by individuals.
8. Maintain detailed log books as records of their technical planning, design and experimental work.
9. Communicate complex technical ideas effectively through oral, poster and written presentations.
10. 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/m	It is expected that students will acquire relevant fundamental principles that are associated with the project. This may be taken from previous modules and enhanced with reading of the state of the art methods. This would be assessed during supervisor meetings and in the final report.
SM3p/m	Projects have requirements from outside EEE, which can have a major impact on the design solution. These could be mechanical or thermal properties, for instance, or from within specific themes of EEE that some students are not aware of but need to use as part of the group process. This is assessed using supervisor discussions and written reports.
SM4m	A literature review and an evaluation of the current State-of-the-Art of the technology relevant to the project area is required.
SM5m	As part of the group process some elements will involve computer modelling of systems and will include limitations of many factors. Although some students in the groups may not need to fully aware of the computational processes they may need to interpret the data for their element of the project. This is assessed in written reports.
SM6m	The group project structure can have a very diverse range of specialisations, including some outside engineering which students will have to engage with to put their contribution in context with the overall project aims. This is assessed in written reports and students use peer review to evaluate group members
EA1p/m	Projects require a range of fundamental techniques in order to solve the challenges. The ability to apply these techniques is fundamental to the group project and is assessed through a range of written reports, oral presentations and supervisor discussions.
EA2p/m	Projects incorporate elements of testing, simulation and data processing at component and systems level. This is assessed by written reports, oral presentations and supervisor discussions.

EA3p/m	A range of modelling and analysis techniques are employed to develop and evaluate effective solutions. The simulation tools are validated against measurements to understand limitations and uncertainties. This is assessed in written reports.
EA4p/m	Group projects inherently require a systems approach in order for individual elements to feed in to an overall solution. Projects involve the application of a range of engineering technologies requiring a systems approach for the optimisation of solutions. This would be assessed using written reports, oral presentations and supervisor discussions.
EA5m	Projects have research elements, where novel solutions need to be developed This would be assessed using written reports, oral presentations and supervisor discussions.
EA6m	Projects will have some part that is unfamiliar to the students and require them to find and interpret appropriate literature. Projects can also use computer based tools in the development of solutions. This would be assessed in written reports.
D1p/m	Projects have very specific user defined outcomes that must be met and often require consideration of wider design considerations. Assessed in the written report and through supervisor discussions.
D2p/m	All projects require the students to define a project specification as a starting point, which includes risk assessment (safety), Coshh evaluation, risk management (project management) etc. This would be assessed in the first report relating to the specification.
D3p/m	Students are required to evaluate all design parameters which will be uncertain or constrained. This could be carried out through modelling, simulation or measurements and would be assessed through written reports and through supervisor discussions.
D4p/m	Students are expected to establish solutions that include manufacturing, operation and product life cycle planning as part of each project. This would be assessed in the final report.
D5p/m	Projects have a financial budget and defined timeframe which must be adhered to. The plan is assessed in the first report and in the interim report to evaluate how they are meeting the plan or if changes have been made in a manageable manner.
D6p/m	The groups present their work as a poster and during oral presentations to members of the department and peers, some of which will not be familiar with the technical details. As this is an industrially based project some sponsoring companies may attend these events who may not be from a technical background.
D7m	Due to the group nature of the project and the high technical content, students need an extensive grasp of the design process so they can successfully develop their individual solution and meet the requirements of the project as a whole. This would be assessed through written reports, supervisor discussions and peer review from group members.
D8m	The very nature of the project will require innovative design/research to fulfil the project needs. This is assessed in written reports and through supervisor discussions.
ET1p/m	Peer review is part of the assessment and there are group deliverables, which require professionalism. Plagiarism is also addressed in group meetings. Ethical considerations could also arise depending on the nature of the project

	which would require the group to design appropriately to. This would be assessed in written reports and through superior discussions.
ET2p/m	Due to the industrial nature of the projects many of the design specifications consider costs, their use by the public and the market they would be sold into. These considerations would be part of the design process and would be assessed by written report and supervisor discussions.
ET3p/m	Each student acts as chair and secretary at project meetings. Project and risk plans are developed and maintained throughout the project. This is assessed in supervisor meetings and in the first and second reports.
ET4p/m	Many projects consider requirements such as the materials used with respect to the sustainability of that material as well as energy requirements. Calculations of the use of energy and often the reduction of energy can be part of the design specification. This would be assessed in written reports and through supervisor discussions.
ET6p/m	Projects require the students to produce a detailed risk assessment (safety), COSHH evaluation and risk management. This is assessed in the first report and again in the second report to evaluate if anything has changed.
ET7m	As part of the range of design solutions students will have to trade off solution risk versus innovation and how the customer (supervisor or industrial partner) my perceive these trade offs.
EP1p/m	A detailed literature review is required as part of the initial specification and also the final thesis. This will demonstrate the students knowledge of the applicability of the technology in the project
EP2p/m	Specialised equipment and materials are used in all projects, requiring intimate knowledge. This would be assessed through supervisor discussions and partially in the final report.
EP3p/m	Projects require the use of practical assessment and characterisation in all themes. This would be assessed in written reports and through supervisor discussions.
EP4p/m	Initial literature reviews define possible solutions and are assessed. This would be assessed in the first report.
EP6p/m	All projects require solutions that conform to industry standards where appropriate and would be assessed against these standards in the written reports.
EP7p/m	Although no formal methods of quality control are taught the students will be expected to address the robustness of their solutions which may need development and improvement throughout the project. This would be assessed through supervisor discussions.
EP8p/m	The risk register that students must prepare at an early stage defines strategies for dealing with uncertainty. Uncertainty in the design parameters will lead to many possible solutions of which the students will need to choose the most appropriate. This would be assessed in written reports.
EP9p	Teamwork is inherent in group projects. Each student acts as chair and secretary at regular project meetings. Tasks are delegated to team members on a regular basis for which team members take personal responsibility. The students use regular peer review to assess team member contributions which effects the marks that they receive.
EP9m	State of the art practices and equipment are employed in all projects. Some projects will involve reviewing or developing state of the art solutions. This would be assessed in written reports

EP10m	Due to the industrial nature of the projects commercial and other constraints will be an inherent part of the project and students will need to evaluate the impact of these on their solutions. This would be assessed in written reports and through supervisor discussions
EP11m	Teamwork is inherent in group projects. Each student acts as chair and secretary at regular project meetings. Tasks are delegated to team members on a regular basis for which team members take personal responsibility. The students use regular peer review to assess team member contributions which effects the marks that they receive.