**Faculty of Engineering and the Built Environment**

**Department of Electrical Engineering**

**2016 Course handout** : **EEE4022F/S**

**An Exit Level Outcomes Course**

|  |  |
| --- | --- |
| Course Name: | EEE4022F/S FINAL YEAR PROJECT |
| SAQA Credits: | 40 |
| Pre-requisites: | All 1st, 2nd, 3rd year core courses and specific, individual, requirements depending on the topic selected. A maximum of 32 credits of coursework can be taken at the same time as the final year project |
| Co-requisites: | None |
|  |  |
| Course convenor: | Associate Professor Barendse and Associate Professor D. O’Hagan |
| Email address: | [Paul.barendse@uct.ac.za](mailto:Paul.barendse@uct.ac.za) and daniel.ohagan@uct.ac.za |
| Office location: | Room 5.22.5 and Room 716 Menzies Building |
| Consultation hours: | By arrangement |
| Course lecturer: | N/A |
| Teaching assistants: | N/A |
|  |  |
| Lecture venue: | N/A |
| Lecture days and time: | N/A |

**Course objectives**

|  |
| --- |
| To give individual students the opportunity to tackle a real engineering project within a limited period under the guidance of a supervisor and submit a project report on the results. |

**Learning outcomes**

|  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| Students who have satisfactorily completed this course will be able to demonstrate that: | At Exit level | | LO 1 | LO 2 | LO 3 | LO 4 | LO 5 | LO 6 | LO 7 | LO 8 | LO 9 | L10 |
| **A. Knowledge (Information plus Understanding)** | | | | | | | | | | | | |
| 1. have attained an honours level in the mastery of electrical engineering principles and practice | | Y |  | 8 |  |  |  |  |  |  |  |  |
| 1. have developed an understanding of the scientific method for the design, implementation and testing of new systems, devices, circuits or other engineering applications | | Y | 8 | 8 | 8 | 8 |  |  |  |  |  |  |
| 1. Demonstrates an awareness of the social and ethical implications of their work | |  |  |  |  |  |  |  |  |  | 8 |  |
| **B. Skills (Application of Knowledge)** | | | | | | | | | | | | |
| 1. have competence in applying basic scientific and engineering knowledge in solving open-ended engineering problems | | Y |  | 8 |  |  |  |  |  |  |  |  |
| 1. understand and can apply their skills to a specific problem in a specialist area of electrical engineering. | | Y |  |  |  | 8 |  |  |  |  |  |  |
| 1. have acquired the skill to translate theory into practical implementation with sound verification of procedures | | Y |  | 8 |  | 8 |  |  |  |  |  |  |
| 1. are able to plan and conduct investigations/experiments | | Y |  |  |  | 8 |  |  |  |  |  |  |
| 1. are able to conduct a literature search and evaluate the material in a critical way | | Y |  |  |  | 8 |  |  |  |  |  |  |
| 1. are able to select and use appropriate equipment and software for their project | | Y |  |  |  | 8 |  |  |  |  |  |  |
| 1. have competence in analysing and interpreting data and information and drawing valid conclusions based on the evidence | | Y |  |  |  | 8 |  | 8 |  |  |  |  |
| 1. have acquired a professional standard of writing a detailed technical report on her / his work (Long report) | | Y |  |  |  |  |  | 8 |  |  |  |  |
| **C. Values and Attitudes** | | | | | | | | | | | | |
| 1. they have the ability to work effectively and independently as an individual | | Y |  |  |  |  |  |  |  | 8 | 8 |  |
| 1. they can take responsibility for their own actions and learning requirements | | Y |  |  |  |  |  |  |  |  | 8 | 8 |

**The course addresses the following Exit Level Outcomes**

|  |  |  |
| --- | --- | --- |
| **Main outcome** | **Activities, skills or abilities contributing to the main outcome/objective** | **Alignment of assessment with relevant ELO descriptions** |
| **Learning outcome 4: Investigations, experiments and data analysis**  Demonstrate competence to plan and conduct investigations and experiments. | Range Statement: The balance of investigation and experiment should be appropriate to the discipline. Research methodology to be applied in research or investigation where the student engages with selected knowledge in the research literature of the discipline. Note: An investigation differs from a design in that the objective is to produce knowledge and understanding of a phenomenon and a recommended course of action rather than specifying how an artifact could be produced. | Students must select final year projects specific to their discipline. Engagement with relevant literature is required and is assessed in a literature review. Every project involves an investigation into a specific problem, and a substantial part of the assessment rubric relates to practical work, formulating experiments, analysing and interpreting data, and drawing conclusions.  During the course of the project the progress made by the student toward meeting the ELOs is monitored by the supervisor and recorded on an ELO tracking form. Where progress is insufficient a DP will be refused and the student cannot submit the final project report. |
| **Learning outcome 6: Professional and technical communication** Demonstrate competence to communicate effectively, both orally and in writing, with engineering audiences and the community at large. | Range Statement: Material to be communicated is in an academic or simulated professional context. Audiences range from engineering peers, management and lay persons, using appropriate academic or professional discourse. Written reports range from short (300-1000 word plus tables diagrams) to long (10 000 to 15 000 words plus tables, diagrams and appendices), covering material at exit-level. Methods of providing information include the conventional methods of the discipline, for example engineering drawings, as well as subject-specific methods. | The work done by the student is presented in the form of a long technical report, written in a professional academic style. It is expected that graphical aids be used as required. Two internal examiners assess the report, and external examiners with a professional engineer status moderate the project reports.  During the course of the project the progress made by the student toward meeting the ELOs is monitored by the supervisor and recorded on an ELO tracking form. Where progress is insufficient a DP will be refused and the student cannot submit the final project report. |
| **Learning outcome 8: Individual, team and multidisciplinary working** Demonstrate competence to work effectively as an individual, in teams and in multidisciplinary environments. | Range Statement: Multidisciplinary tasks require co-operation across at least one disciplinary boundary. Co-operating disciplines may be engineering disciplines with different fundamental bases other than that of the programme or may be outside engineering. | Projects are done individually and the report is used to assess the competence of the student to work effectively as an individual.  During the course of the project the progress made by the student toward meeting the ELOs is monitored by the supervisor and recorded on an ELO tracking form. Where progress is insufficient a DP will be refused and the student cannot submit the final project report. |
| **Learning outcome 9: Independent learning ability** Demonstrate competence to engage in independent learning through well developed learning skills. | Range Statement: Operate independently in complex, ill-defined contexts requiring personal responsibility and initiative, accurately self-evaluate and take responsibility for learning requirements; be aware of social and ethical implications of applying knowledge in particular contexts. | Projects specifications are vague and the student is expected to take responsibility for identifying the nature of the investigation and progressing toward a goal. The open-ended nature of the project ensures that it is complex and ill defined. The university ethics committee must approve any project that requires ethics approval, and all students must include an appendix that ensures that they have considered this issue.  During the course of the project the progress made by the student toward meeting the ELOs is monitored by the supervisor and recorded on an ELO tracking form. Where progress is insufficient a DP will be refused and the student cannot submit the final project report. |

**Detailed course content**

|  |
| --- |
| The final year project is an important opportunity for the student, at the end of the degree programme, to tackle a real engineering project. The student is expected to work on the project both individually and under the guidance of a supervisor. An engineering project involves the creative application of scientific principles to the solution of a technical problem. It involves a problem description or research hypothesis developed in consultation with a supervisor, reviewing the topic in detail and defining the boundaries (scope) carefully, confirming an understanding of the requirements of the supervisor, searching for, selecting and justifying the most appropriate approaches to solving the problem or testing the hypothesis. It also requires a student to be able to analyse, design, build, integrate and test as is appropriate for the specific project. This could include the use of hardware, software and simulation. Students are also required to evaluate the project against the success criteria and design objectives, and to write a report about the project, the findings, and any recommendations. In addition students need to make an oral presentation and prepare an exhibit. |

# Knowledge areas\*

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Maths Sciences | Natural Sciences | Eng Sciences | Design & Synthesis | Complm Studies |
|  |  | 40 | 20 |  |

# \*the remaining 40% varies according to the topic and approach taken in individual projects

# Learning environment

|  |
| --- |
| No formal lectures. The project is carried out under the supervision of allocated project supervisors who meet regularly with students. |

**Suggested time allocation**

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **Learning Activity** | **No./ week** | **Time unit in hours** | **Contact time Multiplier** | **Total no of hours** |
| Number of lectures ***per week*** |  |  |  |  |
| Number of tutorials ***per week*** |  |  |  |  |
| Total practical/lab periods |  |  |  |  |
| Total other contact periods | 1 | 0.5 | 2 | 12.0 |
| Total assignment non-contact ***hours*** | 388 |  |  | 388.0 |
|  |  |  |  |  |
| Number of weeks the course lasts | 14 |  |  |  |
| Total hours | **400.0** |  |  |  |

**\*Time allocation is project dependant**

**General assessment strategy**

|  |  |  |
| --- | --- | --- |
| **Assessment Task %** | **%** | **The following DP rules apply:** |
| Homework |  | Meetings with supervisor to discuss progress towards satisfying the Exit Level Outcomes  Draft section of project report handed in to supervisor by the deadline set by the department  Oral presentation of results  Open day exhibition of project  Timeous hand-in of final report. |
| Tut |  |
| Lab |  |
| Project |  |
| Tests |  |
| Other  Research Report:  Presentation and Poster: | 90  10 |
| Lab exam |  |
| Exam |  |
| **Total** | 100 |

**Information specific to ELOs**

|  |
| --- |
| **Outcome 4** |
| *Where and how is this learning outcome assessed*  The outcome is assessed in the final project report submitted by the student. |
| *What constitutes satisfactory performance?*  The first examiner must sign off that the project report contains evidence that the ELO has been met. |
| *What strategy is to be followed should this learning outcome not be satisfactorily attained?*  Repeat the course. |
| **Outcome 6** |
| *Where and how is this learning outcome assessed*  The outcome is assessed in the final project report submitted by the student. |
| *What constitutes satisfactory performance?*  The first examiner must sign off that the project report contains evidence that the ELO has been met. |
| *What strategy is to be followed should this learning outcome not be satisfactorily attained?*  Repeat the course. |
| **Outcome 8** |
| *Where and how is this learning outcome assessed*  The outcome is assessed in the final project report submitted by the student. |
| *What constitutes satisfactory performance?*  The first examiner must sign off that the project report contains evidence that the ELO has been met. |
| *What strategy is to be followed should this learning outcome not be satisfactorily attained?*  Repeat the course. |
| **Outcome 9** |
| *Where and how is this learning outcome assessed*  The outcome is assessed in the final project report submitted by the student. |
| *What constitutes satisfactory performance?*  The first examiner must sign off that the project report contains evidence that the ELO has been met. |
| *What strategy is to be followed should this learning outcome not be satisfactorily attained?*  Repeat the course. |

**Prescribed Books/Reading Materials/Notes**

|  |
| --- |
| * Various material identified by the literature search that is focused on the specific requirements of each project. |

Absence: The continuous assessment marks will be adjusted to allow for absence only on the following grounds:

* A medical certificate for absence of 3 or more consecutive days
* Death of an immediate family member (parent or sibling)
* Pre-arranged absence to represent a University, provincial or national team.

Academic dishonesty: Plagiarism is a very serious offence and usually leads to disciplinary action that could include expulsion from the university. Therefore, recognise the work of others in any submission. Details of referencing methods are widely available on the Web.