



ELEN4000/4011: 4th Year Design 2022

Course Brief and Outline, Arrangements, Design Approach, Schedules, Timelines

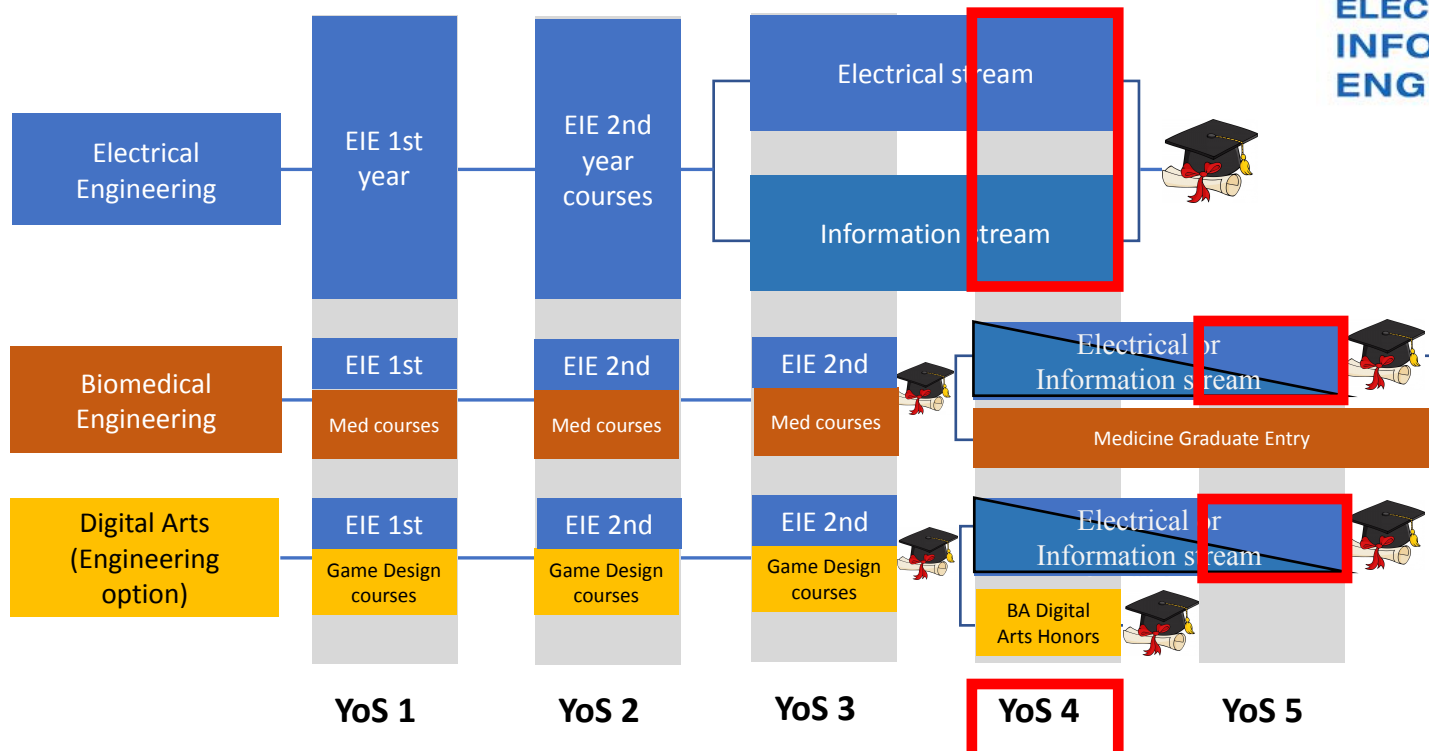
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Welcome



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Course Objectives

- One of two capstone courses
- Context of an independent engineer at the entry level of the profession
- Design is the planning stage before implementation, where the document needs to justify technical choices made towards solving the problem.
- Aim is two-fold:
 - Solution of complex, scoped convergent, or divergent engineering problems
 - Effective communication of findings as well as the impact of the design
- Emphasis is placed on both the technical, engineering aspect of design as well as the social, economic and environmental impact of the proposed solution
- In short, it is about *being an engineer*





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Course Outcomes

- Analyse requirements, synthesize (and create) design
- Done under limited supervision *weekly session to simulate client meetings
- Communicate at suitable level (technical and non-technical)
- Meeting the ECSA GAs
 - GA 1: Problem solving
 - GA 2: Use of fundamental scientific knowledge
 - GA 3: Engineering design
 - GA 5: Effective use of suitable tools in the analysis of results
 - GA 6a & 6b: Reporting in a technical manner and communicating with a non-technical audience
 - GA 7a & 7b: Identify and evaluate socio-economic, environmental and sustainability issues
 - GA 8a: Work effectively as an individual





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Project Expectations

- Project scope, complexity and duration
 - **Full-time** commitment
 - Duration: 7 weeks *Previous years the minimum of 6 weeks
 - Significant technical design, challenging (final design project!)
 - Critical analysis, simulation and justification
 - Requires knowledge from 2nd, 3rd and 4th year courses





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Project Topics

- 13 topics available for different specialties
- Projects will be assigned to students based on an allocation process.
 - Top 5 choices should be elected
 - Students must note the prerequisites for each topic and should take responsibility to ensure they are eligible for all choices.
 - Some preference given to early time-stamps.
 - Repeat students cannot have the same project or supervisor.





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Project Topics

Topic No.	Field	Supervisor
1	Antenna Design	Dr. D. Nitch
2	Biomedical and Artificial Intelligence	Prof. V. Aharonson
3	Control Systems	Prof. A. van Wyk
4	High Voltage I	Dr. H. Geldenhuys
5	High Voltage II	Prof. C. Gomes
6	Optical Communications	Dr. M. Cox
7	Power and Energy I	Prof. D. Dorrell
8	Power and Energy II	Prof. W. Cronje
9	Software I	Prof. T. Celik
10	Software II	Prof. K. Nixon
11	Systems Engineering I	Prof. D. Limebeer
12	Systems Engineering II	Dr. N. West
13	Telecommunications	Prof. F. Takawira





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Timeline

- **Publication of Topic Briefs (22 March, 2022)**
- **Submit top five preferred choices (4th April, 2022)**, link open for 24 hours.
- **Design topic allocations published (20 April, 2022)**
- **Design sessions with supervisor**
 - 7 weeks period (**starting date: 25 July 2022**)
 - Report submission: **9 September 2022.**





Assessment

- Students submit a single report with an ‘Appendix A’
 - an **individual and original technical report**, reflecting the student’s own work, except where contributions of others are incorporated and duly acknowledged.
 - an **individual and original non-technical report** to be attached as Appendix A, communicating the findings and potential impacts of the design to a non-technical audience; this may take the style and form of a newspaper article.
- Assessment is on the basis of the report
- Engineering notebooks must be used and maintained
- Assessment by an internal as well as an external examiner
- Marking will be done based on a marking grid



Satisfactory Performance (SP) Requirements

- Indication of Topic choices and Check Prerequisites IE/EE
- Provide regular feedback on progress of their project;
- Obtain guidance during the project;
- Attend lectures and activities associated with the project as required by the supervisor;
- Record minutes and progress in an engineer's notebook.
- NOTE: It is SP requirement to submit Report within the deadline. Late submissions will be subject to revocation of SP. Any deviation from this will result in SP warning. Report submitted with an SP in place will be capped at 50%.



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Graduate Attributes (GAs)

- All GAs are assessed individually for each student
- Evaluation levels:
 - Excellent, good, acceptable, deficient.
- Final evaluation for each GA per student is discussed from the independent assessments.
- GA categories: fundamental, or supplementary.
- Deficient GAs:
 - One or more deficient GAs will result in failure of the course.
 - Any exception is subjected to a decision made at Board of Examiners.





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Conclusion

- (A) culmination of the undergraduate degree (together with the Investigation Project)
- Lots (and lots) of hard work
- Design is different from implementation, where justification of steps and decisions are vital.
- Outcomes-based - Ensure that all GAs are addressed in the final document.
- Very strict late submission policy
- However...
 - VERY rewarding (not all doom and gloom)
 - HAVE FUN!!!
- Course page...
 - Respective pages on Ulwazi (registered students should already have access).

