


# Stellenbosch University Faculty of Engineering

## Module Framework

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*This document should be read with the following documents:*

- Stellenbosch University Calendar Parts 1 and 11.
- Faculty of Engineering Assessment Rules<sup>1</sup>
- Faculty of Engineering General Stipulations for Undergraduate Modules<sup>1</sup>

<b>Project (E) 448</b> <b>46795-448</b> 2023, Sem 2	Lecturer(s): Module coordinators: Dr C Fischer, <a href="mailto:cfisher@sun.ac.za">cfisher@sun.ac.za</a> Prof TR Niesler, <a href="mailto:trn@sun.ac.za">trn@sun.ac.za</a> Module lecturers: All full-time E&E Eng academic staff employed during 2023. Internal moderator: Prof JAA Engelbrecht	Approved by Programme Coordinator:  Date: 2023/06/02
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## 1 Assessment Details

- Major assessment dates and venues are provided at <https://web-apps.sun.ac.za/academic-exam-timetable/#/start/>
- Method of assessment as indicated in the Calendar Part 11
- Note that awarding a pass mark is subject to meeting each ECSA Graduate Attribute assessed in this module, as stated in Faculty of Engineering's Assessment Rule

Calculation of final marks (according to formulas in the Faculty of Engineering's Assessment Rules):

Project assessment: final mark awarded after evaluation of project, presentation and poster session.

## 2 Language of Tuition

- The language of tuition in this module is according to the Faculty's approved Language Implementation Plan. Please refer to the website of the Engineering Faculty or the "General Information" block on SUNLearn for the particulars.

## 3 Module Objectives

Aim: To complete an individual project involving project planning, problem identification, problem solving, design, implementation, evaluation and documentation.

A student who has successfully completed this module can/This module develops students' abilities to:

- Take responsibility for planning a project and for independent learning
- Identify engineering problems and solve them
- Apply scientific and engineering knowledge
- Design engineering solutions
- Design and conduct investigations and experiments and analyse results
- Use appropriate engineering methods, skills and tools
- Document and communicate methods and results

See the listed ECSA GAs for further details.

<sup>1</sup> Available on SUNLearn for modules offered by Faculty of Engineering, in the block titled "General Programme Information" on the side of the screen

## 4 Module Content and Schedule

Prescribed textbook(s): NA		
Week	Topic	Contact Session/Assignments
All semester weeks	Project work.	Each student must regularly meet with their project study leader.
6 November, 12:00	Project report hand in deadline. Hand in electronically via SUNLearn. Penalty for late submission is 5% per half day.	N/A
Nov 9- 17	Oral presentations and internal examination in this period.	N/A
Nov 11, 23:59	Deadline to voluntarily upload a PDF version of the oral presentation slides. These slides will only be relevant for "Case 2" assessments. In case of failure to upload the slides, the Case 2 option falls away.	N/A
Nov 21/22	Project open day. You must be in attendance and present your poster. This is a requirement for passing the module.	N/A

## 5 ECSA Knowledge Area Credits

Mathematical Sciences	Natural Sciences	Engineering Sciences	Design and Synthesis	Complementary Studies
0	0	0	38	7
<u>Design and Synthesis</u> : A project involving design and synthesis must be completed.				
<u>Complementary Studies</u> : The work involves project planning, documentation and presentation.				

## 6 ECSA Graduate Attribute (GA)

Students are required to complete individual projects, each supervised by a staff member. The problems are varied and contain convergent and divergent aspects, and are of a higher level of complexity than that of Design 314. No structured problem solving method is enforced in a group context.

**GA 1. Problem solving:** Identify, formulate, analyse and solve complex engineering problems creatively and innovatively.

How is the Outcome Assessed?	<p>Assessment is based on a written project report and an oral examination (for Cases 1 and 2), possibly also accompanied by the student's oral presentation slides (only for Case 2). In the project report, the student is required to indicate how they have achieved this outcome by referring to the relevant parts of their report. The oral examination is carried out by two internal examiners under supervision of a convener.</p> <p>The two internal examiners and one external moderator must indicate explicitly on the assessment forms that the student has complied with the required outcome.</p> <ul style="list-style-type: none"> <li>• <b>Case 1:</b> The project report provides the evidence. The internal oral examination's contribution to this assessment is only to aid the two internal examiners' understanding of the evidence on record (i.e. the report).</li> <li>• <b>Case 2:</b> The GA is not achieved with the report, but the presentation slides provide sufficient additional documented evidence for its achievement. A copy of the slides must be attached to the report. A maximum mark of 50% applies.</li> </ul> <p>Also see the assessment forms.</p>
What is Satisfactory Performance?	<p>Using the assessment opportunities, the student must show that they satisfy this GA at a level consistent to that at which a graduate would participate within an employment situation shortly after graduation. This GA entails the following:</p> <ul style="list-style-type: none"> <li>• Solving complex engineering problems requires in-depth fundamental and specialized engineering knowledge; and problems have one or more of the characteristics: <ol style="list-style-type: none"> <li>1. are ill-posed, under- or over-specified, or require identification and refinement;</li> <li>2. are high-level problems including component parts or sub-problems;</li> <li>3. are unfamiliar or involve infrequently encountered issues;</li> </ol> </li> <li>• The solutions have one or more of these characteristics: <ol style="list-style-type: none"> <li>1. are not obvious, require originality or analysis based on fundamentals;</li> <li>2. are outside the scope of standards and codes;</li> <li>3. require information from variety of sources that is complex, abstract or incomplete;</li> <li>4. involve wide-ranging or conflicting issues: technical, engineering and interested or affected parties.</li> </ol> </li> </ul>
What is the consequence of unsatisfactory performance?	If the candidate has not achieved the outcome, he/she cannot pass.

**GA 2. Application of scientific and engineering knowledge:** Apply knowledge of mathematics, natural sciences, engineering fundamentals and an engineering speciality to solve complex engineering problems.

How is the Outcome Assessed?	In the same way as GA 1 (see the GA 1 assessment description).
What is Satisfactory Performance?	Using the assessment opportunities, the student must show that they satisfy this GA at a level consistent to that at which a graduate would participate within an employment situation shortly after graduation. This GA entails the following: <ul style="list-style-type: none"> <li>Mathematics, natural science and engineering sciences are applied in formal analysis and modelling of engineering situations, and for reasoning about and conceptualizing engineering problems.</li> </ul>
What is the consequence of unsatisfactory performance?	If the candidate has not achieved the outcome, he/she cannot pass.

**GA 3. Engineering Design:** Perform creative, procedural and non-procedural design and synthesis of components, systems, engineering works, products or processes.

How is the Outcome Assessed?	In the same way as GA 1 (see the GA 1 assessment description).
What is Satisfactory Performance?	Using the assessment opportunities, the student must show that they satisfy this GA at a level consistent to that at which a graduate would participate within an employment situation shortly after graduation. This GA entails the following: <ul style="list-style-type: none"> <li>The design problem must conform to the definition of a complex engineering problem (refer to GA 1) and should be a major electrical and/or electronic engineering design problem.</li> </ul>
What is the consequence of unsatisfactory performance?	If the candidate has not achieved the outcome, he/she cannot pass.

**GA 4. Investigations, experiments and data analysis:** Demonstrate competence to design and conduct investigations and experiments.

How is the outcome Assessed?	In the same way as GA 1 (see the GA 1 assessment description).
What is Satisfactory Performance?	Using the assessment opportunities, the student must show that they satisfy this GA at a level consistent to that at which a graduate would participate within an employment situation shortly after graduation. This GA entails the following: <ul style="list-style-type: none"> <li>The balance of investigation and experiment should be appropriate to electrical and/or electronic engineering. Research methodology to be applied in research or investigation where the student engages with selected knowledge in the research literature of electrical and/or electronic engineering.</li> </ul>
What is the consequence of unsatisfactory performance?	If the candidate has not achieved the outcome, he/she cannot pass.

**GA 5. Engineering methods, skills and tools, including Information Technology:** Demonstrate competence to use appropriate engineering methods, skills and tools, including those based on information technology.

How is the Outcome Assessed?	In the same way as GA 1 (see the GA 1 assessment description).
What is Satisfactory Performance?	Using the assessment opportunities, the student must show that they satisfy this GA at a level consistent to that at which a graduate would participate within an employment situation shortly after graduation. This GA entails the following: <ul style="list-style-type: none"> <li>• A range of methods, skills and tools appropriate to electrical and/or electronic engineering including: <ol style="list-style-type: none"> <li>1. Discipline-specific tools, processes or procedures;</li> <li>2. Computer packages for computation, modelling, simulation, and information handling;</li> <li>3. Computers and networks and information infrastructures for accessing, processing, managing, and storing information to enhance personal productivity.</li> </ol> </li> </ul>
What is the consequence of unsatisfactory performance?	If the candidate has not achieved the outcome, he/she cannot pass.

**GA 6. Professional and technical communication:** Demonstrate competence to communicate effectively, both orally and in writing, with engineering audiences and the community at large.

How is the Outcome Assessed?	Assessment is based on a written project report, an oral presentation and a poster presentation (the latter is open to the general public). The oral presentation is assessed by the two internal examiners and the poster presentation is assessed by the external moderator. The two internal examiners and one external moderator must indicate explicitly on the assessment forms that the student has complied with the required outcome. Also see the assessment forms.
What is Satisfactory Performance?	Using the assessment opportunities, the student must show that they satisfy this GA at a level consistent to that at which a graduate would participate within an employment situation shortly after graduation. This GA entails the following: <ul style="list-style-type: none"> <li>• Material to be communicated is in an academic or simulated professional context. The audience for the report and presentation is engineering peers and management, while the poster is aimed at lay persons, using appropriate academic or professional discourse. The long written report (10 000 to 15 000 words plus tables, diagrams and appendices) covers material at exit-level. Methods of providing information include the conventional methods of electrical and/or electronic engineering.</li> </ul>
What is the consequence of unsatisfactory performance?	If the candidate has not achieved the outcome, he/she cannot pass.

**GA 8. Individual work:** Demonstrate competence to work effectively as an individual.

How is the Outcome Assessed?	In the same way as GA 1 (see the GA 1 assessment description).
What is Satisfactory Performance?	Using the assessment opportunities, the student must show that they satisfy this GA at a level consistent to that at which a graduate would participate within an employment situation shortly after graduation.
What is the consequence of unsatisfactory performance?	If the candidate has not achieved the outcome, he/she cannot pass.

**GA 9. Independent Learning Ability:** Demonstrate competence to engage in independent learning through well-developed learning skills.

How is the Outcome Assessed?	In the same way as GA 1 (see the GA 1 assessment description).
What is Satisfactory Performance?	Using the assessment opportunities, the student must show that they satisfy this GA at a level consistent to that at which a graduate would participate within an employment situation shortly after graduation. This GA entails the following: <ul style="list-style-type: none"> <li>• 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.</li> </ul>
What is the consequence of unsatisfactory performance?	If the candidate has not achieved the outcome, he/she cannot pass.

## 7 Other Module Specific Information

### 7.1 Responsibilities and Student's GA Achievement Plan

The candidate makes an appointment with the project leader as soon as possible after the announcement of the project allocations, but not later than the first week of the second semester. At this meeting, the aims, methods, requirements and planning of the project are discussed. The final project proposal is summarised in the form of the agreement titled *"Responsibilities and Student's GA Achievement Plan"* (attached and also made available via the module website). This agreement between the project leader and the candidate clearly states the expectations and responsibilities of both parties. The student must also explicitly explain in this document how they aim to achieve **all** the required the GAs. The agreement must be completed by the end of the 4th week of the second semester and submitted via SUNLearn.

The project leader and the candidate must agree on a time for their weekly appointments.

**The project study leader must give guidance to the candidate by:**

- Making the candidate aware of the departmental policy with regard to the course module;
- Honouring the weekly appointments with the candidate;
- Verifying on a continuous basis that the candidate has clarity with regard to the aims of the project, and that the candidate's planning for the project is a true reflection of the aims;
- Monitoring the progress of the project, and encouraging the student to have a critical approach to the problem;
- Spelling out the consequences of plagiarism;
- Explanation of the importance of effective communication;
- Emphasising the importance of verification that all the outcomes were satisfied;
- Giving feedback at least once, with regards to a draft version of the report.

**During the execution of the project the candidate must:**

- Adhere to the policy with regard to the course module, and ensure that all due dates are honoured;
- Attend the weekly appointments with the project leader;
- With the exception of field measurements and report writing, work in the buildings of the Faculty as much as possible;
- Verify that all the ECSA Graduate Attributes are satisfied;
- Compile a planning schedule (Appendix A in project report) for the project. The candidate must present a preliminary planning schedule by the second week of the semester to their project leader.

## 7.2 Evaluation

The final mark is determined by evaluation of the following:

- Project report
- Oral presentation
- Poster presentation

Each project is internally evaluated by two examiners and then externally moderated. The two internal examiners determine whether all the claimed outcomes are achieved and award a preliminary, consensus mark. In case no fail/pass consensus is achieved by the two internal examiners, a third internal examiner is appointed.

The external moderator is responsible for the final verification of outcomes and determination of the final mark. They have access to the examination reports of the internal examiners, as well as the project reports (and possibly the presentation slides in special cases --- see "Case 2" below) and the poster presentation. The final marks are verified by the external moderator with their signature. That is the final certification of achievement of claimed outcomes. Penalties for late submission are subtracted from these final marks. The marks are then verified by the internal module moderator, as appointed by the Departmental Executive.

### **Notes on Case 2:**

- ***"Case 2" above provides the student with the opportunity to extend/finish their work during the period between report hand in and the oral, in case critical content is absent from the report such that they might likely fail the "Case 1" assessment.***
- ***Case 2 limits the mark to  $\leq 50\%$ .***
- ***It is recommended that the student informs their project leader ahead of the oral, of their intention to present significant further work at the oral through comprehensive documentation via their slides, with an aim towards achieving outcomes which otherwise might likely not be achieved.***
- ***Additional work beyond the contents of the report, which is presented at the oral, will not be taken into account for a Case 1 assessment.***
- ***Presenting additional work at the oral does not automatically place the student in the Case 2 category.***
- ***Case 2 is only engaged when it is to the benefit of the student.***
- ***It is the student's responsibility to upload their slides to the module website by the deadline indicated. Students will not be informed that they will be regarded as Case 2. Failure to upload slides will lead to the assessment reverting back to Case 1.***

The evaluation forms are attached.



## 7.3 Project report

An electronic copy (PDF) of the project report must be submitted via the module website by the due date and time as specified in the module schedule above. TurnItIn will be used to detect plagiarism.

**Please format the file name of your uploaded file as follows:**

(studentnumber)\_(surname)\_(initials)\_skripsie(year).pdf

**Example:** 1234567\_Bloggs\_PJ\_skripsie2015.pdf

**The required report format is as follows:**

- Typeset on A4 paper with 12-point font.
- Maximum length of the body of the report: 40 pages (the body starts on the first page of the Introduction and ends on the last page of the Conclusion).
  - 10% may be deducted from the final mark for an over-length report.
- All tables, graphs, diagrams and photos must be numbered and have captions.
- Margins: left 2.5 cm, right 2.5 cm, top 2.5 cm, bottom 2.5 cm.

**The required report sections are:**

- Title page, with the following:
  - Project title
  - Name of candidate.
  - Student number of the candidate.
  - The words "Report submitted in partial fulfilment of the requirements of the module Project (E) 448 for the degree Baccalaureus in Engineering in the Department of Electrical and Electronic Engineering at the University of Stellenbosch".
  - STUDY LEADER: (Name of lecturer(s));
  - DATE: (Month and Year).
- Page with acknowledgements.
- A page with the official SU plagiarism declaration, signed.
- Page with summary(ies) in Afrikaans and/or English, each maximum of 150 words.
- Table of Contents.
- Lists with figures, tables and symbols.
- Chapter 1: Introduction, where the background to the project and the project aims are described. A short summary of the report can also be given.
- Chapters 2..N-1: Body of the report, and results. Be precise and concise.
- Chapter N: Conclusions and recommendations.
- Literature references using IEEE or Harvard format.
- Appendix A: Project planning schedule.
- Appendix B: Outcomes compliance. State explicitly how each of the required ECSA outcomes were achieved during the execution of the project, with reference to the relevant report sections.
- Appendices, that may include circuit diagrams, measured data, derivations, programs, printouts, etc. Note examiners will mostly look at the main body in evaluating your work.



## 7.4 Oral examination

- The oral examination is used in conjunction with the main report to determine the extent to which the candidate was able to satisfy the outcomes of the module.
- The module coordinator appoints two internal examiners, consisting of the project leader and another lecturer, as well as a convener for the oral. The module coordinator gives a copy of the project report to each of the examiners.
- The format of the oral examination is as follows:
- The evaluation is chaired by the convener of the oral.
- The candidate has 10 minutes for their oral presentation. This might be via an uploaded video or virtual/in-person presentation. For in-person presentation the use of the provided projector is advised; organize a laptop yourself (ask your project leader if needed).
- The two internal examiners can ask questions to determine the extent to which the candidate has mastered the work and the candidate is excused.
- The study leader gives an indication of the extent of the guidance that was required by the candidate.
- The preliminary reports from the two internal examiners, with their preliminary mark allocation, are handed to the convener. The evaluations are based on the evaluation form and ensure that all the required outcomes were considered in awarding the preliminary mark.
- The consensus outcomes assessment and recommended final mark are determined after discussion. The following recommendations are possible (subject to the verification of the external moderator):
- The candidate passes with  $PP \geq 50\%$  upon evidence of the report.
- The candidate passes with  $PP = 50\%$ , upon evidence of both the report and the presentation slides.
- The candidate fails with  $PP < 50\%$ . The course module must be repeated with a different topic. Note that there is no option for improvement of the work/report beyond this point.
- In the case where the examiners cannot reach pass/fail consensus, a third internal examiner is appointed by the module coordinator.
- Afterwards, it is the responsibility of the Convenor to hand over the two preliminary evaluation forms and the convener report form containing the recommended final mark, to the project coordinator, via a departmental administrative officer.

## **7.5 Open Day and poster presentation**

The external moderators conduct their moderation work directly after completion of the internal examination process. The Project Open Day is scheduled to coincide with the completion of their work. Every candidate must prepare a poster that is presented at the Project Open Day. The poster (A1 size) must give an overview of the scope of the project, as well as the main results. The candidate must also prepare a short oral presentation (3 minutes maximum) to give the external moderators an overview of the project, if so requested.

The final verification of the claimed outcomes and mark cannot take place in the absence of the candidates, and attendance of the Project Open Day is therefore compulsory. Non-attendance will lead to an incomplete assessment for the module.

## **7.6 A note on project assignment**

This happens during the first semester. Individual preference data collection from students is accomplished via the module website and a cut-off date for students to submit their preferences is communicated via the website. Based on the preference data, students are assigned to supervisors. The assignments are made known before the end of the examination period of the first semester. Students are strongly advised to make an appointment with their project supervisors before the start of the July vacation in order to be able to make preliminary preparations during the vacation period. Students must however schedule this appointment not later than the first week of the second semester.

## **7.7 Communication with students**

SUNLearn will be used as the primary channel of communication when disseminating information about this module.

## **7.8 Forms**

The project agreement form and assessment forms are attached.

Each examiner must complete this form independently, and then hand it over to the convener.

## Student

Initials and surname		SU number	
Project title			

## Internal examiner

Initials and surname	Signature	Role (tick one)
		<input type="radio"/> Supervisor <input type="radio"/> 2nd examiner

## Grading assessment

<b>Only for Case 2:</b> Tick if the <b>oral presentation slides</b> provide <b>necessary evidence</b> in order to achieve certain GAs, and list those GA numbers (in this case a mark of $\leq 50\%$ must be awarded) <input type="checkbox"/> GA(s): _____	
Preliminary mark • Provide a percentage, or percentage range • Failed GA(s) $\Rightarrow \leq 45\%$	
Comments in support of the preliminary assessment:	

## Graduate attribute (GA) assessment

<b>Recorded evidence requirements, for GA achievement at the level expected of a recent graduate</b> • <b>GAs 1–5, 8 and 9:</b> ○ <b>Case 1:</b> The project report provides the evidence. The internal oral exam's contribution is only to aid internal examiners' understanding of the evidence on record (i.e. the report). ○ <b>Case 2:</b> Some GAs are not achieved with the report, but the presentation slides provide evidence for their achievement. These GAs may be marked as achieved, provided that a copy of the slides is attached to the report. A maximum mark of 50% applies. • <b>GA 6:</b> The project report (written communication) AND a satisfactory oral (oral communication)	Tick one in each row			
	Student satisfies the GA criteria, taken as a whole		Student fails to satisfy the GA criteria, taken as a whole	
	Satisfied	Marginally satisfied	Marginally not satisfied	Not satisfied

<b>GA 1: Problem solving</b> (identify, formulate, analyse and solve complex engineering problems creatively and innovatively) <ul style="list-style-type: none"> <li>Solving complex engineering problems requires in-depth fundamental and specialized engineering knowledge; and problems have one or more of the characteristics: <ol style="list-style-type: none"> <li>are ill-posed, under- or over-specified, or require identification and refinement;</li> <li>are high-level problems including component parts or sub-problems;</li> <li>are unfamiliar or involve infrequently encountered issues;</li> </ol> </li> <li>The solutions have one or more of these characteristics: <ol style="list-style-type: none"> <li>are not obvious, require originality or analysis based on fundamentals;</li> <li>are outside the scope of standards and codes;</li> <li>require information from variety of sources that is complex, abstract or incomplete;</li> <li>involve wide-ranging or conflicting issues: technical, engineering and interested or affected parties.</li> </ol> </li> </ul>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
<b>GA 2: Application of scientific and engineering knowledge</b> (apply knowledge of mathematics, natural sciences, engineering fundamentals and an engineering speciality to solve complex engineering problems) <ul style="list-style-type: none"> <li>Mathematics, natural science and engineering sciences are applied in formal analysis and modelling of engineering situations, and for reasoning about and conceptualizing engineering problems.</li> </ul>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
<b>GA 3: Engineering design</b> (perform creative, procedural and non-procedural design and synthesis of components, systems, engineering works, products or processes) <ul style="list-style-type: none"> <li>The design problem must conform to the definition of a complex engineering problem (refer to GA 1) and should be a major electrical and/or electronic engineering design problem.</li> </ul>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
<b>GA 4: Investigations, experiments and data analysis</b> (demonstrate competence to design and conduct investigations and experiments) <ul style="list-style-type: none"> <li>The balance of investigation and experiment should be appropriate to electrical and/or electronic engineering. Research methodology to be applied in research or investigation where the student engages with selected knowledge in the research literature of electrical and/or electronic engineering.</li> </ul>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
<b>GA 5: Engineering methods, skills and tools, including information technology</b> (demonstrate competence to use appropriate engineering methods, skills and tools, including those based on information technology) <ul style="list-style-type: none"> <li>A range of methods, skills and tools appropriate to electrical and/or electronic engineering including: <ol style="list-style-type: none"> <li>Discipline-specific tools, processes or procedures;</li> <li>Computer packages for computation, modelling, simulation, and information handling;</li> <li>Computers and networks and information infrastructures for accessing, processing, managing, and storing information to enhance personal productivity.</li> </ol> </li> </ul>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
<b>GA 6: Professional and technical communication</b> (demonstrate competence to communicate effectively, both orally and in writing, with engineering audiences and the community at large) <ul style="list-style-type: none"> <li>Material to be communicated is in an academic or simulated professional context. The audience for the report and presentation is engineering peers and management, while the poster is aimed at lay persons, using appropriate academic or professional discourse. The long written report (10 000 to 15 000 words plus tables, diagrams and appendices) covers material at exit-level. Methods of providing information include the conventional methods of electrical and/or electronic engineering.</li> </ul>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
<b>GA 8: Individual work</b> (demonstrate competence to work effectively as an individual)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
<b>GA 9: Independent learning ability</b> (demonstrate competence to engage in independent learning through well-developed learning skills) <ul style="list-style-type: none"> <li>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.</li> </ul>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

After receiving the two examiner reports the convener facilitates a discussion between the two examiners, with the aim of establishing a consensus assessment, which is documented here.

In case consensus GA succeed/fail assessment(s) differ from one/both examiner's report(s), or no consensus occurs, then the convener must document the examination panel's motivations.

The convener returns the completed convener and two examiner reports to the module administrator.

## Student

Initials and surname		SU number	
Project title			

## Internal examination panel

Role	Initials and surname	Signature
Supervisor (and 1st examiner)		
2nd examiner		
Convener		
Date		Time

## Grading consensus assessment

Fill only for Case 2 slide-based GA achievement **and/or** failed GAs **and/or** failure to achieve consensus

☐ **Case 2:** Tick and list if GA(s) are achieved by consensus, on **presentation slide evidence**.

GA(s): \_\_\_\_\_

☐ Tick in case **consensus was reached** that one or more GAs are **not** achieved.

☐ Tick in case **consensus was not reached** on one or more GAs.

☐ Tick in case **consensus was not reached** on the mark.

## Recommended mark

- In case of slide-based GA evidence, ≤50% must be awarded
- In case of consensus on ANY failed GA(s), ≤45% must be awarded
- In case of NO mark consensus, provide both internal examiner marks (no ranges, supervisor first, 2nd examiner second)

Comments in support of the recommended mark –OR– Reason(s) for no mark consensus (only needed if these are different from the provided reasons for GA non-consensus):

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### Graduate attribute (GA) consensus assessment

Recorded evidence requirements, for GA achievement at the level expected of a recent graduate	Tick one in each row				
		Student satisfies the GA criteria, taken as a whole		Student fails to satisfy the GA criteria, taken as a whole	
<ul style="list-style-type: none"> <li><b>GAs 1–5, 8 and 9:</b> <ul style="list-style-type: none"> <li><b>Case 1:</b> The project report provides the evidence. The internal oral exam's contribution is only to aid internal examiners' understanding of the evidence on record (i.e. the report).</li> <li><b>Case 2:</b> Some GAs are not achieved with the report, but the presentation slides provide evidence for their achievement. These GAs may be marked as achieved, provided that a copy of the slides is attached to the report. A maximum mark of 50% applies.</li> </ul> </li> <li><b>GA 6:</b> The project report (written communication) AND a satisfactory oral (oral communication)</li> </ul>	No consensus	Satisfied	Marginally satisfied	Marginally not satisfied	Not satisfied
<b>GA 1: Problem solving</b> (identify, formulate, analyse and solve complex engineering problems creatively and innovatively)		<input type="radio"/>	<input type="radio"/>		
<b>GA 2: Application of scientific and engineering knowledge</b> (apply knowledge of mathematics, natural sciences, engineering fundamentals and an engineering speciality to solve complex engineering problems)		<input type="radio"/>	<input type="radio"/>		
<b>GA 3: Engineering design</b> (perform creative, procedural and non-procedural design and synthesis of components, systems, engineering works, products or processes)		<input type="radio"/>	<input type="radio"/>		
<b>GA 4: Investigations, experiments and data analysis</b> (demonstrate competence to design and conduct investigations and experiments)		<input type="radio"/>	<input type="radio"/>		
<b>GA 5: Engineering methods, skills and tools, including information technology</b> (demonstrate competence to use appropriate engineering methods, skills and tools, including those based on information technology)		<input type="radio"/>	<input type="radio"/>		
<b>GA 6: Professional and technical communication</b> (demonstrate competence to communicate effectively, both orally and in writing, with engineering audiences and the community at large)		<input type="radio"/>	<input type="radio"/>		
<b>GA 8: Individual work</b> (demonstrate competence to work effectively as an individual)		<input type="radio"/>	<input type="radio"/>		
<b>GA 9: Independent learning ability</b> (demonstrate competence to engage in independent learning through well-developed learning skills)		<input type="radio"/>	<input type="radio"/>		
Motivation for every GA where succeed/fail consensus differs from examiner report(s), or with no consensus:					



*The external moderator makes an assessment of the work, based upon the internal examination panel's reports, the project report (possibly with attached oral presentation slides) and the poster.*

## Student

Initials and surname		SU number	
Project title			

## External moderator

Initials and surname	Signature	Date

## Grading assessment

Are all GAs achieved? ( <i>tick one</i> )		<input type="checkbox"/> Yes	<input type="checkbox"/> No
Internal, recommended consensus mark (from convener form)		External, final mark • Slide-based GA evidence $\Rightarrow \leq 50\%$ • Failed GA(s) $\Rightarrow \leq 45\%$	
Comments:			

### Graduate attribute (GA) assessment

Recorded evidence requirements, for GA achievement at the level expected of a recent graduate	Tick one in each row	
	Student satisfies the GA criteria, taken as a whole	Student fails to satisfy the GA criteria, taken as a whole
<ul style="list-style-type: none"> <li>• <b>GAs 1–5, 8 and 9:</b> <ul style="list-style-type: none"> <li>○ <b>Case 1:</b> The project report provides the evidence. The external poster session's contribution is only to aid external moderators' understanding of the evidence on record (i.e. the report).</li> <li>○ <b>Case 2:</b> Some GAs are not achieved with the report, but the presentation slides provide evidence for their achievement. These GAs may be marked as achieved, provided that a copy of the slides is attached to the report. A maximum mark of 50% applies.</li> </ul> </li> <li>• <b>GA 6:</b> The project report (written communication) AND satisfactory internal oral + satisfactory external poster (oral communication)</li> </ul>		
<b>GA 1: Problem solving</b> (identify, formulate, analyse and solve complex engineering problems creatively and innovatively) • Evaluation criteria as on internal examiner form	○	○
<b>GA 2: Application of scientific and engineering knowledge</b> (apply knowledge of mathematics, natural sciences, engineering fundamentals and an engineering speciality to solve complex engineering problems) • Evaluation criteria as on internal examiner form	○	○
<b>GA 3: Engineering design</b> (perform creative, procedural and non-procedural design and synthesis of components, systems, engineering works, products or processes) • Evaluation criteria as on internal examiner form	○	○
<b>GA 4: Investigations, experiments and data analysis</b> (demonstrate competence to design and conduct investigations and experiments) • Evaluation criteria as on internal examiner form	○	○
<b>GA 5: Engineering methods, skills and tools, including information technology</b> (demonstrate competence to use appropriate engineering methods, skills and tools, including those based on information technology) • Evaluation criteria as on internal examiner form	○	○
<b>GA 6: Professional and technical communication</b> (demonstrate competence to communicate effectively, both orally and in writing, with engineering audiences and the community at large) • Evaluation criteria as on internal examiner form	○	○
<b>GA 8: Individual work</b> (demonstrate competence to work effectively as an individual)	○	○
<b>GA 9: Independent learning ability</b> (demonstrate competence to engage in independent learning through well-developed learning skills) • Evaluation criteria as on internal examiner form	○	○

## Project (E) 448      Responsibilities & Student's GA Achievement Plan      Ver2.1

*This form must be filled out by the student, signed and handed in to the module administrator early in the semester. Both the student and the supervisor must sign the agreement on main details and mutual responsibilities. The student should discuss their GA achievement plan with the supervisor, before completing this form. Only the student signs their GA achievement plan, as it is their own responsibility. **This plan is NOT a guaranteed recipe for passing Project (E) 448.** Rather, it serves as a record of the student having considered these important aspects at an appropriately early stage. GA achievement plans should be revised as needed and in consultation with the supervisor, during the course of the project.*

### Main details

Student	Initials and surname		SU number	
Supervisor	Initials and surname			
Project title				
Project description, including the aim, scope and envisioned approach (max. 150 words)				

### Mutual responsibilities

1. It is the responsibility of the student to clarify aspects such as the definition and scope of the project, the place of study, research methodology, reporting opportunities and -methods (e.g. progress reports, internal presentations and conferences) with the supervisor.
2. It is the responsibility of the supervisor to give regular guidance and feedback with regard to the literature, methodology and progress.
3. The rules regarding submission and evaluation of the project is outlined in the module framework and SUNLearn page and will be strictly adhered to.
4. The supervisor conveyed the departmental view on plagiarism to the student, and the student acknowledges the seriousness of such an offence.
5. The supervisor certifies that the project as described above has sufficient scope to achieve, in principle, the required GAs.
6. It is the responsibility of the student to initiate a discussion with the supervisor on GA achievement prior to filling out and handing in this form.

### Signatures for agreement on main details and mutual responsibilities

Role	Signature	Date
Student		
Supervisor		

### Student's graduate attribute (GA) achievement plan

How will GA 1 ( <b>problem solving</b> ) be achieved? ( <i>&lt;=100 words</i> )
How will GA 2 ( <b>application of scientific and engineering knowledge</b> ) be achieved? ( <i>&lt;=100 words</i> )
How will GA 3 ( <b>engineering design</b> ) be achieved? ( <i>&lt;=100 words</i> )
How will GA 4 ( <b>investigations, experiments and data analysis</b> ) be achieved? ( <i>&lt;=100 words</i> )
How will GA 5 ( <b>engineering methods, skills and tools, including IT</b> ) be achieved? ( <i>&lt;=100 words</i> )
How will GA 6 ( <b>professional and technical communication</b> ) be achieved? ( <i>&lt;=100 words</i> )
The project includes a written report and an oral presentation. These demonstrate competence to communicate effectively, both orally and in writing.
How will GA 8 ( <b>individual work</b> ) be achieved? ( <i>&lt;=100 words</i> )
The student will take primary responsibility for successful completion of all aspects of the project.
How will GA 9 ( <b>independent learning ability</b> ) be achieved? ( <i>&lt;=100 words</i> )
For successful completion of the project, the student is required to acquire knowledge independently (from the literature or the internet, for example) and without the context of this required knowledge being fully specified in the project definition.

### Signature acknowledging own responsibility to achieve GAs

	Signature	Date
Student		