Prifysgol Cymru
Y Drindod Dewi Sant
University of Wales
Trinity Saint David

APPENDIX GA36c

LEVEL 6 ASSESSMENT SPECIFICATION

Student name:		**Student ID number:**	
Programme:	OME		
Module:	Structural Mechanics		
Module code:	ACDA6009	**Contribution to Overall Module Assessment (%):**	50%
Lecturer:	Paul Cullen	**Internal Verifier:**	
Assignment Title:	Deflection of cantilever beams	**Word count (or equivalent):**	2500
Submission deadline:	**16/12/2022**	**Return date of provisional marks & written feedback:**	**13/01/2023**
Submission method:	All written assessments, where practical and possible, must be submitted via Turnitin unless otherwise instructed by the Lecturer. (Please DO NOT put this assessment specification into Turnitin or it will match many similarities with other students' submissions.) **Alternative submission method (if applicable):** **Late submission of the assessment will result in a late penalty mark.** Penalties for late submission: Up to one week late, maximum mark of 40%. Over one week late, 0%. Only the Extenuating Circumstances Panel may approve a change to submission dates.		
Academic honesty / referencing:	Academic honesty is required. In the main body of your submission you must give credit to authors on whose research and ideas your work is based. Append to your submission a reference list that indicates the books, articles, etc. that you have used, cited or quoted in order to complete this assessment.		

Module Learning Outcomes
(from module syllabus)

1. Demonstrate a systematic understanding of the similarities and differences between different classes of material
2. Critically analyse how a particular material would behave in a scenario relevant to trials activities
3. Validate material models against empirical trials

TASK DESCRIPTION

Aims and Objectives

To demonstrate your ability to describe Macaulay's Method.

To conduct a beam deflection test on beams of different materials.

To compare experimental results with calculated and comment upon any differences.

Introduction

A test rig is being designed that consists of a cantilever beam supporting a piece of test equipment. For initial design purposes the structure can be considered to be a point load at the end of the beam.

A company that designs and builds this type of test rig has asked you to carry out a preliminary investigation into the deflection of materials in beam form; the materials are from two class of metal, ferrous and non-ferrous.

Your task is to carry out indicative deflection calculations using Macaulay's method and validate the calculations by test.

The client's design team will use your report information in initial designs ahead of building the test rig.

Tasks

1. Conduct a beam deflection test on beams of different materials (brass and mild steel).
    a. Set the specimen in a test rig as a cantilever beam. Using the simply supported method,
    b. measure the beam deflection for each beam varying the applied (refer to the lab sheet supplied).
2. Using Macaulay's method calculate the deflections (use of MS excel or similar would be advantageous).
3. Compare the calculated deflections with measured deflections.
4. Write a professional report of your findings; a suggested report structure is provided below:

The following guide may help you structure your report:

1. **Title Page**
2. **Abstract –** A summary of a technical report briefly summarises the report. It should describe motivations, methods, results, and conclusions. Be concise in the abstract. Think of an abstract as a one-paragraph summary of the report. (Abstract – before the table of contents, Summary – after the table of contents)
3. **Table of Contents**
4. **Introduction –** The introduction of a technical report represents the subject, the purpose, and the plan of the development of your report. Writing the introduction, you should keep in mind that your main aim is to introduce your readers to the problem that you are setting out to solve in the course of your technical report. It is important to highlight the **aims** and **objectives** of the experiment.
5. **Background Theory –** This section includes some brief background information to get your readers acquainted with the concepts/theories relating to the experiments.
6. **Experimental Procedure and Equipment -** This is the section where details of the experiments (including its procedures) are outlined. Think of experimental details section as a recipe in a cookbook. The description must contain enough details to enable someone else to duplicate the experiment.
7. **Results –** this is where the results of the experiment are reported and any calculations presented.
8. **Discussion –** This is where findings and results are discussed. Any significance in the results must be made clear by detailed analysis and discussions. Any discrepancies should be discussed.

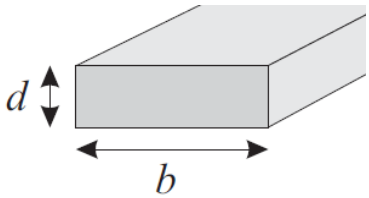
9. **Conclusions –** Conclude what was presented in the Results and Discussion sections. Do not conclude anything that had not been discussed. Think of the conclusion as a short restatement of important findings from the experiment.
10. **Recommendations –** how could the experiment be improved?
11. **References and Appendices**

When preparing your analysis, you are free to make assumptions. However, all assumptions must be clearly stated and justified in your report. You are expected to do additional research and reading as part of this assignment.

All source material must be referenced according to the Harvard Referencing system.

Useful Data

Material	Young's Modulus E (Pa)
Aluminium Alloy	69×10^9 (69 GPa)
Brass	105×10^9 (105 GPa)
Mild Steel	200×10^9 (200 GPa)



Second moment of area given by:

$$I = \frac{bd^3}{12}$$

GUIDANCE FOR STUDENTS IN THE COMPLETION OF TASKS

You are required to present an electronic report containing detailed observational notes of your work. The report must contain 2500 words and should be preceded by a title page, table of contents and list of figures (which are not part of the word count):-

Your title page for the report should contain the following information:

Course:	
Module:	ACDA6009 Structural Mechanics
Assignment:	Deflection of beams
Name:	?????? ??????
University number:	XXXXXXX
Date submitted:	DD/MM/YYYY
Word count:	?????

Further guidance:

- Do not use a styled document (template) and don't add your company logo.
- Do not include photographs of course notes or formative classroom work.
- All pages and figures must be numbered and listed in the Table of Contents and List of Figures.
- There is no need to include whole data sheets; simply cite their source or include a "snip" of the relevant information.
- Write all sections in the third person.
- Note which sections of your report have been identified above as places where the marks will be awarded and use your word allocation wisely.
- Save your report as a .pdf with your university number as the file name.
- The TurnIt-In rubric will be used to record your marks and provide you with tutor feedback.
- Use Arial font size 11pt, with full justification of paragraphs and 1.5 line spacing with pages numbering set to bottom centred. This all makes your report easier to mark and allows your tutor room to add comments. It will also incur more marks for transferrable skills.
- To reduce your word count, avoid telling a story of how you carried out your work, simply focus on the end product and explain it. This is not a journal!

Going Over the Word Limit

If you are found to have exceeded the specified word limit for an assessment, your work may be subject to a penalty:

- Under length - No penalty, but your work is probably missing key information
- Up to 10% over length - No deduction off final mark
- 11% or more over length - Deduction of 5 marks off final mark (but cannot reduce mark below 40%)

To measure the word count, DO NOT use Turnit-In and do not include the following:

- Assignment brief
- Index, Table of Contents and Table of Figures
- Executive Summary
- Formula and calculations (use MSEquation or text boxes to contain these)
- Reference list or bibliography

- Appendices used for: large results tables, computer code listings, data sheet extracts and any other 3rd party information

Spot checking of declared word counts will be carried out by your lecturer and second marker.

The executive summary must be written in non-technical language and it must outline all that is contained in the report. It must also be written in the past tense using around 300 words but these will not be included in the overall word count. You will be assessed against the following common assessment criteria. The Turnit-in rubric will be used to record your marks with your tutor's feedback.

NOTE: The guidance offered below is linked to the five generic assessment criteria overleaf.
Significant differences from level 5 are highlighted in red.

1. Engagement with Literature Skills

Your work must be informed and supported by scholarly material that is *relevant* to and *focused* on the task(s) set; you should make use of scholarly reviews and primary sources, where appropriate (for example, refereed research articles and/or original materials appropriate to the discipline). You should provide evidence that you have accessed a wide *range* of sources, which may be academic, governmental and industrial; these sources may include academic journal articles, textbooks, current news articles, organisational documents, and websites. You should consider the *credibility* of your sources; academic journals are normally highly credible sources while websites require careful consideration/selection and should be used sparingly. Any sources you use should be current and up-to-date, mostly published within the last five years or so, though seminal/important works in the field may be older. You must provide *evidence* of your research/own reading throughout your work, using a suitable referencing system, including in-text citations in the main body of your work and a reference list at the end of your work.

Guidance specific to this assessment: *This will be assessed by the extent of your reading, relevance of credible sources and the Harvard method used.*

2. Knowledge and Understanding Skills

At level 6, you should be able to demonstrate coherent and detailed knowledge and a systematic understanding of the subject area, at least some of which is informed by the latest research and/or advanced scholarship within the discipline. You should be aware of the uncertainty, ambiguity and limits of knowledge. Your work must demonstrate the growing extent of your knowledge and systematic understanding of concepts and underlying principles associated with the subject area. *Knowledge* relates to the facts, information and skills you have acquired through your learning. You demonstrate your *understanding* by interpreting the meaning of the facts and information (knowledge). This means that you need to select and include in your work the concepts, techniques, models, theories, etc. appropriate to the task(s) set. You should be able to explain the theories, concepts, etc. meaningfully to show your understanding. Your mark/grade will also depend upon the *extent* to which you demonstrate your knowledge and understanding; ideally each should be complete and detailed, with comprehensive coverage.

Guidance specific to this assessment: *This will be assessed by the knowledge displayed and awareness of current thinking related to strategic planning, CSR and lean manufacturing.*

3. Cognitive and Intellectual Skills

You should be able to: critically evaluate evidence, arguments, assumptions, abstract concepts and data some of which are at the forefront of a discipline (and that may be incomplete) to devise and sustain arguments, to make judgements and/or solve problems; describe and comment upon particular aspects of current research, or equivalent advanced scholarship, in the discipline. Your work must contain evidence of logical, analytical thinking, evaluation and synthesis. For example, to examine and break information down into parts, make inferences, compile, compare and contrast information. This means not just describing

what! But also justifying: Why? How? When? Who? Where? At what cost? At all times, you must provide justification for your arguments and judgements. Evidence that you have reflected upon the ideas of others within the subject area is crucial to you providing a reasoned and informed debate within your work. Furthermore, you should provide evidence that you are able to make sound judgements and convincing arguments using data and concepts. Sound, valid conclusions are necessary and must be derived from the content of your work. Where relevant, alternative solutions and recommendations may be proposed.

Guidance specific to this assessment: *This will be assessed by your critical thinking skills and your elaboration of the broader grasp of the topic of Engineering Management.*

4. Practical Skills

At level 6, you should be able to apply the methods and techniques that you have learned to review, consolidate, extend and apply your knowledge and understanding, and to initiate and carry out projects. You will deploy accurately established techniques of analysis and enquiry relevant to the discipline, and apply them in complex and unpredictable contexts, to devise and sustain arguments and/or to solve problems. You should be able to frame appropriate questions to achieve a solution - or identify a range of solutions. You should be able to demonstrate how the subject-related concepts and ideas relate to real world situations and/or a particular context. How do they work in practice? You will deploy models, methods, techniques, and/or theories, in that context or circumstances, to assess current situations, perhaps to formulate plans or solutions to solve problems, or to create artefacts, some of which may be innovative and creative. This is likely to involve, for instance, the use of real world artefacts, examples and cases, the application of a model within an organisation and/or benchmarking one theory or organisation against others based on stated criteria. You should show awareness of the limitations of concepts and theories when applied in particular contexts.

Guidance specific to this assessment: *This will be assessed by your use and application of the strategic management evaluation tools..*

5. Transferable Skills for Life and Professional Practice

Your work must provide evidence of the qualities and transferable skills necessary for graduate-level employment requiring the exercise of initiative and personal responsibility and decision-making in complex and unpredictable circumstances. This includes demonstrating: the learning ability for professional development to advance existing skills and acquire new competences of a professional nature that will enable you to assume significant responsibility within organisation; that you can initiate and complete tasks and procedures, whether individually and/or collaboratively; that you can use appropriate media to effectively communicate information, arguments and analysis in a variety of forms to specialist and non-specialist audiences; fluency of expression; clarity and effectiveness in presentation and organisation. Work should be coherent and well-structured in presentation and organisation.

Guidance specific to this assessment: *This will assess your ability to produce a professional report, which is assessed by the written and presentational quality of your report including page numbering, figure quality, figure numbering and listing, writing style, punctuation, grammar and spelling.*

STUDENT FEEDBACK FORM

This section details the *extent* to which the assessment criteria are demonstrated by you, which in turn determines your mark. The marks available for each category of skill are shown. Lecturers will use the space provided to comment on the achievement of the task(s), including those areas in which you have performed well and areas that would benefit from development/improvement.

Generic Assessment Criteria	**Marks available**	**Marks awarded**
1. Engagement with Literature Skills		
	10	
2. Knowledge and Understanding Skills		
Description of the underpinning theory	30	
3. Cognitive and Intellectual Skills		
Interpretation of the results, conclusions and recommendations	20	
4. Practical Application Skills		
Experimental method, description of the method and presentation of the data	30	
5. Transferable Skills for Life and Professional Practice		
Overall report quality (/5) Word count (/5)	10	

Assessment Mark (Assessment marks are subject to ratification at the Exam Board. These comments and marks are to give feedback on module work and are for guidance only until they are confirmed.)	**Late Submission Penalties (tick if appropriate)**		**%**
	Up to 1 week late (40% Max)		
	Over 1 week late (0%)		

GENERIC ASSESSMENT CRITERIA

Level 6

In accordance with the Framework for Higher Education Qualifications, at the end of Level 6 students should have coherent and detailed knowledge and a systematic understanding of their subject area, at least some of which is informed by the latest research and/or advanced scholarship within the discipline. They will be able to accurately deploy established techniques of analysis and enquiry within a discipline, using their conceptual understanding to devise and sustain arguments and/or to solve problems. They should be aware of the uncertainty, ambiguity and limits of knowledge. They should be able to critically evaluate evidence, arguments, assumptions, abstract concepts and data (that may be incomplete), to make judgements, and to frame appropriate questions to achieve a solution - or identify a range of solutions. They will apply the methods and techniques that they have learned to review, consolidate, extend and apply their knowledge and understanding, and to initiate and carry out projects. They will have the ability to manage their own learning, and to make use of scholarly reviews and primary sources (for example, refereed research articles and/or original materials appropriate to the discipline). They will demonstrate the qualities and transferable skills necessary for employment requiring: the exercise of initiative and personal responsibility; decision-making in complex and unpredictable contexts; the learning ability needed to undertake appropriate further training of a professional or equivalent nature.

Level 6	**FAIL**	**MARGINAL FAIL**	**SATISFACTORY (3rd / Pass)**	**GOOD (2.2 / Pass)**	**VERY GOOD (2.1 / Merit)**	**EXCELLENT (1st / Distinction)**	**EXCEPTIONAL (1st / Distinction)**
Category	**0-29%**	**30-39%**	**40-49%**	**50-59%**	**60-69%**	**70-84%**	**85-100%**
1. Engagement with literature (including reading, referencing, academic conventions and academic honesty)	Little or no evidence of reading and/or reliance on inappropriate sources. Views and findings mostly unsupported and non-authoritative. Referencing conventions used incoherently or largely absent.	Poor engagement with essential reading. No evidence of wider reading. Reliance on inappropriate sources, and/or indiscriminate use of sources. Heavily reliant on information gained through class contact. Inconsistent and weak use of referencing.	Engagement with a limited range of mostly relevant and credible sources. Some omissions and minor errors. Referencing conventions evident though not always applied accurately or consistently.	Engagement with an appropriate range of research-informed literature, including sources retrieved independently. Some over-reliance on texts. Referencing may show minor inaccuracies or inconsistencies.	Engagement with a wide range of research-informed literature, including sources retrieved independently. Selection of relevant and credible sources. Very good use of referencing, with no/very few inaccuracies or inconsistencies.	Engagement with an extensive range of relevant and credible literature, informed by the latest research. Consistently accurate application of referencing.	Exceptional engagement with an extensive range of relevant and credible literature, informed by the latest research. High-level referencing skills consistently and professionally applied.

2. Knowledge and understanding (Coherent and detailed knowledge and systematic understanding of the subject area, at least some of which is informed by the latest research and/or advanced scholarship within the discipline.)	Major gaps in knowledge and systematic understanding of the subject matter. Substantial inaccuracies. No awareness of knowledge of the latest research and/or advanced scholarship within the discipline.	Gaps in knowledge, with only superficial systematic understanding. Some significant inaccuracies and/or irrelevant material. No awareness of knowledge of the latest research and/or advanced scholarship within the discipline.	Limited knowledge and systematic understanding of the relevant concepts and principles within the subject area which to some limited extent, is informed by current research and scholarship.	Knowledge is reasonably detailed, accurate with a good systematic understanding of the field of study and to some extent, current research and scholarship.	Knowledge is reasonably extensive coherent and detailed. Exhibits very good understanding of the breadth and depth of established views, and the work is, at least in part, well-informed by current research and scholarship.	Excellent coherent and detailed knowledge and systematic understanding of the principles and theories of current research and scholarship. Clear awareness of challenges to established views and the limitations of the knowledge base.	Exceptionally coherent and detailed knowledge and systematic understanding of the principles and theories of the subject, well-informed by current research and scholarship. A critical, sophisticated and nuanced awareness of the ambiguities and limitations of knowledge.

3. Cognitive and intellectual skills (Conceptual and critical thinking, analysis, synthesis and evaluation of research, assumptions, abstract concepts and data (that may be incomplete); logic, argument and judgement.)	Wholly or almost wholly descriptive work. Little or no analysis, synthesis or evaluation. Failure to develop arguments, leading to illogical or invalid judgements. Unsubstantiated generalisations, made without use of any credible evidence.	Largely descriptive work, with superficial use of critical evaluation. Weak development of arguments and judgements. Information accepted uncritically, uses generalised statements made with scant evidence and unsubstantiated opinions. Ideas sometimes illogical and contradictory.	Limited attempt at critical thinking, analysis, synthesis and evaluation, tending towards description. Some evidence to support emerging arguments and judgements but these may be underdeveloped or with a little inconsistency / mis-interpretation. Asserts rather than argues a case.	Some critical thinking, analysis, synthesis and evaluation. Can analyse new and/or abstract concepts and data without guidance. An emerging awareness of different stances and ability to use evidence (that may be incomplete) to support the argument. Mostly valid arguments and logical judgements. Some tendency to assert/state opinion rather than argue on the basis of reason and evidence.	Sound critical thinking, analysis, synthesis and evaluation demonstrating critical thinking. Ability to devise and sustain persuasive arguments, and to review the reliability, validity and significance of evidence (that may be incomplete) to make mostly appropriate and valid judgements.	Excellent critical thinking, analysis, synthesis and evaluation. Ability to investigate contradictory or incomplete information and make strong, persuasive, arguments and sophisticated judgements. Some evidence of independent thought and ability to 'see beyond the question', suggesting a grasp of the broader field and wider concepts.	Exceptional critical thinking, analysis, synthesis and evaluation based on judiciously selected evidence. Ability to investigate contradictory or incomplete information and make strong, persuasive, arguments and sophisticated, nuanced, judgements. Evidence of independent thought and ability to 'see beyond the question', suggesting an outstanding grasp of the broader field and wider concepts.

4. Practical skills (Apply/deploy accurately established tools and techniques; initiate and carry out projects; formulate solutions to solve problems in complex and unpredictable contexts.)	Limited or no use of methods, materials, tools and/or techniques. Little or no appreciation of the context of the application. Limited understanding of the application of theory to practice or making appropriate links between the two. Very weak problem-solving skills in complex and unpredictable contexts.	Rudimentary application of methods, materials, tools and/or techniques but without consideration and competence. Flawed appreciation of the context of the application. Weak understanding of the application of theory to practice, with only occasional evidence of making appropriate links between the two. Weak problem-solving skills in complex and unpredictable contexts.	An adequate awareness and mostly appropriate application of well-established methods, materials, tools and/or techniques. Basic appreciation of the context of the application. Theoretical knowledge and understanding applied in practice, but not always making logical links between the two. Can identify problems and propose basic solutions in complex and unpredictable contexts without fully appreciating the complexity.	A good and appropriate application of standard methods, materials, tools and/or techniques. Clear appreciation of the context of the application. Mainly consistent, accurate and logical application of theory to practice, making appropriate links between the two Can identify problems and propose mostly appropriate solutions in complex and unpredictable contexts.	A very good application of a range of methods, materials, tools and/or techniques. Very good consideration of the context of the application, with perceptive insights. Can identify problems and propose appropriate solutions in complex and unpredictable contexts. Evidence of some innovation and creativity.	An advanced application of a range of methods, materials, tools and/or techniques. The context of the application is well considered, and insightful. Application and deployment extend beyond established conventions. Can identify complex problems and propose excellent solutions. Innovation and creativity evident.	Exceptional levels of application and deployment skills in unpredictable, practical contexts, drawing skilfully on the latest research within the discipline. Can identify complex problems and propose sophisticated solutions. Assimilation and development of cutting edge processes and techniques.

5. Transferable skills for life and professional practice (Exercise of initiative and personal responsibility; professional development; initiate and complete tasks and procedures: individually and/or collaboratively; use appropriate media to communicate effectively; fluency of expression; clarity and effectiveness in presentation and organisation.)	Communication medium is inappropriate or misapplied. Work is poorly structured, disorganised and/or confusingly expressed. Very weak use of language and/or very inappropriate style. Little or no evidence of autonomy (or collaboration, where relevant) in the completion of tasks. Little or no evidence of the skills required in graduate employment.	Communication medium is poorly designed and/or not suitable for the audience. Work is poorly presented in a disjointed manner. It is loosely, and at times incoherently, structured, with information and ideas often poorly expressed. Weak use of language and/or inappropriate style. Weak independent initiative (or collaboration, if relevant). Limited evidence of the skills required in graduate employment.	Can communicate in a suitable medium but with some room for improvement. Mostly ordered presentation and structure in which relevant ideas / concepts are reasonably expressed. Work may lack coherence in places. Can work as part of a team, but with limited involvement in group activities. Demonstrates the basic skills required in graduate employment, with some areas of minor weakness.	Can communicate effectively in a suitable format, but may have minor errors. Mostly coherent, organised work, in a suitable structure and is for the most part clearly expressed. Can work effectively independently and/or as part of a team, with clear contribution to group activities. Demonstrates the skills required in graduate employment, with some areas of strength and some of minor weakness.	Can communicate well, confidently and consistently in a suitable format. Work is coherent, fluent, well-structured and organised. Can work very well autonomously and/or as part of a team, with very good contribution to group activities. Demonstrates very good graduate employment skills, with just occasional minor weakness.	Can communicate professionally confidently and consistently in a suitable format. Work is coherent, very fluent and is presented professionally. Can work autonomously with initiative. Where relevant can work professionally within a team, showing leadership skills as appropriate, managing conflict and meeting obligations. Demonstrates excellent graduate employment skills and an appetite for further development.	Can communicate with an exceptionally high level of professionalism. Work is exceptionally coherent, very fluent and is presented professionally. Can work exceptionally well and professionally within a team, showing advanced leadership skills. Demonstrates exceptional graduate employment skills and an appetite for further development.