

LEVEL 6 ASSESSMENT SPECIFICATION

Student name:		Student ID number:	
Programme:	BEng Engineering Part Time Portfolio		
Module:	Advanced Processes and Materials		
Module code:	ACMA6000	Contribution to Overall Module Assessment (%):	50%
Lecturer:	Dr Mohamed Gabr Dr Phil Holden	Internal Verifier:	Dr Jordan Jenkins
Assignment Title:	Manufacture of Wind turbine blade	Word count (or equivalent):	3,000
Submission deadline:	07 September 2026 9:00am	Return date of provisional marks & written feedback:	Within 20 working term time days of submission date
Submission method:	All written assessments, where practical and possible, must be submitted via Moodle 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: Work which is submitted up to 1 week late will be capped at 40% for the first attempt and will be awarded a mark of 0% for re-assessment. Late submission penalties may be lifted only if there is an approved extenuating circumstances claim. Work submitted more than 1 week late will be considered as a non-submission and will not be marked. The work may be considered as a submission for reassessment if offered by an Examining Board or if there is an approved extenuating circumstances claim.		
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)**

Critically analyse the structure-property relationships and behaviour of a range of advanced engineering materials and manufacturing processes

Critically appraise the potential for application of a range of advanced materials and processes in typical engineering applications, gaining an understanding of the development of new sustainable materials for specific applications.

Engineering Council AHEP4 Learning Outcomes Assessed in this Module

*C1	Apply knowledge of mathematics, statistics, natural science and engineering principles to the solution of complex problems. Some of the knowledge will be at the forefront of the particular subject of study.
C5	Design solutions for complex problems that meet a combination of societal, user, business and customer needs as appropriate. This will involve consideration of applicable health and safety, diversity, inclusion, cultural, societal, environmental and commercial matters, codes of practice and industry standards.
C7	Evaluate the environmental and societal impact of solutions to complex problems and minimise adverse impacts.
C13	Select and apply appropriate materials, equipment, engineering technologies and processes, recognising their limitations.

*Only applies to Mechanical Engineering programme

You **MUST** demonstrate that the work submitted in completion of this assessment meets each of the AHEP4 learning outcomes listed above.

TASK DESCRIPTION

Use of Generative AI in Assessment

(Lecturer to indicate Yes or Not against each element)

RESEARCH	For this assessment, you can use Generative AI to support you in research, including searching for bibliography, using tools to summarise, compare and interrogate materials.	Yes ☒ No ☐
STRUCTURE	For this assessment, you can use Generative AI to support you in structuring your submission, including creating a draft argument structure, identifying parts and headings, etc.	Yes ☒ No ☐
PROOFREADING	For this assessment, you can use Generative AI to check your own text/creation for grammatical and syntactical mistakes, including rephrasing of your own work within specific standards.	Yes ☒ No ☐
WRITING	For this assessment, you can use Generative AI to create text for submission.	Yes ☐ No ☒
CREATIVE	For this assessment, you can use Generative AI to create creative materials, such as images.	Yes ☐ No ☒
PROGRAMING	For this assessment, you can use Generative AI to create and check code.	Yes ☐ No ☒
NONE	For this assessment, you are not allowed to use any type of Generative AI support. This includes research support, structure support, writing/proofreading support and creative support.	Yes ☐ No ☒

You have joined Company X as a renewable energy engineer. The company specializes in the design and manufacture of wind turbine blades. A client approaches your company with a project to develop next-generation wind turbine blades that are lightweight, durable, and efficient. The aim is to enhance the energy output while minimizing maintenance costs. Your manager asks you to conduct a preliminary study focusing on four aspects:

- Design parameters
- Materials: Metals, Ceramics, and Polymer-based composites
- Manufacturing processes and processing-induced defects
- Costs involved

Prepare a short report (3000 words).

Task 1: Market/Literature Research Conduct market and literature research to determine:

- What are the optimal dimensions and aerodynamic shapes for wind turbine blades to maximize energy capture?
 - Study existing wind turbine designs and determine standard rotor radii, tip speed ratios (TSR), and blade tapers.
 - Investigate aerodynamic profiles (e.g., NACA 4412) and benchmarks for power coefficients (e.g., $C_p \leq 0.4$).
- What are the critical design parameters to consider for wind turbine blades (e.g., lift-to-drag ratio, fatigue resistance, weight distribution)?
 - Explain the importance of lift-to-drag ratio, fatigue resistance, and material weight.
 - Discuss environmental conditions like wind variability and their impact on blade performance.
 - Outline the properties of metals, ceramics, and composites (e.g., density, tensile strength).
 - Include any limitations of each material for blade design.
 - Use visuals (e.g., graphs, tables) to summarise findings.
 - Reference academic articles, textbooks, and industry reports.
- What is the approach you are going to follow to design the wind turbine blade?
 - Use the aerodynamic force, blade length, chord length, camber, and thickness distribution calculations to generate blade design graphs for each section, guiding your design methodology.
 - Draw the required graphs for each section based on your calculations, and include the blade graphs generated using MS Excel in your report.
 - Apply your prior knowledge of 3D CAD modelling to generate the blade shell using the calculated geometry.
 - Include screenshots of your CAD model in the report to illustrate your design approach.

Task 2: Exploration of Manufacturing Routes Investigate different manufacturing routes for producing wind turbine blades using:

- Metals (e.g., aluminum alloys, steel): Discuss casting and extrusion processes, focusing on high strength but heavier weight.
- Ceramics (e.g., silicon carbide, zirconia): Explore sintering or additive manufacturing, considering brittleness and thermal resistance.

- Polymer Composites (e.g., fiberglass-reinforced polymers, carbon fiber-reinforced polymers): Investigate resin transfer moulding (RTM) or vacuum infusion, highlighting lightweight and customisable properties.
 - Describe each manufacturing method in detail, including required equipment and steps.
 - Identify challenges like defects (e.g., voids in composites) or energy consumption.
 - Compare production costs, scalability, and time requirements.
 - Discuss environmental and safety considerations for each process.

Task 3: Cost Evaluation Using the data from Tasks 1 and 2, evaluate the cost of manufacturing the wind turbine blades using three different material candidates:

- Metals
- Ceramics
- Polymer Composites In your cost calculation, include only the raw material costs.
 - Collect and compare raw material costs for metals, ceramics, and composites.
 - Present costs per kilogram or cubic metre, linking them to total blade material needs.
 - Estimate production costs, including labour, equipment, and defect mitigation.
 - Use a comparative table to summarise the data.
 - Discuss cost-performance trade-offs, considering durability, weight, and efficiency.

Task 4: Comparative Analysis Compare the processes and materials in terms of:

- Mechanical properties (e.g., tensile strength, fatigue resistance, stiffness)
 - Tensile strength, stiffness, fatigue resistance, and density.
 - Relate these properties to the blade's performance under real-world conditions (e.g., high winds, cyclic loads).
 - Present tables or graphs comparing the mechanical properties of each material.
 - Use clear labels to highlight which material excels in critical design parameters.
 - Link the mechanical properties to the structural and aerodynamic requirements of a wind turbine blade.
- Material selection
 - Productivity (e.g., manufacturing time, scalability)
 - Include properties such as tensile strength, fatigue resistance, density, cost, and recyclability.
 - Use a weight scale (e.g., 0 to 1) based on the importance of each property for blade design.
 - Assign scores (1 to 5) to each material for every property and calculate the weighted total
- Manufacturing defects (e.g., voids, surface imperfections)
 - Highlight limitations in each process.
 - Identify common defects (e.g., warping, voids) and their impact on blade performance.

- Suggest mitigation strategies.
- Health and safety considerations (e.g., handling of materials, environmental impact during manufacturing processes)
 - Discuss handling risks and recyclability of each material.
 - Evaluate the environmental footprint of the processes.

Concluding Recommendation:

- Summarise findings to recommend the most suitable material and process.
- Justify the choice with evidence from earlier tasks.

Key Points for Drawing the Blade

- Students must draw the blade showing:
 - Chord Lengths: Use linear taper calculations from Task 1 (e.g., 0.4m at root to 0.1m at tip).
 - Thickness Profiles: Refer to standard NACA 4412 coordinates for each section.
 - Spanwise Sections: Label sections based on radial positions ($r/R = 0.2, 0.4, 0.6, 0.8, 1.0$).

Deliverables Checklist

- Report Structure: Follow the provided outline.
- Blade Drawing: Include all dimensions and spanwise sections.
- Calculations: Provide detailed aerodynamic, structural, and cost analyses.
- References: Cite all sources accurately.

NOTES:

- You should include a properly formatted Table of Contents, list of Tables/Figures in the beginning of your assignment.
- You should properly cite others' work within the body of your assignment (use Harvard referencing system) and provide a list of cited references at the end of your assignment. Copying and pasting a text from others' work is not acceptable. You should rephrase the text in a way that suits your needs.
- You should use "Arial" font size 12 and 1.5 spacing between lines. You will lose marks if you do not use such formatting.
- You may include appendices at the end of your assignment and refer to them in the body of your assignment when required.
- You should also provide an abstract at the beginning of your assignment.
- You should use heading and sub-headings in your assignment.
- You should be very specific to include examples, if your examples are not relevant you will not be awarded any marks for it.
- You must pay a special attention to the "generic assessment criteria" on the page 8-11 of this document. This will be strictly followed to mark your assignments.
- A word limit of 3,000 will also be strictly followed as not following this will affect your mark.

Suggested Report Structure

Cover Page (use the template provided)

- Include:
 - Assignment title
 - Module name (ACMA6000: Advanced Processes & Materials)
 - Student name and ID
 - Submission date
 - Word count

Abstract

- Summarise the report in 150–200 words.
- Include:
 - Purpose of the report
 - Key findings (e.g., material selection, manufacturing route)
 - Final recommendation

Table of Contents

- Provide a clear table of contents with headings and page numbers.
- Use Microsoft Word's automated Table of Contents feature if possible.

1. Introduction

- State the objective of the report (designing a wind turbine blade).
- Provide an overview of the tasks (e.g., research, cost evaluation, and analysis).
- Explain the importance of wind energy and blade design in renewable energy systems.
- Mention that the material selection and manufacturing processes are critical for optimal performance.

2. Literature Review

- **Purpose:** Demonstrate understanding of existing knowledge relevant to blade design.
- **Content:**
 - **Aerodynamic Profiles:** Discuss standard airfoils (e.g., NACA 4412), lift-to-drag ratio, and power coefficient ($C_p \leq 0.4$).
 - **Optimal Dimensions:** Provide examples of blade lengths, tip speed ratios (TSR), and taper profiles from existing designs.
 - **Material Properties:** Summarise the mechanical properties (e.g., tensile strength, density) of metals, ceramics, and composites.
 - **Environmental Factors:** Discuss the impact of wind variability and operating conditions on blade performance.
- Use tables and graphs to present data clearly.
- Reference credible sources (e.g., journal articles, textbooks, industry standards).

3. Design Specifications

- **Objective:** Define the design parameters for the wind turbine blade.
- **Content:**
 - Rotor radius, chord lengths, and taper from root to tip.
 - Blade section parameters (e.g., $r/R = 0.2, 0.4, 0.6, 0.8, 1.0$).
 - Airfoil profile and maximum thickness locations (e.g., NACA 4412).
 - Efficiency requirements (e.g., $C_p = 0.4$, $Cl = 1.2$).
 - Environmental conditions (e.g., wind speed = 12 m/s, air density = 1.225 kg/m^3).

4. Material Selection

- **Approach:**
 - Use a Weighted Decision Matrix (WDM) to evaluate metals, ceramics, and polymer composites.
- **Content:**
 - **Criteria:** Mechanical properties (e.g., tensile strength, fatigue resistance), cost, environmental impact, and ease of manufacturing.
 - **Weighting:** Assign weights (e.g., 0 to 1) based on importance.
 - **Scoring:** Score each material based on criteria and calculate the total score.
 - **Recommendation:** Select the material with the highest score and justify the choice.

5. Exploration of Manufacturing Routes

- **Objective:** Investigate the most suitable manufacturing process for **the selected material**.
- **Content:**
 - **Metals:** Casting, extrusion, and their limitations (e.g., weight).
 - **Ceramics:** Sintering or additive manufacturing and their brittleness challenges. **OR**
 - **Polymers:** Injection moulding
 - **Polymer Composites:** Vacuum infusion or resin transfer moulding, highlighting scalability and lightweight properties.
 - Compare production costs, time, scalability, and environmental impact for each route.
 - Recommend the most efficient and cost-effective manufacturing process for the selected material.

6. Cost Evaluation

- **Objective:** Analyse costs for materials and manufacturing.
- **Content:**
 - **Material Costs:** Present raw material costs for metals, ceramics, and composites (e.g., cost per kg/m^3).
 - **Manufacturing Costs:** Estimate labour, equipment, and defect mitigation expenses.
 - Include a comparative table summarising the total costs.

- Discuss cost-performance trade-offs.

7. Mechanical Properties Analysis

- **Objective:** Analyse the stress and deformation characteristics of the blade under operational loads.
- **Content:**
 - **Force Calculations:** Calculate lift and drag forces for each section.
 - **Stress Analysis:** Perform bending and torsional stress calculations for critical blade sections.
 - Compare calculated stresses to the yield strengths of the selected materials.
 - Evaluate safety factors and identify the most suitable material for each section.
- Provide detailed calculations with clear explanations.

8. Comparative Analysis

- **Objective:** Compare the performance of materials and processes.
- **Content:**
 - Mechanical properties (e.g., tensile strength, stiffness, fatigue resistance).
 - Productivity and scalability (e.g., manufacturing time and scalability).
 - Manufacturing defects (e.g., voids, surface imperfections).
 - Environmental and safety considerations (e.g., recyclability, handling risks).
- Summarise findings in a comparative table and highlight the advantages of the selected material and process.

9. Blade Drawing

- Include a detailed drawing of the blade showing:
 - **Chord Lengths:** Linear taper from root to tip (e.g., 0.4 m at root to 0.1 m at tip).
 - **Thickness Profiles:** Use NACA 4412 coordinates to define the thickness at each section (e.g., $r/R = 0.2, 0.4, 0.6, 0.8, 1.0$).
 - Label all dimensions and key features (e.g., maximum thickness and its position along the chord).

10. Conclusions and Recommendations

- **Conclusions:**
 - Summarise the key findings from material selection, cost evaluation, and stress analysis.
 - State the final material and manufacturing process recommendations.
- **Recommendations:**
 - Suggest future improvements (e.g., optimising blade geometry for specific wind conditions).
 - Highlight potential areas for further research.

11. References

- List all sources used in the report in the appropriate referencing format (e.g., Harvard, APA).
- Ensure consistency and accuracy in citations.

12. Appendices

- Include supporting materials such as:
 - Detailed calculations (e.g., force, stress, and cost analyses).
 - Raw data tables and additional figures.

Recommendations for Formatting

- **Font:** Use a professional font (e.g., Arial or Times New Roman) with size 12 for text and size 14–16 for headings.
- **Line Spacing:** Use 1.5 line spacing for clarity.
- **Headings:** Follow a hierarchical structure (e.g., Heading 1, Heading 2).
- **Margins:** Set 1-inch margins on all sides.
- **Figures and Tables:**
 - Number all figures and tables sequentially (e.g., Figure 1, Table 1).
 - Provide captions below figures and above tables.
- **Page Numbers:** Include page numbers on all pages except the cover page.

GUIDANCE FOR STUDENTS IN THE COMPLETION OF TASKS

NOTE: The guidance offered below is linked to the five generic assessment criteria overleaf.

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:

Marks will be awarded for demonstrating in-depth research into wind turbine blade design, with clear referencing of credible sources such as academic journals, textbooks, and industry reports. You are expected to cover topics such as aerodynamic profiles, material properties, and manufacturing processes. Visual presentation of findings (e.g., tables, graphs) is encouraged to support clarity and critical analysis. It is strongly recommended to use Harvard referencing. Evaluate your sources critically and explain their relevance to your work.

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:

Your work should reflect systematic knowledge of wind turbine blade design, including aerodynamic, structural, and material considerations. Key theoretical concepts such as lift-to-drag ratio, chord length taper, and aerodynamic profiles (e.g., NACA 4412) should be explained and related to real-world turbine blade applications. You should use calculations and analyses to support your decisions and clearly show how your findings align with current engineering practices and literature.

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:

Marks will be awarded for your methodology to calculate the cost of manufacturing a wind turbine blade using three different sets of materials: metals, ceramics, and polymer composites. You are expected to apply critical thinking in evaluating design decisions and demonstrate logical reasoning in comparing trade-offs such as cost, performance, and environmental impact. The use of tools like a weighted decision matrix is encouraged to support your analysis. You should provide clear, evidence-based conclusions and practical suggestions where appropriate.

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:

You are expected to perform and present detailed aerodynamic, cost, and stress calculations with clarity and accuracy. These should inform design decisions and reflect a sound understanding of engineering principles. You must include a full blade drawing showing chord lengths, thickness profiles, and key dimensions. Practical discussions should include the challenges of each manufacturing route, such as production time, scalability, and defects (e.g., voids or warping), as well as how these can be addressed. A fair comparison of material properties and process implications is essential.

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 organisations; 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:

You should ensure that your report is professionally written, logically structured, and easy to follow. Use clear headings, labelled figures and tables, and follow formatting standards (e.g., Arial size 12, 1.5 line spacing). Your referencing must be accurate and consistent. The inclusion of tables, figures, diagrams, and summary charts will enhance the presentation. A well-organised submission, with a consistent writing style and fluent expression, will help you to meet this criterion effectively.

Your report should be well presented and concise please consult the engineering the report writing handbook and the following university rules on exceeding word count.

- i. Different assessments have varying word lengths specified for them; it is important that the student keeps to the word length specified for each assessment at all times on the following grounds:
- To encourage succinct and clear writing by students.
 - To ensure equity between all the students doing that particular assessment
- ii. If the specified word limit for an assessment has been exceeded, the following penalties would normally apply. The penalty cannot take the work into the fail category.

	Up to 10% over	10-25% over	25-50% over	50%+ over
Word Count	3000-3300	3301-3750	3751-4500	4501
Deduction (to 40% Cap)	0%	5%	10%	Mark capped to 40%

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		
	20	
2. Knowledge and Understanding Skills		
	30	
3. Cognitive and Intellectual Skills		
	20	
4. Practical Application Skills		
	20	

5. Transferable Skills for Life and Professional Practice		
	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 (3 rd / Pass)	GOOD (2.2 / Pass)	VERY GOOD (2.1 / Merit)	EXCELLENT (1 st / Distinction)	EXCEPTIONAL (1 st / Distinction)
Category	0-29%	30-39%	40-49%	50-59%	60-69%	70-84%	85-100%
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.
Knowledge and understanding (Coherent and detailed)	Major gaps in knowledge and systematic understanding of the subject	Gaps in knowledge, with only superficial systematic understanding.	Limited knowledge and systematic understanding of the relevant	Knowledge is reasonably detailed, accurate with a good systematic	Knowledge is reasonably extensive coherent and detailed.	Excellent coherent and detailed knowledge and systematic	Exceptionally coherent and detailed knowledge and systematic

Level 6	FAIL	MARGINAL FAIL	SATISFACTORY (3 rd / Pass)	GOOD (2.2 / Pass)	VERY GOOD (2.1 / Merit)	EXCELLENT (1 st / Distinction)	EXCEPTIONAL (1 st / Distinction)
Category	0-29%	30-39%	40-49%	50-59%	60-69%	70-84%	85-100%
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.)	matter. Substantial inaccuracies. No awareness of knowledge of the latest research and/or advanced scholarship within the discipline.	Some significant inaccuracies and/or irrelevant material. No awareness of knowledge of the latest research and/or advanced scholarship within the discipline.	concepts and principles within the subject area which to some limited extent, is informed by current research and scholarship.	understanding of the field of study and to some extent, current research and scholarship.	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.	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.	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.
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	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

Level 6	FAIL	MARGINAL FAIL	SATISFACTORY (3 rd / Pass)	GOOD (2.2 / Pass)	VERY GOOD (2.1 / Merit)	EXCELLENT (1 st / Distinction)	EXCEPTIONAL (1 st / Distinction)
Category	0-29%	30-39%	40-49%	50-59%	60-69%	70-84%	85-100%
				the basis of reason and evidence.			grasp of the broader field and wider concepts.
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.
Transferable skills for life and professional practice (Exercise of initiative and	Communication medium is inappropriate or misapplied. Work is poorly structured, disorganised	Communication medium is poorly designed and/or not suitable for the audience. Work is poorly presented in a	Can communicate in a suitable medium but with some room for improvement.	Can communicate effectively in a suitable format, but may have minor errors.	Can communicate well, confidently and consistently in a suitable format.	Can communicate professionally confidently and consistently in a suitable format.	Can communicate with an exceptionally high level of professionalism.

Level 6	FAIL	MARGINAL FAIL	SATISFACTORY (3 rd / Pass)	GOOD (2.2 / Pass)	VERY GOOD (2.1 / Merit)	EXCELLENT (1 st / Distinction)	EXCEPTIONAL (1 st / Distinction)
Category	0-29%	30-39%	40-49%	50-59%	60-69%	70-84%	85-100%
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.)	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.	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.	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.	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.	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.	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.	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.