

LEVEL 5 ASSESSMENT SPECIFICATION

Student name:		Student ID number:	
Programme:	BEng Mechanical Engineering, BEng Mechanical & Manufacturing Engineering		
Module:	Manufacturing Design & Technology (FT)		
Module code:	ACMA5002	Contribution to Overall Module Assessment (%):	100
Lecturer:	Dr Richard Morgan Dr Mohamed Gabr	Internal Verifier:	Dr Jordan Jenkins
Assignment Title:	Design for Manufacture and Assembly: Component Optimisation	Word count (or equivalent):	5000
Submission deadline:	15 June 2025 (9:00 am)	Return date of provisional marks & written feedback:	20 Working Days from Submission
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)

1. Use appropriate design methods in conjunction with advanced features of a 3D CAD system in engineering design.
2. Apply the physical principles of manufacturing processes with a view to improve the selection and optimisation of existing processes.
3. Use computational methods for the manufacture and appraisal of mechanical components and understand the limitations of manufacturing processes in respect to their effects on both operating conditions and material performance.

Engineering Council AHEP3 Learning Outcomes Assessed in this Assessment	
EA4b	Understanding of, and the ability to apply, an integrated or systems approach to solving engineering problems
D1	Understand and evaluate business, customer and user needs, including considerations such as the wider engineering context, public perception and aesthetics
D2	Investigate and define the problem, identifying any constraints including environmental and sustainability limitations; ethical, health, safety, security and risk issues; intellectual property; codes of practice and standards
D4	Apply advanced problem-solving skills, technical knowledge and understanding, to establish rigorous and creative solutions that are fit for purpose for all aspects of the problem including production, operation, maintenance and disposal
D5	Plan and manage the design process, including cost drivers, and evaluate outcomes
EL6	Knowledge and understanding of risk issues, including health & safety, environmental and commercial risk, and of risk assessment and risk management techniques
P3	Ability to apply relevant practical and laboratory skills

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 ☒

TASK DESCRIPTION

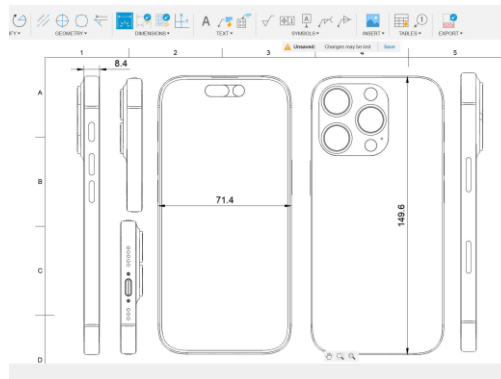
A leading manufacturing company is seeking to optimise its production processes for high-demand consumer products. The company has identified three critical products that require advanced manufacturing techniques and design optimisation. The company requests that you select one of the following products and design an efficient production component (e.g., mould, fixture, or jig) for its manufacturing process. Your design must align with Design for Manufacture (DFM) and Design for Assembly (DFA) principles while addressing manufacturability, robustness, sustainability, and cost efficiency.

Product Options:

1. Mobile Phone Housing:

A lightweight polymer housing with integrated mounting points, ventilation slots, and snap-fit fasteners.

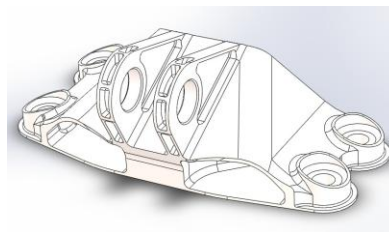
Must be optimised for injection moulding.



2. Automotive Engine Bracket:

A metallic structural component designed to secure an engine to the chassis.

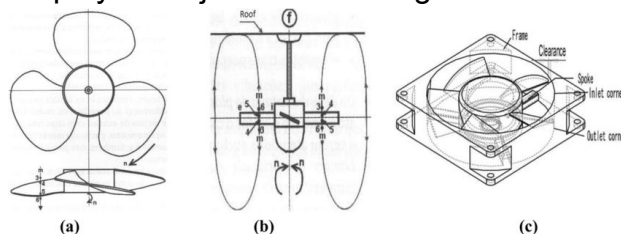
Requires optimised casting or forging techniques for high strength and minimal material wastage.



3. Laptop Cooling Fan Blade:

A high-precision polymer component with thin blades and aerodynamic profiles.

Optimised for high-volume polymer injection moulding.



Client's Design Criteria:

1. **Manufacturability:** The design must be suitable for high-volume production.
2. **Defect Mitigation:** Mould/die designs must minimise defects such as warping, air pockets, or stress concentrations.
3. **Material and Cost Efficiency:** The design must balance material performance with cost-effectiveness and demonstrate clear cost analysis.
4. **Sustainability:** Recyclable materials and energy-efficient processes must be prioritised.

Assignment Requirements

Using Computer-Aided Design (CAD) tools, you are required to:

1. Component Design:

- Create a 3D CAD model of the selected product's component.
- Apply DFM principles to ensure manufacturability and minimal production costs.
- Apply DFA principles to optimise ease of assembly and minimise assembly time.

2. Production Component Design:

For Mobile Phone Housing: Design an injection mould, ensuring efficient material flow and minimal defects.

For Automotive Engine Bracket: Design a casting mould or forging die, focusing on defect mitigation and material strength.

For Laptop Cooling Fan Blade: Design an injection mould, optimising for precision and surface quality.

3. Simulation and Validation:

- Use SolidWorks/Infusion/3D equivalent Plastics for polymer components to validate material flow, cooling, and defect prevention.
- For metal components (e.g. engine bracket), assume the part is made from a polymer and simulate it using SolidWorks/Infusion/3D equivalent Plastics to demonstrate your ability to use the software. Clearly state the assumptions and reflect on the limitations of this approach.
- Use SolidWorks/Infusion/3D equivalent Simulation (FEA) to evaluate stress and deformation of the mould, die, or the component (drop test) under operational loads.
Note (for Metal options): The objective is not to perfectly simulate real-world behaviour for metal parts in Plastics, but to demonstrate your practical skills with SolidWorks/Infusion/3D equivalent simulation tools and develop comparative insights.

4. Material Selection:

- Use the Cambridge Engineering Selector (CES) Database to select appropriate materials for the component or/and the mould/die.
- Ensure that materials balance performance, cost, and sustainability.

5. Sustainability Considerations:

Include measures to reduce waste, improve recyclability, and minimise environmental impact in your design.

6. Cost Calculation and Analysis:

- Calculate the cost per unit for producing the component based on material costs, manufacturing process costs (e.g., machine time, tooling), and labour costs.
- Include an analysis of tooling costs (e.g., injection mould, casting die) and the break-even point for production volume.
- Perform a cost comparison between different manufacturing approaches (e.g., casting vs. forging, or different materials).

7. Manufacturing Process Planning:

Provide a step-by-step process plan for manufacturing the component, from material preparation to quality inspection.

Technical Report Structure

1. Introduction

- Purpose of the Report: Define the objective, such as designing a component (e.g., mould, gripper) for manufacturing.
- Problem Definition: Briefly outline the selected product (e.g., mobile phone housing, engine bracket, cooling fan blade) and the challenges to address.
- Scope: Mention the methodologies used, such as QFD, FMEA, SolidWorks/Infusion/3D equivalent Plastics analysis, FEA, and cost calculations.

2. Literature Review

- Overview of Design Principles: Design for Manufacture (DFM) and Design for Assembly (DFA).
- Relevant Manufacturing Techniques: Injection moulding, casting, or other processes based on the product.
- Review of Analysis Tools: Briefly introduce QFD, FMEA, DOE, SolidWorks/Infusion/3D equivalent Plastics, and FEA.

3. Define Customer Requirements

- Performance Attributes: List and define the key performance requirements for the selected product (e.g., durability, lightweight, precision).
- QFD Application: Use QFD to translate customer needs into measurable technical specifications.
- Risk Analysis (FMEA): Identify potential failure points and propose mitigations.
- Optimisation (DOE): Conduct DOE to test and optimise critical design variables, such as material thickness and gate placement in moulds.

4. Design and Development

- 3D CAD Models: Include detailed CAD drawings of the component.
- Show exploded and assembled views of the mould, die, or fixture.
- Material Selection: Use the Cambridge Engineering Selector (CES) Database to choose suitable materials for the component or/and the mould/die.
- Provide a rationale for balancing performance, cost, and sustainability.

5. Simulation and Validation

- SolidWorks/Infusion/3D equivalent Plastics: Simulate polymer flow for injection moulding components.
- Highlight material flow, cooling, and defect mitigation (e.g., weld lines, air traps).
- Finite Element Analysis (FEA): Validate the robustness of the component (e.g., stress, deformation) under operational conditions.
- Dimensional Accuracy: Discuss results of tolerance analysis to ensure high precision.

6. Cost Calculation Analysis

- Material Costs: Provide estimates for raw materials, including volume and pricing.
- Manufacturing Costs: Break down machine time, tooling costs, and labour expenses.
- Break-Even Analysis: Calculate the break-even production volume to justify high-volume manufacturing.

7. Sustainability Considerations

- Material Recyclability: Highlight how material choices support recyclability.
- Energy Efficiency: Discuss design choices that reduce energy consumption (e.g., optimised cooling channels in moulds).
- Waste Reduction: Show how the design minimises scrap and production waste.

8. Discussion and Recommendations

- Compare simulation and validation results with customer requirements.
- Discuss design trade-offs made to meet constraints (e.g., cost vs. quality).
- Suggest further refinements or future work to improve the design.

9. Conclusion

- Summarise key findings, such as how the design meets performance, manufacturability, and sustainability requirements.
- Highlight the overall impact of the design on high-volume manufacturing.

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.
- Work must follow the required formatting guidelines (Arial, size 12, 1.5 spacing). Marks may be deducted for failure to comply with presentation requirements.
- Students must save and submit their work using the following file naming convention: First name Surname_IDnumber_ACMA4000 (e.g. Alex Smith_2103456_ACMA4000).
- 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.

See the generic assessment criteria included at the end of this brief. This will be strictly followed to mark your assignments.

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 provide evidence that you have accessed an appropriate *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 evaluating the extent to which your design, analysis, and decision-making are explicitly informed by current, credible, and discipline-appropriate sources. You are expected to engage with recent peer-reviewed journal articles, textbooks, industrial reports, and recognised standards relating to Design for Manufacture (DFM), Design for Assembly (DFA), injection moulding or casting/forging processes, polymer flow simulation, FEA, sustainability in manufacturing, and cost modelling. Literature should clearly influence your design choices rather than being used in a purely descriptive manner. This should be demonstrated through referenced justification of material selection using CES data supported by published sources, referenced explanations of manufacturing defects such as warping, weld lines, air traps, shrinkage, and residual stress, and the appropriate use of relevant standards where applicable. Harvard referencing must be used consistently throughout the main body of the report and in the final reference list. All figures, tables, graphs, diagrams, and numbered images that are based on external sources, adapted from literature, or informed by published data must be fully referenced; unreferenced visuals will not be accepted as evidence.

2. Knowledge and Understanding Skills

At level 5, you should be able to demonstrate: sound knowledge and critical understanding of the well established concepts and principles of the subject area and the way in which those principles have developed; knowledge of the main methods of enquiry in the discipline. *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.

Guidance specific to this assessment: This will be assessed by evaluating the depth and accuracy of your understanding of key manufacturing and design principles and how effectively these are applied to your selected product. You should demonstrate sound understanding of DFM and DFA principles, the fundamentals of the chosen manufacturing process, defect mechanisms, material behaviour, and product lifecycle considerations from production through to end-of-life and recyclability. Rather than simply describing theory, you must apply these concepts directly to your CAD design, explaining how specific features such as gate location, runner layout, cooling channels, draft angles, wall thickness, and tolerances support manufacturability and high-volume production. Your discussion should show how your design reduces the likelihood of defects and improves robustness and efficiency. Where relevant, you should include clear calculations, for example relating to material usage, shrinkage, estimated cycle time, or stress levels, to support your reasoning. Throughout the report, your arguments should be reinforced with properly referenced figures, technical tables, and annotated diagrams that demonstrate genuine technical understanding rather than superficial description.

3. Cognitive and Intellectual Skills

You should be able to critically analyse information, and propose solutions to problems arising from that analysis, including the critical evaluation of the appropriateness of different approaches to solving problems. 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/evidence 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, with an understanding of the limits of knowledge, and how this influences analyses and interpretations. 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 the extent to which you use structured analytical tools to investigate, optimise, and justify your design decisions in a rigorous and logical manner. You are expected to apply QFD to translate customer needs into measurable technical requirements, conduct a detailed FMEA that identifies realistic failure modes and proposes appropriate mitigation strategies, and use DOE where applicable to explore key design variables such as wall thickness, gate placement, or cooling design. Your use of SolidWorks Plastics (or equivalent) should go beyond simply generating plots; you must interpret results relating to flow behaviour, cooling efficiency, and defect risks, and explain how these influenced your design. Similarly, your FEA work should include clearly stated assumptions, boundary conditions, and loads, followed by a critical discussion of stress and deformation results. Your cost analysis must include transparent numerical calculations for material costs, tooling costs, machine time, labour, and break-even production volume rather than final figures alone. All analytical outputs, including tables, charts, and simulation images, must be numbered, clearly labelled, discussed in the text, and referenced where based on external data or established methodologies. Your overall argument should be evidence-driven, logically structured, and reflective of the limitations of your methods.

4. Practical Skills

At level 5, you should be able to use/deploy a range of established techniques within the discipline, and apply underlying concepts and principles outside the context in which they were first studied, including, where appropriate, the application of those principles in an employment context. 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, to assess current situations, perhaps to formulate plans or solutions to solve problems, or to create artefacts, some of which may be 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 competent and professional use of digital engineering tools to support design development and decision-making. You are expected to produce clear and accurate 3D CAD models of both the selected component and its associated production tooling, including assembled and exploded views that demonstrate manufacturability and assembly logic. Your use of SolidWorks Plastics (or equivalent) should inform design improvements rather than simply illustrate material flow, and your FEA work should meaningfully validate the structural performance of either the component or the tooling under realistic operational conditions. You should provide evidence of iterative design development, showing how simulation results led to specific design changes and improvements. Screenshots of CAD models, simulation outputs, and analysis results must be clearly numbered, labelled, and integrated into your written discussion. Where software settings, material properties, or modelling assumptions are used, these must be explicitly stated and justified.

5. Transferable Skills for Life and Professional Practice

Your work must provide evidence of the qualities and transferable skills necessary for employment requiring the exercise of personal responsibility and decision-making. This includes demonstrating: professional development to advance existing skills and acquire new competences 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: This will be assessed through the overall professionalism, clarity, and coherence of your written report and design documentation. You are expected to write in formal, third-person academic style, using appropriate technical terminology throughout. The report should follow the prescribed structure in a logical and well-organised manner, with clear links between text, figures, tables, and numbered diagrams. All visuals must be properly referenced, numbered, and explicitly discussed in the main body of the report rather than appended without explanation. Your work should read as a professional engineering design report rather than a descriptive coursework narrative, demonstrating systematic thinking, independent judgement, and careful integration of analysis, simulation, and cost considerations. Your ability to communicate complex technical decisions clearly and convincingly to an informed engineering audience, supported by calculations, standards, and visual evidence, will be central to this assessment. Compliance with professional report conventions, including file naming, formatting standards (Arial 12, 1.5 spacing), and consistent Harvard referencing, forms part of the assessment of professional practice and presentation quality.

Word Count Policy

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

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% above the word limit – No deduction off final mark
- Between 10% and 25% above the word limit – Deduction of 5 marks off final mark, or reduce the mark to the capped mark, whichever is the lesser penalty. For example, for an undergraduate student achieving a final mark of 44%, the mark 87 Academic Quality Handbook 2022/23 would be reduced to the capped mark of 40%; whereas for an undergraduate student achieving a final mark of 49%, the mark would be reduced to 44%. For a postgraduate student achieving a final mark of 54%, the mark would be reduced to the capped mark of 50%; whereas for a postgraduate student achieving a final mark of 67%, the mark would be reduced to 62%.
- Between 25% and 50% above the word limit – Deduction of 10 marks off final mark, or reduce the mark to the capped mark, whichever is the lesser penalty. For example, for an undergraduate student achieving a final mark of 47%, the mark would be reduced to the capped mark of 40%; whereas for an undergraduate student achieving a final mark of 55%, the mark would be reduced to 45%. For a taught postgraduate student achieving a final mark of 59%, the mark would be reduced to the capped mark of 50%; whereas for a postgraduate student achieving a final mark of 64%, the mark would be reduced to 54%.
- 50% or more over length – Maximum mark of capped mark

A failure to meet the word limit (or minimum word limit if a range is given) may result in lower marks based on the quality of the work because the work may not include the necessary information required for the assessment to meet the stated learning outcomes.

The feedback on the assessment should explicitly mention any mark deduction and the reason for it.

	Word Limit to 10%	10-25% over	25-50% over	50%+ over
Word count	5000-5500	5500-6250	6251-7500	7501+
Deduction (to 50% cap)	0%	5%	10%	Mark capped to 50%

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		
This will be assessed by evaluating the extent to which your work is research informed. Ensure that you use research to inform your design and development work and cite references to evidence your information sources. It's important to use correct referencing technique when citing references within the main body and at the end of the report – in the full reference list.	15	
2. Knowledge and Understanding Skills		
This will be assessed by evaluating the discussion and understanding shown of key concepts, processes, and principles in your report. This includes the manufacturing process selection, the design for 'X' considerations (e.g., DFM, DFA), product lifecycle considerations, and cost efficiency.	30	
3. Cognitive and Intellectual Skills		

This will be assessed by evaluating the extent to which analytical tools have been used throughout the project for problem investigation/definition, redesign and development, cost analysis, and design evaluation/verification. This includes the use of Failure Modes Effects Analysis (FMEA), SolidWorks/Infusion/3D equivalent Plastics simulation, Design for 'X' evaluation, and cost-break-even calculations.	30	
4. Practical Application Skills		
This will be assessed by evaluating your use of digital tools such as CAD, simulation tools (e.g., SolidWorks/Infusion/3D equivalent Plastics, FEA), and cost analysis tools to support your design and development work or communication of your designs.	15	
5. Transferable Skills for Life and Professional Practice		
This will be assessed via the written and presentational quality of your report and the standard of the design and development documentation. Aim to write in the third person and to use a formal writing style. Avoid colloquial terms and aim to use appropriate, technical terminology and language.	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 5

In accordance with the Framework for Higher Education Qualifications, at the end of Level 5 students will be expected to have developed sound knowledge and critical understanding of the well-established concepts and principles in their field of study, and of the way in which those principles have developed. They will have learned to apply those concepts and principles more widely outside the context in which they were first studied, including, where appropriate, the application of those principles in an employment context. They will have knowledge of the main methods of enquiry in the subject area, and ability to evaluate critically different approaches to problem solving. They will possess an understanding of the limits of their knowledge, and how this influences their analyses and interpretations. They will be able to use a range of established techniques to initiate and undertake critical analysis of information, and to propose solutions to problems arising from that analysis. They will be able to effectively communicate information, arguments and analysis in a variety of forms to specialist and non-specialist audiences, and deploy key techniques of the discipline effectively. They will be able to undertake further training, develop existing skills and acquire new competences that will enable them to assume significant responsibility within organisations. They will have the qualities and transferable skills necessary for employment requiring the exercise of personal responsibility and decision-making.

Level 5	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 literature, including sources retrieved independently. Some over-reliance on texts. Referencing may show minor inaccuracies or inconsistencies.	Engagement with a wide range of 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. Consistently accurate application of referencing.	Exceptional engagement with an extensive range of relevant and credible literature. High-level referencing skills consistently applied.
Knowledge and understanding (Sound knowledge and	Major gaps in knowledge with unsatisfactory, uncritical understanding of	Fragmentary knowledge, with only superficial critical understanding.	Limited but adequate knowledge and critical understanding of	Knowledge is reasonably detailed and accurate. A good critical	Knowledge is reasonably extensive. Exhibits very competent	Excellent, detailed knowledge and highly critical understanding of	Exceptionally detailed knowledge and outstanding critical

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Category	0-29%	30-39%	40-49%	50-59%	60-69%	70-84%	85-100%
critical understanding of the well-established concepts and principles in their field of study; knowledge of the main methods of enquiry in the discipline.)	the subject matter. Much irrelevant material. Substantial inaccuracies. Significantly flawed understanding of the main methods of enquiry in the discipline.	Some significant inaccuracies and/or irrelevant material. Incomplete or partially flawed understanding of the main methods of enquiry in the discipline.	the well-established concepts and principles within the subject area, with a few gaps in the selection of material. A narrow critical understanding of the main methods of enquiry.	understanding of the well-established concepts and principles and the main methods of enquiry, with minor gaps in the selection of material.	critical understanding of the well-established concepts and principles of the subject and the main methods of enquiry. Breadth and depth of knowledge.	the well-established concepts and principles of the subject and the main methods of enquiry.	understanding of the well-established concepts and principles of the subject and the main methods of enquiry. May go beyond established theories.
Cognitive and intellectual skills (Critical evaluation and analysis of concepts and principles; argument and judgement; the limits of their knowledge, and how this influences their analyses and interpretations.)	Wholly or almost wholly descriptive work. Little or no critical evaluation and analysis of concepts and principles. Failure to develop arguments, leading to illogical or invalid judgements. Unsubstantiated generalisations or opinion, made without use of any credible evidence.	Largely descriptive work, with superficial use of critical evaluation and analysis of concepts and principles. 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 evaluation and analysis of concepts and principles, tending towards description. Some evidence to support arguments and judgements but these may be underdeveloped, with a little inconsistency / mis-interpretation or failure to fully recognise limits of knowledge.	Some critical evaluation and analysis of concepts and principles, though descriptive in parts. An emerging awareness the limits of their knowledge and ability to use evidence to support the argument though with some tendency to assert/state opinion rather than argue on the basis of reason and evidence. Mostly valid arguments and logical judgements.	Sound critical evaluation and analysis of concepts. Is selective in the range of evidence used and synthesises rather than describes. Ability to devise arguments that show awareness of different stances, and use evidence convincingly, to support appropriate and valid judgements.	Excellent critical evaluation and analysis of concepts and principles leading to logical, evidence-based, reasoned arguments and judgements. Explicit recognition of other stances and a strong awareness of the limits of their knowledge. A capacity for independent thought and ability to 'see beyond the question', suggesting some grasp of the broader field and wider concepts.	Outstanding critical evaluation and analysis of concepts and principles. Uses evidence exceptionally well to connect ideas, and support highly logical and persuasive, arguments and judgements. Evidence of independent thought and ability to 'see beyond the question', suggesting a clear grasp of the broader field and wider concepts. Perceptive recognition of

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Category	0-29%	30-39%	40-49%	50-59%	60-69%	70-84%	85-100%
							the limits of their knowledge, and how this influences their analyses and interpretations.
Practical skills (Apply underlying concepts and principles more widely outside the context in which they were first studied; use a range of established techniques; propose solutions to problems arising from analysis.)	Limited or no use of established 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 outside the context in which they were first studied.	Rudimentary application of established 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 outside the context in which they were first studied.	An adequate awareness and mostly appropriate application of 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 outside the context in which they were first studied.	A good and appropriate application of established 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 outside the context in which they were first studied.	A very good application of a range of established methods, materials, tools and/or techniques. Very good consideration of the context of the application, with perceptive insights. Consistent, accurate and logical application of theory to practice, making appropriate links between the two. Can identify problems and propose appropriate solutions outside the context in which they were first studied. Evidence of some creativity.	An advanced application of a range of established methods, materials, tools and/or techniques. The context of the application is well considered, and insightful. Consistent, accurate and logical application of theory to practice, making well-developed links between the two. Can identify problems and propose excellent, creative solutions outside the context in which they were first studied.	Exceptional levels of application and deployment skills using established methods, materials, tools and/or techniques. Consistent, accurate and logical application of theory to practice, making highly developed links between the two. Can identify routine and non-routine problems and propose quite sophisticated, creative solutions outside the context in which they were first studied.
Transferable skills for life	Communication medium is	Communication medium is poorly	Can communicate in	Can communicate	Can communicate	Can communicate	Can communicate

Level 5	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%
and professional practice (Effectively communicate in a variety of forms to specialist and non-specialist audiences; the qualities and transferable skills necessary for employment requiring the exercise of personal responsibility and decision-making.)	inappropriate or misapplied. Work is poorly structured, disorganised and/or confusingly expressed. Very weak use of language and/or very inappropriate style. Failure to work effectively as part of a group. Little or no evidence of the skills for employment requiring the exercise of personal responsibility and decision-making.	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. Flawed approach to group work, meeting only partial obligations to others. Limited evidence of the skills for employment requiring the exercise of personal responsibility and decision-making.	a suitable medium for the audience 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 group, meeting most obligations to others but perhaps with limited involvement in group activities. Demonstrates the basic skills for employment requiring the exercise of personal responsibility and decision-making, with some areas of minor weakness.	effectively in a suitable medium for the audience, 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 for employment requiring the exercise of personal responsibility and decision-making, with some areas of strength and some of minor weakness.	well, confidently and consistently in a suitable medium for the audience. 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 skills for employment requiring the exercise of personal responsibility and decision-making, with just occasional minor weakness.	professionally confidently and consistently in a suitable medium for the audience. Work is coherent, very fluent and is presented proficiently. Can work autonomously with initiative. Where relevant can work professionally within a team, showing leadership skills as appropriate, and meeting obligations. Demonstrates excellent skills for employment requiring the exercise of personal responsibility and decision-making and an appetite for further development.	with an exceptionally high level of professionalism, highly suitable for the audience. Work is exceptionally coherent, very fluent and is presented professionally. Can work exceptionally well within a team, showing leadership skills. Demonstrates exceptional skills for employment requiring the exercise of personal responsibility and decision-making and an appetite for further development.

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