

LEVEL 6 ASSESSMENT SPECIFICATION

Student name:		Student ID number:	
Programme:	BEng Engineering programmes		
Module:	Advanced Materials and Processes		
Module code:	M6X00414	Contribution to Overall Module Assessment (%):	30%
Lecturer:	Graham Howe & Dr Greg Owen	Internal Verifier:	Dr Greg Owen
Assignment Title:	Advanced Processes Report	Word count (or equivalent):	1,800
Submission deadline:	Report: 10am 22-Jun-20 Presentation: 26-Jun-20	Return date of provisional marks & written feedback:	17-Jul-20
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.		

Turnitin: Lecturer to tick to indicate if an electronic version of the assignment must be submitted to Turnitin. Note: the Turnitin version is the primary submission and acts as a receipt for the student. Both electronic and paper versions MUST be submitted by the same deadline. No marks will be released until both submissions are received. Late submission of either the electronic or paper version will result in a late penalty mark. Penalties for late submission: Up to one week late, maximum mark of 40%. Over one week late, Refer.	YES	✓
	NO	

Learning Outcomes tested (from module syllabus)	Assessment Criteria To achieve each outcome a student must demonstrate the ability to:
Analyse the structure-property relationships and behaviour of a range of advanced engineering materials and manufacturing processes	Apply appropriate physical principles in the analysis of the structure property behaviour relationships of a range of novel engineering materials and manufacturing processes.

Critically appraise the potential for application of a range of advanced materials and processes in typical engineering applications

Analyse the materials and processing requirements for specified engineering applications and specify appropriate materials and processes

- Please submit the assignment parts in a suitable report folder– not in polypockets.
- This form (ALL PAGES) MUST be at the front of the paper submission. Assignments will not be accepted without this form as it is a requirement that you sign the disclosure regarding referencing convention.
- DO NOT put this form into Turnitin or it will match many similarities with other students' submissions.

TASK DESCRIPTION

You are required to select an advanced technology from the list below and produce an investigative report that addresses the issues specified.

List of options;

1. Ceramics for high temperature applications
2. Ceramics for medical applications
3. Laser forming of sheet metals
4. Recycling and subsequent refining of ferrous based alloys
5. Metallic/polymer/ceramic coatings for the purpose of corrosion resistance
6. Electrical conductivity of metals and Semi-conductors.
7. Another technology of your choice agreed in advance with the module tutor.

Your assignment should address the following;

1. Fundamental scientific principles of the technology (30%)
2. Detailed analysis of the application(s) including manufacturing, environmental, ethical and health and safety implications. (25%)
3. A critical evaluation of the potential strategic impact of the technology on the appropriate industrial / market sector. (25%)
4. Marks awarded for the structure, presentation and referencing. (10%)
5. 10 minute presentation (with questions) to the peer-group and lecturing staff. (10%)

Word Count 1,800 words

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, as 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 correctly 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.

Your background research should show evidence of fundamental underpinning working practices for continuous improvement as well as technically relevant information of the Industry 4 technologies that could be considered. In addition to your independently sourced research material, supporting material and podcasts are included on the Module Moodle pages.

2. Knowledge and Understanding Skills

At this level, you should be able to demonstrate a systematic understanding of knowledge, and a critical awareness of current problems and/or new insights, much of which is at, or informed by, the forefront of your academic discipline, field of study or area of professional practice, with a comprehensive understanding of techniques applicable to your own research or advanced scholarship.

Your work must demonstrate your growing mastery of these concepts, principles, current challenges, innovation and insights 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 contemporary 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.

Your knowledge of this subject should be evidenced by your choice of underpinning technologies and the structure of your analyses. Where assumptions are made these should be validated.

3. Cognitive and Intellectual Skills

You should be able to: evaluate critically current research and advanced scholarship in the discipline; evaluate methodologies and develop critiques of them and, where appropriate, to propose new hypotheses; deal with complex issues both systematically and creatively to make sound judgements in the absence of complete data. 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 experts within the subject area is crucial to you providing a reasoned and informed debate within your work.

Your choice of methodologies to gather data and information must be rigorously defended. Furthermore, you should provide evidence that you are able to make sound judgements and convincing arguments using data and concepts. Sound, valid, persuasive conclusions are necessary and must be derived from the content of your work. Where relevant, alternative solutions and recommendations may be proposed.

4. Practical Skills

At level 7, you should be able to demonstrate originality in the application of knowledge, together with a practical understanding of how established techniques of research and enquiry are used to create and interpret knowledge in the discipline. This includes acting autonomously in planning and implementing tasks at a professional or equivalent level, originality in tackling and solving problems, and decision-making in complex and unpredictable contexts or situations.

You should be able to demonstrate mastery of the leading edge subject-related concepts and ideas as they relate to real world situations and/or particular contexts. How do they work in practice? You will deploy models, methods, techniques, and/or theories, in those contexts or circumstances, to assess current situations, perhaps to formulate plans or plausible, justifiable recommendations to solve problems, or to propose new models, or to create artefacts, which may be innovative and creative, thereby demonstrating your understanding of how the boundaries of knowledge are advanced through research and/or application. 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.

5. Transferable Skills for Life and Professional Practice

Your work must provide evidence of the qualities and transferable skills necessary for postgraduate-level employment in circumstances requiring sound judgement, personal responsibility and initiative in complex and unpredictable professional environments.

This includes demonstrating: the independent learning ability for continuing 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, projects and procedures, whether individually and/or collaboratively, to a professional level; that you can use appropriate media to effectively communicate information, arguments and analysis in a variety of forms for a variety of audiences; fluency of expression; clarity and effectiveness in presentation and organisation. Work should be coherent and well-structured in presentation and organisation.

This will be assessed in the way that you present your work. Your essay should be presented in a professional manner, be easy to read with each of the above tasks clearly addressed. Use of appropriate spreadsheets, numerical analysis software, graphical interpretation of results, etc.

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		
	30	
2. Knowledge and Understanding Skills		
	15	
3. Cognitive and Intellectual Skills		
	20	
4. Practical Application Skills		
	15	
5. Transferable Skills for Life and Professional Practice		
	20	

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 (50% Max)		
	Over 1 week late (0%)		

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 knowledge and	Major gaps in knowledge and systematic understanding of the subject matter.	Gaps in knowledge, with only superficial systematic understanding. Some significant	Limited knowledge and systematic understanding of the relevant concepts and	Knowledge is reasonably detailed, accurate with a good systematic understanding of	Knowledge is reasonably extensive coherent and detailed. Exhibits very	Excellent coherent and detailed knowledge and systematic understanding of	Exceptionally coherent and detailed knowledge and systematic understanding of

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systematic understanding of the subject area, at least some of which is informed by the latest research and/or advanced scholarship within the discipline.)	Substantial inaccuracies. No awareness of knowledge of the latest research and/or advanced scholarship within the discipline.	inaccuracies and/or irrelevant material. No awareness of knowledge of the latest research and/or advanced scholarship within the discipline.	principles within the subject area which to some limited extent, is informed by current research and scholarship.	the field of study and to some extent, current research and scholarship.	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.	the principles and theories of current research and scholarship. Clear awareness of challenges to established views and the limitations of the knowledge base.	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 the basis of	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

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Category	0-29%	30-39%	40-49%	50-59%	60-69%	70-84%	85-100%
				reason and evidence.			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 personal	Communication medium is inappropriate or misapplied. Work is poorly structured, disorganised and/or	Communication medium is poorly designed and/or not suitable for the audience. Work is poorly presented in a disjointed	Can communicate in a suitable medium but with some room for improvement. Mostly ordered presentation and	Can communicate effectively in a suitable format, but may have minor errors. Mostly coherent, organised work,	Can communicate well, confidently and consistently in a suitable format. Work is coherent, fluent,	Can communicate professionally confidently and consistently in a suitable format. Work is coherent, very	Can communicate with an exceptionally high level of professionalism. Work is exceptionally

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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.)	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.	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.	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.	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.	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.	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.	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.

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