

MODULE SPECIFICATION FORM

Module Title:	Engineering Materials and Components	Level:	4	Credit Value:	10
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Module code: (if known)	ENG405	Cost Centre:	GAME	JACS2 code:	J500
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Semester(s) in which to be offered:	1	With effect from:	July 2015
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Office use only: To be completed by AQSU:	Date approved:	July 2015
	Date revised:	
	Version No:	1

Existing/New:	Existing	Title of module being replaced (if any):	N/A
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Originating Academic area:	Engineering and Applied Physics	Module Leader:	R. Grant
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Module duration (total hours)	100	Status:	Free-standing 10-credit component comprising 'Materials' section of ENG460 (Laboratory Methods and Materials).
Scheduled learning and teaching hours	36	core/option/elective	
Independent study hours	64	(identify programme where appropriate):	
Placement hours	0		

Percentage taught by Subjects other than originating Subject (please name other Subjects):	0%
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Programme(s) in which to be offered: Engineering European Programme (Non Award Bearing)	Pre-requisites per programme (between levels):	None
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Module Aims: To provide an understanding of the properties of a range of materials used in engineering in order to enable selection of appropriate materials for a given component or structure.
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Expected Learning Outcomes	
<u>Knowledge and Understanding:</u> At the completion of this module, the student should be able to:	
<ol style="list-style-type: none"> 1. Apply mechanical and electrical science principles to characterisation of the performance parameters of a range of materials; 2. Define the processes used to produce specific properties within selected materials; 3. Evaluate, by practical investigation, the properties of materials and their suitability for use in specific devices, components or structures, including availability and cost. (KS 1) 	
<u>Key skills for employability</u>	
<ol style="list-style-type: none"> 1. Written, oral and media communication skills, 2. Leadership, team working and networking skills 3. Opportunity, creativity and problem solving skills 4. Information technology skills and digital literacy 5. Information management skills 6. Research skills 	<ol style="list-style-type: none"> 7. Intercultural and sustainability skills 8. Career management skills 9. Learning to learn (managing personal and professional development, self management) 10. Numeracy

Assessment:

Please indicate the type(s) of assessment (eg examination, oral, coursework, project) and the weighting of each (%). **Details of indicative assessment should also be included.**

Assessment is 100% in-course. The assessment is based on a range of practical labworks and investigations culminating in a single formal report to cover all outcomes. The formal report would be an in-depth investigation based on a selected log report, requiring extensive student-driven investigation in addition to the practical work. For example: the design of a component to withstand a particular loading (stress/strain, or current). This may integrate with work from other modules.

(This corresponds to Assessment 2 of the Module ENG460.)

Assessment number	Learning Outcomes to be met	Type of assessment	Weighting	Duration (if exam)	Word count (if coursework)
Assessment One:	1, 2, 3	Report	100%		1500

Learning and Teaching Strategies:

The module will be delivered by a mixture of lectures, assignments and practical sessions. The relevant mode of delivery will be linked to the desired learning outcome. For example tensile strength of materials would be delivered by a practical session, Bohr's Theory in a lecture.

Syllabus outline:

(These topics will be biased towards the Electrical and Electronic applications or towards Mechanical applications, depending on the cohort).

Materials structures: Atomic structure, bonding, crystalline and amorphous structures.

Properties of a range of materials. Applications: Range of applications, types of components.

Materials production and manipulation – range of processes applied to materials.

Material/device selection: manufacturers' data, British Standards.

Practical evaluation of characteristics and properties; test methods; equipment used; measurements and error quantification. Test evaluation.

BibliographyEssential Reading:

Ashby, M.F. (2010) *Materials Selection in Mechanical Design*, 4th Edn., Butterworth-Heinemann.

Jiles, D. (2001) *Introduction to the Electronic Properties of Materials*, 2nd Edn., CRC Press.

Recommended Reading:

Bolton, W; (2004); *Engineering Materials Technology*, 4th Edition; Butterworth.

Higgins, R. & Bolton, W. (2010) *Materials for Engineering and Technicians*, 5th Edn., Newnes.

Shackelford, J.F. (2008) *Introduction to Materials Science for Engineers*, 7th Edn., Prentice Hall.

Bolton, W. (2001) *Electrical Electronic Measurement & Testing*, Butterworth-Heinemann.

Irene, E. (2008) *Electronic Materials Science: Surfaces, Interfaces, and Thin Films for Microelectronics*,

Wiley-Blackwell.

Ulrich, R.K. & Schaper, L.W. (2003) *Integrated Passive Component Technology*, Wiley-Blackwell.