

## MODULE SPECIFICATION FORM

Module Title:	<b>Engineering Design</b>	Level:	<b>5</b>	Credit Value:	<b>10</b>
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Module code: (if known)	<b>ENG508</b>	Cost Centre:	<b>GAME</b>	JACS2 code:	<b>H150</b>
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Semester(s) in which to be offered:	<b>1</b>	With effect from:	<b>July 2015</b>
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<b>Office use only:</b> To be completed by AQSU:	Date approved:	July 2015
	Date revised:	
	Version No:	1

Existing/New:	<b>Existing</b>	Title of module being replaced (if any):	N/A
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Originating Academic area:	<b>Engineering and Applied Physics</b>	Module Leader:	<b>Z. Chen</b>
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Module duration (total hours)	100	<b>Status:</b> Free-standing 10-credit component comprising second half of ENG551 (Engineering Mechanisms and Dynamics and Engineering Design).
Scheduled learning and teaching hours	36	
Independent study hours	64	
Placement hours	0	

Percentage taught by Subjects other than originating Subject (please name other Subjects):	<b>0%</b>
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<b>Programme(s) in which to be offered:</b>	Pre-requisites per programme (between levels):	<b>None</b>
<b>Engineering European Programme</b> (Non Award Bearing)		

<b>Module Aims:</b>
To develop understanding of the design process, the use of specifications, and the creation of design solutions by manual methods and by use of computers, including relevant theory, such as basic statics and dynamics, in the design process.

<b>Expected Learning Outcomes</b>
<u>Knowledge and Understanding:</u> At the completion of this module, the student should be able to:
1. Demonstrate an ability to recognise, identify, define and produce specifications for a set of engineering problems and communicate the results effectively to a client. (KS 2)
2. Identify and with a minimum of guidance, analyse the data provided and select appropriate methods/techniques to produce an optimum design. (KS 9)
3. Appraise the social and environmental implications of the design process. (KS 7)
<u>Key skills for employability</u>
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
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. It is by means of a portfolio of reflective design activities, both individually and within a group covering all outcome. It comprises: Individual design work 50%, contribution to group design work 50%.

(This corresponds to 'Assessment 2' of ENG551.)

Assessment number (use as appropriate)	Learning Outcomes met	Type of assessment	Weighting	Duration (if exam)	Word count (if coursework)
Assessment One:	1, 2, 3	Portfolio.	100%		2000

**Learning and Teaching Strategies:**

The object of this module is to allow the student to apply knowledge and analysis methods from previous modules to the design process and choose appropriate methods for their resolution. It will also give responsibility to the student at this level to manage the process within broad guidelines and to plan and develop interactive group skills. To this end formal lectures are kept to the minimum except to introduce new concepts to allow this freedom. The use of discussion groups, seminars and tutorials will be the method of delivery envisaged. Use of computers, standards and codes of practice will be encouraged.

**Syllabus outline:**

**Appreciation of design requirements:** Innovation in Design. Design constraints: market, technical, manufacturing, economic and environmental constraints. Codes and standards. Ethical considerations. Evaluation.

**Sustainable design:** Phases of design. Product life cycle. Reliability. Economics of the design. Environmental impacts of the product.

**Design solutions:** Team work: From a specific design brief (a 'real' industrial problem) work as part of a small team, analyse problem, and propose various designs. Apply static and dynamic analysis. Choose one cost effective design and produce a design study with full documentation.

**Computer simulation in design:** Understand how computers can aid the designer in the design process. Introduction to various simulation packages such as linkage simulations, optimisation design process etc.

**Stages in the development of a project:** relate the design process to the requirements and stages of a student's individual project - in preparation for level 6 main individual project.

**Bibliography:**Essential reading:

Cross, N. (2008) *Engineering Design Methods: Strategies for Product Design*, 4<sup>th</sup> Edn., Wiley-Blackwell.

Recommended Reading:

Michael F.,(2002).*Materials & Design*.Oxford Uk:Butterworth Heinemann

Bstrom M.,(2006).*Practical Engineering Design*.London: CRC Press

Gerdeen JC.,(2006).*Engineering Design with Polymers & Composites*.London :CRC Press

Swift KG.,(2003).*Process Selection from Design to Manufacture*.Oxford UK:Butterworth Heinemann