

<b>Module Title:</b>	Composite Design & Manufacture	<b>Level:</b>	6	<b>Credit Value:</b>	20
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<b>Module code:</b>	ENG60A	<b>Is this a new module?</b>	YES	<b>Code of module being replaced:</b>	
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<b>Cost Centre:</b>	GAME	<b>JACS3 code:</b>	J500
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<b>Trimester(s) in which to be offered:</b>	2	<b>With effect from:</b>	September 17
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<b>School:</b>	Applied Science, Computing & Engineering	<b>Module Leader:</b>	N.Luhyna
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Scheduled learning and teaching hours	60 hrs
Guided independent study	140 hrs
Placement	0 hrs
<b>Module duration (total hours)</b>	<b>200 hrs</b>

<b>Programme(s) in which to be offered</b>	Core	Option
BEng (Hons) Composite Design	<input checked="" type="checkbox"/>	<input type="checkbox"/>

<b>Pre-requisites</b>
None

Office use only

Initial approval February 17

APSC approval of modification

Have any derogations received Academic Board approval?

Version 1

Yes  No

**Module Aims**

- To provide an understanding of the importance of design, manufacture and performance issues in current applications of composite materials.
- This module develops an integrated approach to design for composite structures.

**Intended Learning Outcomes**

Key skills for employability

KS1	Written, oral and media communication skills
KS2	Leadership, team working and networking skills
KS3	Opportunity, creativity and problem solving skills
KS4	Information technology skills and digital literacy
KS5	Information management skills
KS6	Research skills
KS7	Intercultural and sustainability skills
KS8	Career management skills
KS9	Learning to learn (managing personal and professional development, self-management)
KS10	Numeracy

At the end of this module, students will be able to

Key Skills

At the end of this module, students will be able to		Key Skills	
1	Demonstrate the understanding of the major issues for the design and manufacture of composite structures.	KS1	KS10
		KS3	KS6
2	Apply computer modelling and analysis to the solutions of practical and complex design problems on composite materials.	KS1	KS10
		KS2	KS3
3	Demonstrate the understanding and use of conceptual design, manufacturability analysis and structural analysis of composite components for research and development.	KS1	KS10

**Derogations**

A derogation from regulations has been approved for this programme which means that whilst the pass mark is 40% overall, each element of assessment (where there is more than one assessment) requires a minimum mark of 30%.

**Assessment:**

Assessment One: An individually prepared report for solutions, discussion of results obtained by computer modelling of a composite related problem.

Assessment Two: A written examination which assesses the capability of knowledge and use of conceptual design, manufacturability analysis and structural analysis of composite components.

Assessment number	Learning Outcomes to be met	Type of assessment	Weighting (%)	Duration (if exam)	Word count (or equivalent if appropriate)
1	1,2	Coursework	50		2000
2	3	Examination	50	2 hours	

**Learning and Teaching Strategies:**

The module will be delivered through detailed presentations combined with interactive sessions to enhance students' learning. The learning experience will be further supported by tutorials and self-study work.

**Syllabus outline:**

**Introduction to design of composite materials**

Introduction to design techniques.

**Composite design and manufacture principles**

Design challenges and opportunities, design tools and product standards.

**CAD for composite design and manufacture**

Computer aided design (CAD) for composite design (CATIA, ABAQUS or ANSYS), Finite Element Analysis (FEA). Modelling of practical composite problems.

**Materials modelling**

Laminate analysis, modelling and design of composites, impact, interlaminar stresses. Modelling of practical composite problems.

**Design for manufacture of composites**

Process modelling and control in composites manufacture, costing and optimisation. Problem solving techniques (brainstorming, mind maps, etc.), project panning (Gantt charts, etc.).

**Bibliography:**

**Essential reading**

Barbero, E.J. (2011) Introduction to composite materials design. Boca Raton, F: CRC Press. 2nd Ed.

Potter, K. (1997) An introduction to composite products, design, development and manufacture, Chapman & Hall.

**Other indicative reading**

Riley, P. (2000) Computer Aided Engineering, International Business Press.

Long, A. (2005) Design and Manufacture of Textile Composites, Woodhead Publishing. 1st Ed.

Swanson, S.P. (1997) Introduction to Design and Analysis with Advanced Composite materials. Prentice Hall.

Ferziger, J. H & Peric, M. (2004) Computational Methods for Fluid Dynamics. Springer. 3rd Ed.

Mitra, S.K., (2012) Digital Signal Processing, McGraw-Hill International. 3rd Ed.