



## MODULE SPECIFICATION

Part 1: Information			
Module Title	Composite Engineering		
Module Code	UFMFU6-15-3	Level	Level 6
For implementation from	2020-21		
UWE Credit Rating	15	ECTS Credit Rating	7.5
Faculty	Faculty of Environment & Technology	Field	Engineering, Design and Mathematics
Department	FET Dept of Engin Design & Mathematics		
Module type:	Standard		
Pre-requisites	None		
Excluded Combinations	None		
Co- requisites	None		
Module Entry requirements	None		

Part 2: Description
<p><b>Overview:</b> The course aims to provide a rounded understanding of composite engineering (design, manufacture and performance) so that students are competent with the subject when they work in industry.</p> <p><b>Educational Aims:</b> See Learning Outcomes</p> <p><b>Outline Syllabus:</b> Classification and structure of composite materials, composition and structural relationships.</p> <p>Matrix materials: thermoplastic and thermosetting polymer, ceramic and metallic.</p> <p>Reinforcing materials: fibres and particulates, including carbon, glass, aramid, boron, metallic and ceramic.</p> <p>Fabric materials: woven, stitched, chopped mats and 3D fabrics.</p> <p>Core materials: honeycombs and foams.</p> <p>Joining of composite materials: bonded and bolted joints.</p>

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<p>Manufacturing processes: main methods, influence on material properties, quality, volumes and cost.</p> <p>Design for manufacture and assembly.</p> <p>Calculation of physical and mechanical properties: rule of mixtures, Hart-Smith, simplified classical laminate analysis method.</p> <p>Design of composite structures: fundamental principles, design guidelines, balance, symmetry, thickness law.</p> <p>Testing of composite materials: reasons for importance, destructive and nondestructive methods.</p> <p>Performance of composite structures: tension, compression, bending, shear, impact toughness, fatigue, failure criterion.</p> <p>Sustainability and recycling of composites: natural fibres and matrices, reduced weight, conflicts.</p> <p><b>Teaching and Learning Methods:</b> Contact: 36 hours</p> <p>Assimilation and development of knowledge: 75 hours</p> <p>Problem solving: 11 hours</p> <p>Examination preparation: 28 hours</p> <p>Total: 150 hours</p> <p>Large group lecture supported by laboratory sessions. Study time outside of contact hours will be spent on going through exercises and example problems.</p> <p>Scheduled learning: lectures and a laboratory based design, manufacture, analyse and test learning cycle project.</p> <p>Independent learning: essential reading, preparation, e-learning activity and assessment, assignment preparation and completion.</p>
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Part 3: Assessment			
<p>Component A: Computer based tests assess competency and breadth of understanding of composite materials.</p> <p>Component B: The coursework is both summative and formative.</p> <p>The assignment provides the students with the opportunity to apply composite theory, develop a hands-on understanding of the materials and manufacturing process and test their understanding of the course material through an applied learning cycle.</p>			
First Sit Components	Final Assessment	Element weighting	Description
Online Assignment - Component A		25 %	E-learning assessment on composite materials
Portfolio - Component B		75 %	Assignment on design, manufacture and and test of composites

## STUDENT AND ACADEMIC SERVICES

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Part 4: Teaching and Learning Methods																	
Learning Outcomes	<p>On successful completion of this module students will achieve the following learning outcomes:</p> <table border="1"> <thead> <tr> <th>Module Learning Outcomes</th> <th>Reference</th> </tr> </thead> <tbody> <tr> <td>Justify the selection of optimum materials for particular applications</td> <td>MO1</td> </tr> <tr> <td>Critically analyse the inter-relationship between manufacturing process, material properties, quality and cost</td> <td>MO2</td> </tr> <tr> <td>Design optimum solutions with composite materials</td> <td>MO3</td> </tr> <tr> <td>Calculate the physical and mechanical properties of composite materials and justify their advantages over metallic solutions</td> <td>MO4</td> </tr> <tr> <td>Appraise the performance and discuss the key conflicts with composite materials with regard to sustainability and recyclability</td> <td>MO5</td> </tr> </tbody> </table>	Module Learning Outcomes	Reference	Justify the selection of optimum materials for particular applications	MO1	Critically analyse the inter-relationship between manufacturing process, material properties, quality and cost	MO2	Design optimum solutions with composite materials	MO3	Calculate the physical and mechanical properties of composite materials and justify their advantages over metallic solutions	MO4	Appraise the performance and discuss the key conflicts with composite materials with regard to sustainability and recyclability	MO5				
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Reading List	<p>The reading list for this module can be accessed via the following link:</p> <p><a href="https://uwe.rl.talis.com/modules/ufmfu6-15-3.html">https://uwe.rl.talis.com/modules/ufmfu6-15-3.html</a></p>																

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### Part 5: Contributes Towards

This module contributes towards the following programmes of study:

Mechanical Engineering with Manufacturing {Apprenticeship} [Sep][PT][Frenchay][4yrs] BEng (Hons) 2018-19

Automotive Engineering [Sep][FT][Frenchay][4yrs] MEng 2018-19

Automotive Engineering [Sep][FT][Frenchay][3yrs] BEng (Hons) 2018-19

Mechanical Engineering [Sep][FT][Frenchay][4yrs] MEng 2018-19

Mechanical Engineering [Sep][FT][Frenchay][3yrs] BEng 2018-19

Mechanical Engineering with Manufacturing [Sep][PT][Frenchay][4yrs] BEng (Hons) 2018-19

Mechanical Engineering with Manufacturing {Apprenticeship} [Sep][PT][UCW][4yrs] BEng (Hons) 2018-19

Mechanical Engineering with Manufacturing {Apprenticeship} [Sep][PT][COBC][4yrs] BEng (Hons) 2018-19

Mechanical Engineering with Manufacturing {Apprenticeship} [Sep][FT][Frenchay][3yrs] BEng (Hons) 2018-19