MODULE SPECIFICATION

Part 1: Information			
Module Title	Composite Engineering		
Module Code	UFMFU6-15-3	Level	Level 6
For implementation from	2019-20		
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

Overview: 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.

Educational Aims: See Learning Outcomes

Outline Syllabus: Classification and structure of composite materials, composition and structural relationships.

Matrix materials: thermoplastic and thermosetting polymer, ceramic and metallic.

Reinforcing materials: fibres and particulates, including carbon, glass, aramid, boron, metallic and ceramic.

Fabric materials: woven, stitched, chopped mats and 3D fabrics.

Core materials: honeycombs and foams.

Joining of composite materials: bonded and bolted joints.

Manufacturing processes: main methods, influence on material properties, quality, volumes and cost.

Design for manufacture and assembly.

Calculation of physical and mechanical properties: rule of mixtures, Hart-Smith, simplified classical laminate analysis method.

Design of composite structures: fundamental principles, design guidelines, balance, symmetry, thickness law.

Testing of composite materials: reasons for importance, destructive and nondestructive methods.

Performance of composite structures: tension, compression, bending, shear, impact toughness, fatigue, failure criterion.

Sustainability and recycling of composites: natural fibres and matrices, reduced weight, conflicts.

Teaching and Learning Methods: Contact: 36 hours

Assimilation and development of knowledge: 75 hours

Problem solving: 11 hours

Examination preparation: 28 hours

Total: 150 hours

Large group lecture supported by laboratory sessions. Study time outside of contact hours will be spent on going through exercises and example problems.

Scheduled learning: lectures and a laboratory based design, manufacture, analyse and test learning cycle project.

Independent learning: essential reading, preparation, e-learning activity and assessment, assignment preparation and completion.

Part 3: Assessment

The examination (component A) is summative and assesses the students' understanding of concepts and techniques, and their ability to apply them to relatively straightforward problems.

The coursework is both summative and formative. The computer based tests assess competency and breadth of understanding of composite materials. 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. Feedback from the coursework is intended to assist students with their preparations for the end-of-year examination.

First Sit Components	**Final Assessment**	**Element weighting**	**Description**
Portfolio - Component B		37 %	Assignment on design, manufacture and and test of composites
Online Assignment - Component B		13 %	E-learning assessment on composite materials
Examination - Component A	✓	50 %	Examination (2 hours)

Resit Components	Final Assessment	Element weighting	Description
Portfolio - Component B		50 %	Assignment on design, manufacture and test of composites
Examination - Component A	✓	50 %	Examination (2 hours)

Part 4: Teaching and Learning Methods

Learning Outcomes

On successful completion of this module students will achieve the following learning outcomes:

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

Contact Hours

Independent Study Hours:	
Independent study/self-guided study	114
Total Independent Study Hours:	114
Scheduled Learning and Teaching Hours:	
Face-to-face learning	36
Total Scheduled Learning and Teaching Hours:	36
Hours to be allocated	150
Allocated Hours	150

Reading List

The reading list for this module can be accessed via the following link:

https://uwe.rl.talis.com/modules/ufmfu6-15-3.html

Part 5: Contributes Towards
This module contributes towards the following programmes of study: