MODULE SPECIFICATION

Part 1: Information			
Module Title	Stress Analysis, Materials and Finite Element Analysis		
Module Code	UFMF9Q-30-3	Level	Level 6
For implementation from	2019-20		
UWE Credit Rating	30	ECTS Credit Rating	15
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 Stress Analysis, Materials, and Finite Element Analysis module focusses on advanced stress concepts, such as curved beams, deflections and un-symmetric bending and material stress and fatigue. Key areas for study are understanding stress theory and how to apply FEA theory to practical modelling techniques.

Educational Aims: Learners will develop the theoretical understanding of advanced stress concepts and material stress, alongside Finite Element Analysis (FEA) to enable the learner to apply stress concepts to carry out modelling, which would be used in industry.

Outline Syllabus: The topics covered in this unit are:

Stress:
Stress Concentration
Un-symmetric bending
Curved beams
Elementary elastic plastic analysis
Buckling of struts
Beams deflections
Mohr's Circle for stress and strain
Rosette analysis

Failure criteria for ductile and brittle materials

Materials:
Introduction to Design Codes and Standards
Energy Methods in Structural Analysis
Impact
Fatigue Analysis
Fracture Mechanics
Introduction to Creep and Plastic Stress Analysis

Finite Element Analysis:
Introduction to FEA theory, technique and applications
Practical modelling techniques
Elementary elastic plastic analysis.

Teaching and Learning Methods: See Outline Syllabus and Assessment.

Part 3: Assessment

Component A – Data Interpretation: Analysing a Case Study – The learner will be given a set of stress data as a case study and will be asked to perform stress analysis calculations.

Component B – FEA Model Design – The learners will design an FEA model of stress in a section of nuclear plant and present their results, along with material stress analysis results and material properties evaluation in presentation slides.

The resit assessment tasks for this module will involve a rework and reflective evaluation of the work carried out in the original task.

First Sit Components	**Final Assessment**	**Element weighting**	**Description**
Set Exercise - Component B		45 %	Presentation slides
Practical Skills Assessment - Component B		30 %	FEA model design
Case Study - Component A	✓	25 %	Data interpretation - case study
Resit Components	**Final Assessment**	**Element weighting**	**Description**
Set Exercise - Component B		45 %	Presentation slides
Practical Skills Assessment - Component B		30 %	FEA model design
Case Study - Component A	✓	25 %	Data interpretation - case study

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
Conduct stress and dynamics analysis calculations	MO1
Analyse stress in real engineering scenarios	MO2
Evaluate the design and properties of materials under load	MO3
Design and create stress models using FEA	MO4

Contact Hours

Independent Study Hours:	
Independent study/self-guided study	228
Total Independent Study Hours:	228
Scheduled Learning and Teaching Hours:	
Face-to-face learning	72
Total Scheduled Learning and Teaching Hours:	72
Hours to be allocated	300
Allocated Hours	300

Reading List

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

https://uwe.rl.talis.com/index.html

Part 5: Contributes Towards

This module contributes towards the following programmes of study: