MODULE SPECIFICATION

Part 1: Information			
Module Title	Advanced Structural Analysis		
Module Code	UBGMM3-15-3	Level	Level 6
For implementation from	2020-21		
UWE Credit Rating	15	ECTS Credit Rating	7.5
Faculty	Faculty of Environment & Technology	Field	Geography and Environmental Management
Department	FET Dept of Geography & Envrnmental Mgmt		
Module type:	Standard		
Pre-requisites	Applications of Mathematics in Civil and Environmental Engineering 2020-21, Structural Analysis 2020-21		
Excluded Combinations	None		
Co- requisites	None		
Module Entry requirements	None		

Part 2: Description

Overview: Pre-requisites: 60 credits at Level 2 To include: UFMFF7-15-2 Applications of Mathematics for Civil and Environmental Engineering

Educational Aims: In this module students will develop the necessary knowledge, understanding and skills to analyse and solve problems relating to multi-variable structural systems of both statically determinate and indeterminate structure types, including plates.

In addition the educational experience may explore, develop, and practise but not formally discretely assess the following:
Appreciation of the importance of validation and verification in interpretation of computer output.
Appreciation of the uncertainties inherent in selection of material properties, loadings and boundary conditions.

Outline Syllabus: The syllabus includes:

Matrix methods in structural analysis: matrix algebra, matrix displacement method.
Stiffness method of structural analysis of pin-jointed structures and frames: nodes, elements, stiffness matrix, loads and restraints.
Introduction to finite elements analysis: nodes, elements, meshes, stiffness matrix, boundary conditions and loads.

Practical finite elements techniques: element types, mesh generation, pre-processing, post-processing.
Influence line analysis.
Modelling dynamic systems: single degree of freedom systems, multi degree of freedom systems, interpreting dynamic response.

Teaching and Learning Methods: This module will be delivered through lecture sessions aimed at establishing the discipline context, key definitions/concepts, and also at establishing a framework for learning. The lectures will be supported by e-learning using computer-based learning exercises. Through these mechanisms learners will also build upon the fundamental concepts covered in the lectures and start applying new understanding through the tasks and activities provided. Regular formative feedback is built into the weekly contact sessions.

Contact Hours:

On average students will receive 4.5 hours of contact time per week. This will be in a range of formats, including lectures, laboratory practicals, field work, tutorial or computer-based sessions, formative feedback sessions and support via e-mail.

The amount of time spent on activities in this module is:

Activity:
Contact time (lectures/feedback/practical sessions): 36 hours
Assimilation and development of knowledge: 84 hours
Coursework preparation: 30 hours
Total study time: 150 hours

Part 3: Assessment

Component A – Examination. Learning outcomes 1,2 and 4. Demonstration of learning outcomes 1, 2 and 4 is via solving unseen questions in a written examination. This allows the fundamental processes associated with these learning outcomes to be assessed with the assurance the work is individual.

Component B – Report (1000 words). Learning outcome 3. To allow the students to demonstrate learning outcome 3 a coursework task, requiring application of a finite element modelling to an engineering problem is used. The input parameters of the problem can be adjusted allowing for a unique problem for each student. The submission is a concise technical report.

Students work on the above tasks throughout the module and receive regular formative feedback in tutorial sessions.

First Sit Components	**Final Assessment**	**Element weighting**	**Description**
Examination (Online) - Component A	✓	50 %	Online Exam
Report - Component B		50 %	See assessment strategy.
Resit Components	**Final Assessment**	**Element weighting**	**Description**
Examination (Online) - Component A	✓	50 %	Online Exam
Report - Component B		50 %	Report (1000 words)

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
Use matrix methods to carry out elastic structural analysis	MO1
Use the stiffness method to carry out elastic structural analysis of trusses and frames	MO2
Use the finite element method to model frames and plates to investigate their response to different load conditions	MO3
Use of single and multi-degree of freedom models to assess the dynamic response of structures	MO4

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/ubgmm3-15-3.html

Part 5: Contributes Towards

This module contributes towards the following programmes of study:

Civil Engineering [Jan][FT][Northshore][4yrs] MEng 2018-19

Civil and Environmental Engineering [Sep][FT][Frenchay][4yrs] MEng 2018-19

Civil and Environmental Engineering [Sep][FT][Frenchay][3yrs] BEng (Hons) 2018-19