MODULE SPECIFICATION

Part 1: Information			
Module Title	Aero Structures		
Module Code	UFMFX6-15-2	Level	Level 5
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	Stress & Dynamics 2019-20		
Excluded Combinations	None		
Co- requisites	None		
Module Entry requirements	None		

Part 2: Description

Educational Aims: The module aims to provide a solid foundation for the design, analysis and evaluation of aircraft structures. The module covers several aspects related to the structural analysis of aircraft structures. The module also aims to provide some fundamental concepts of solid mechanics of materials, stress analysis, idealisation methods and shear flows used in the analysis of aircraft structures.

Outline Syllabus: Elasticity: including stress and strain in deformable bodies, stress-strain relationship, compatibility and equilibrium equations and failure criteria.

Structural Instability: including Euler buckling of columns and tension field beams.

Bending, Shear and Torsion of Thin-Walled Beams: including unsymmetrical bending, thin walled beam shear, and open section beam shear and torsion.

Structural Idealisation: including structural idealisation and deflection of open and closed section beams.

Fatigue of aerospace structures: including fatigue failure criteria, life estimates, endurance limit and cumulative damage.

Teaching and Learning Methods: We will focus on applications on aircraft analysis such as wing boxes and fuselage and dimension components for fatigue life and design plates for buckling analysis of some important aircraft components such as spars and skin panels.

The module involves extensive comprehension of stress analysis. Hence, possessing a sound understanding of concepts within the realm of theory of linear elasticity such as stress/strain, principal stresses/strains and Mohr's circle is imperative.

Part 3: Assessment

This module is assessed via an open book exam at the end of the semester (3 hours, 50%) to assess the students' understanding of concepts and techniques.

An assessment on a team-based coursework carrying a weighting (50%) to encourage engagement and focus on application of the theory and stimulate project related work. The delivery for the assessment will be a report of maximum 12 pages for each group. The group size will be between 5-6 students. There will be a group mark. However, in the case of lack of contribution of team members, the student team is allowed to peer mark each individual moderated by the module leader. Therefore, in such cases, individual marks will be adjusted and distributed based on the level of contribution of each team member complying with group work marking strategy given prior to the issuance of the coursework.

The resit assignment will be for an individual, and thus will consist of a problem to be solved using the taught techniques. The student effort in the resit is the same as each individual is expected to contribute in the first sitting's group activity. The page limit for the report is limited to 3 pages.

First Sit Components	**Final Assessment**	**Element weighting**	**Description**
Report - Component B		50 %	Assessment for practical work (max. 12 pages)
Examination - Component A	✓	50 %	Exam (3 hours)
Resit Components	**Final Assessment**	**Element weighting**	**Description**
Report - Component B		50 %	Assessment for practical work (max. 3 pages)
Examination - Component A	✓	50 %	Exam (3 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
Show a detailed knowledge and understanding of key theoretical principles and results	MO1
Model and solve a range of real aero structures problems	MO2
Apply the knowledge and experience to develop research skills to investigate and solve more complex problems in aero-structures	MO3
Develop and solve simplified mathematical models of the structural design of real aircraft	MO4
Demonstrate key transferable skills in problem formulation and decision-making	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/ufmfx6-15-2.html

Part 5: Contributes Towards

This module contributes towards the following programmes of study:

Aerospace Engineering with Pilot Studies [Sep][SW][Frenchay][5yrs] MEng 2018-19
Aerospace Engineering [Sep][SW][Frenchay][5yrs] MEng 2018-19
Aerospace Engineering [Sep][FT][Frenchay][3yrs] BEng (Hons) 2018-19
Aerospace Engineering with Pilot Studies [Sep][SW][Frenchay][4yrs] BEng (Hons) 2018-19
Aerospace Engineering (Design) [Sep][SW][Frenchay][5yrs] MEng 2018-19
Aerospace Engineering (Systems) [Sep][FT][Frenchay][4yrs] MEng 2018-19
Aerospace Engineering with Pilot Studies [Sep][FT][Frenchay][3yrs] BEng (Hons) 2018-19
Aerospace Engineering with Pilot Studies (Design) [Sep][FT][Frenchay][3yrs] BEng (Hons) 2018-19
Aerospace Engineering with Pilot Studies (Design) [Sep][SW][Frenchay][4yrs] BEng (Hons) 2018-19
Aerospace Engineering with Pilot Studies [Sep][FT][Frenchay][4yrs] MEng 2018-19
Aerospace Engineering (Design) [Sep][FT][Frenchay][4yrs] MEng 2018-19
Aerospace Engineering with Pilot Studies (Design) [Sep][SW][Frenchay][5yrs] MEng 2018-19
Aerospace Engineering with Pilot Studies (Manufacturing) [Sep][SW][Frenchay][5yrs] MEng 2018-19
Aerospace Engineering with Pilot Studies (Systems) [Sep][SW][Frenchay][5yrs] MEng 2018-19
Aerospace Engineering with Pilot Studies (Systems) [Sep][FT][Frenchay][4yrs] MEng 2018-19
Aerospace Engineering with Pilot Studies (Manufacturing) [Sep][FT][Frenchay][4yrs] MEng 2018-19
Aerospace Engineering with Pilot Studies (Design) [Sep][FT][Frenchay][4yrs] MEng 2018-19
Aerospace Engineering with Pilot Studies (Manufacturing) [Sep][FT][Frenchay][3yrs] BEng (Hons) 2018-19
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Aerospace Engineering (Manufacturing) [Sep][SW][Frenchay][4yrs] BEng (Hons) 2018-19
Aerospace Engineering (Systems) [Sep][FT][Frenchay][3yrs] BEng (Hons) 2018-19
Aerospace Engineering (Systems) [Sep][SW][Frenchay][4yrs] BEng (Hons) 2018-19
Aerospace Engineering (Systems) {Foundation} [Sep][SW][Frenchay][5yrs] BEng (Hons) 2018-19
Aerospace Engineering with Pilot Studies {Foundation} [Sep][SW][Frenchay][5yrs] BEng (Hons) 2018-19
Aerospace Engineering {Foundation} [Sep][SW][Frenchay][5yrs] BEng (Hons) 2018-19