

Module Title:	Mechanics of Materials 1
Language of Instruction:	English
Credits:	5
NFQ Level:	8
Module Delivered In	2 programme(s)
Teaching & Learning Strategies:	The module will be delivered using lectures, tutorials and laboratory sessions to illustrate the concepts under study
Module Aim:	To provide the student with: • the skills to analyse the internal effects of forces applied to the members in an aircraft structure, as evidenced by the stresses and deformations resulting. • a foundation for subsequent modules in the area of Aircraft Structural Mechanics, with particular reference to Aircraft structures
Learning Outcomes	
<i>On successful completion of this module the learner should be able to:</i>	
LO1	Analyse the behaviour of composite materials subject to loading.
LO2	Apply formulae to determine the shear force and bending moment distributions of beams.
LO3	Solve the forces in the individual members of a loaded truss or framework in an aircraft.
LO4	Contribute effectively, as an individual and as part of a group, to the planning and realization of investigations in a laboratory environment into the behaviour of structural materials in service.
Pre-requisite learning	
Module Recommendations <i>This is prior learning (or a practical skill) that is recommended before enrolment in this module.</i>	
No recommendations listed	
Incompatible Modules <i>These are modules which have learning outcomes that are too similar to the learning outcomes of this module.</i>	
No incompatible modules listed	
Co-requisite Modules	
No Co-requisite modules listed	
Requirements <i>This is prior learning (or a practical skill) that is mandatory before enrolment in this module is allowed.</i>	
No requirements listed	

Module Content & Assessment

Indicative Content

Frameworks

Analysis of the loads carried by individual members of a loaded frame in an aircraft by the Method of Joints.

Composite Materials

Use of Composite materials in Aircraft applications. Elastic constants of Composite materials – Rule of Mixtures. Particulate, fibre and laminar composites.

Properties of Sections

Centroid of a cross-section. Second Moment of Area; Parallel Axis Theorem; Second Moment of Area of composite sections; Section Modulus.

Shear Force and Bending Moment in beams

Shear force and bending moment distributions; Simply supported beams & Cantilevers; Concentrated loading; Uniformly distributed loading.

Stress due to bending

Direct Stresses in beams of rectangular cross-section due to bending; Shear Stresses in beams of rectangular cross-section due to bending; Stresses in beams of composite/irregular cross-section; Maximum allowable applied loads.

Assessment Breakdown	%
Continuous Assessment	80.00%
Practical	20.00%

Continuous Assessment

Assessment Type	Assessment Description	Outcome addressed	% of total	Assessment Date
Examination	CA 1		20.00	Week 5
Examination	CA 2	1,2	30.00	Week 9
Examination	Students will be expected to sit a number of individual written assessments throughout the academic year, typically at the conclusion of one or more learning outcomes.	2,3	30.00	Week 13

No Project

Practical

Assessment Type	Assessment Description	Outcome addressed	% of total	Assessment Date
Practical/Skills Evaluation	Students will carry out a number of laboratory experiments throughout the academic year and will produce written reports describing each one. Students will be assigned to groups for the execution of the laboratory practical work but reports must be submitted on an individual basis. The laboratory practical work will include the following: • Shear force in a beam • Bending moment in a beam • Modulus of Rigidity • Stresses in a thin cylinder	2,3,4	20.00	n/a

No End of Module Formal Examination

SETU Carlow Campus reserves the right to alter the nature and timings of assessment

Module Workload

Workload: Full Time		
<i>Workload Type</i>	<i>Frequency</i>	<i>Average Weekly Learner Workload</i>
Lecture	12 Weeks per Stage	3.00
Laboratory	12 Weeks per Stage	1.00
Independent Learning	15 Weeks per Stage	5.13
Total Hours		125.00

Module Delivered In

Programme Code	Programme	Semester	Delivery
CW_EEAER_B	Bachelor of Engineering (Honours) in Aerospace Engineering	4	Mandatory
CW_EEACS_D	Bachelor of Engineering in Aircraft Systems	4	Mandatory