MECH H3602: Mechanics of Materials 2

Module Title:	Mechanics of Materials 2
Language of Instruction:	English

Credits:	5

NFQ Level:	7

Module Delivered In	1 programme(s)

Teaching & Learning Strategies:	This module will be taught by Lectures, Tutorials & Practical Tasks.

Module Aim:	The student will be able to compute standard structural calculations and describe standard structural practices related to aviation.

Learning Outcomes	
On successful completion of this module the learner should be able to:	
LO1	Evaluate the general design concepts of an aircraft structure
LO2	Calculate minimum beam sizes from shear and bending moment calculations.
LO3	Predict the behaviour and/or failure of mechanical systems subjected to loads.
LO4	Apply software applications to predict the behaviour of mechanical systems subjected to loads.

Pre-requisite learning
Module Recommendations *This is prior learning (or a practical skill) that is recommended before enrolment in this module.*
No recommendations listed
Incompatible Modules *These are modules which have learning outcomes that are too similar to the learning outcomes of this module.*
No incompatible modules listed
Co-requisite Modules
No Co-requisite modules listed
Requirements *This is prior learning (or a practical skill) that is mandatory before enrolment in this module is allowed.*
No requirements listed

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Module Content & Assessment

Indicative Content
Airframe Structures - General Concepts Airworthiness requirements for structural strength; Structural classification, primary, secondary and tertiary; Fail safe, safe life, damage tolerance concepts; Zonal and station identification systems; fatigue; Drains and ventilation provisions; System installation provisions; Construction methods of: stressed skin fuselage, formers, stringers, longerons, bulkheads, frames, doublers, struts, ties, beams, floor structures, reinforcement, methods of skinning, anti-corrosive protection, wing, empennage and engine attachments; Structure assembly techniques: bonding; Methods of surface protection, such as chromating, anodising, painting; Surface cleaning; Airframe symmetry: methods of alignment and symmetry checks
Airframe Structures - Aeroplanes Fuselage (ATA 52/53/56): Construction and pressurisation sealing; Wing, stabiliser, pylon and undercarriage attachments; Seat installation and cargo loading system; Doors and emergency exits: construction, mechanisms, operation and safety devices; Windows and windscreen construction and mechanisms Wings (ATA 57) Construction; Fuel storage; Landing gear, pylon, control surface and high lift/drag attachments Stabilisers (ATA 55) Construction; Control surface attachment Flight Control Surfaces (ATA 55/57) Construction and attachment; Balancing - mass and aerodynamic Nacelles/Pylons (ATA 54) Nacelles/Pylons: - Construction; - Firewalls; - Engine mounts
Beams Simply supported, cantilver, Shear Force and Bending Moment diagrams, Section properties, Section modulus, selection of beams.
Deflection of Beams Double integral method, Macaulay's Method.
Cylinders (Thin Walled and Thick Walled) Hoop stress, axial stress, Lamé's theorm.
Truss analysis: Method of Joints review and Method of Sections.
Slender Columns Euler theory for slender columns, buckling for pin ended and or fixed ended
Numerical Methods Simpsons method, Trapezoidal method.

Assessment Breakdown	%
Continuous Assessment	80.00%
Practical	20.00%

Continuous Assessment

Assessment Type	*Assessment Description*	*Outcome addressed*	*% of total*	*Assessment Date*
Examination	A short examination that may be administered through the college VLE.	1	10.00	Week 5
Written Report	Students will the asked to make a report based on some numerical analysis of a structural problem.	2,3,4	35.00	Week 7
Examination	An in class test.	1,2,3	35.00	Week 10

No Project

Practical

Assessment Type	*Assessment Description*	*Outcome addressed*	*% of total*	*Assessment Date*
Practical/Skills Evaluation	Each student will complete a range of practical tasks, administered during term time.	1,2,3	20.00	Every Week

No End of Module Formal Examination

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

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Module Workload

Workload: Full Time		
Workload Type	*Frequency*	*Average Weekly Learner Workload*
Lecture	12 Weeks per Stage	2.00
Practicals	12 Weeks per Stage	2.00
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	5	Mandatory