

Module Code	MEU44B01
Module Name	Mechanics of Solids
ECTS Weighting	5 ECTS
Semester taught	Semester 2
Module Coordinator/s	Assistant Professor Mark Ahearne
Module Learning Outcomes with reference to the Graduate Attributes and how they are developed in discipline	<p>LO1. Demonstrate a fundamental knowledge of the theory of elasticity, including equilibrium equations, compatibility equations, boundary conditions and stress functions.</p> <p>LO2. Calculate the stress and strain distribution using stress functions in a number of engineering structures under load.</p> <p>LO3. Assess the suitability of specific viscoelastic models for different materials and different mechanical characterization techniques.</p> <p>LO4. Calculate the mechanical behaviour of laminates in different orientations</p> <p>LO5. Demonstrate a basic understanding of the finite element method</p> <p>Graduate Attributes: levels of attainment</p> <p>To act responsibly - Enhanced</p> <p>To think independently - Enhanced</p> <p>To develop continuously - Enhanced</p> <p>To communicate effectively - Not embedded</p>
Module Content	<p>This module expands upon fundamental topics developed in MEU33B03. Theory of elasticity is used to develop equations describing the stress-strain behaviour in different components under load. The use of stress functions is developed and applied to problems such as thick-walled pressure vessels and holes in plates. Rheological models are developed and used to describe the behaviour of viscoelastic materials. The mechanical characteristic of laminate structures and the influence orientation has on mechanical strength are examined. Finally, the theory of the finite element method and its use in solving problems in mechanics is introduced.</p>
Teaching and Learning Methods	<p>This part of the module is taught using a combination of lectures and tutorials. During the tutorials the students work in groups thereby encouraging teamwork and cooperation.</p>

Assessment Details Please include the following: <ul style="list-style-type: none"> • Assessment Component • Assessment description • Learning Outcome(s) addressed • % of total • Assessment due date 	Assessment Component	Assessment Description	LO Addressed	% of total	Week due
	Written or online examination	End of semester examination	1-5	85	Exam period
	Assignment	Viscoelastic modelling of materials report	3	15	End of week 28
Reassessment Requirements	Written Examination				
Contact Hours and Indicative Student Workload	<hr/> Contact hours: 40 (32 Lectures, 8 tutorials) <hr/> Independent Study (preparation for course and review of materials): 50 <hr/> Independent Study (preparation for assessment, incl. completion of assessment): 25 <hr/>				
Recommended Reading List	<ul style="list-style-type: none"> • Theory of Elasticity, S Timoshenko & JN Goodier (McGraw-Hill) • Plastics Engineering, RJ Crawford (Butterworth-Heinemann) • Mechanics of Composite Materials, RM Jones (Taylor & Francis) 				
Module Pre-requisite	MEU33M03 Mechanics of Solids				
Module Co-requisite	None				
Module Website	www.tcd.ie/Engineering/undergraduate/baiyear4/modules/4B1.pdf				
Are other Schools/Departments involved in the delivery of this module? If yes, please provide details.	No				

Module Approval Date

Approved by

Academic Start Year

Academic Year of Date