

MODULE DESCRIPTION FORM

DEPARTMENT OF MECHANICAL AND AEROSPACE ENGINEERING

16232 ENGINEERING MECHANICS 2

Module Registrar: Dr Robert Hamilton r.hamilton@strath.ac.uk	Taught To (Course): Cohorts for whom class is compulsory		
Other Lecturers Involved: Dr Jinglang Feng	Credit Weighting: 20 (ECTS 10)	Semester: 1 and 2	
Assumed Prerequisites: 16132	Compulsory	Academic Level: 2	Suitable for Exchange: Y

Module Format and Delivery (HOURS i.e. 1 credit = 10hrs of study):

Lecture	Tutorial	Laboratory	Groupwork	External	Online	Project	Assignments	Private Study	Total
44	21	4						131	200

Educational Aim

This module aims to:

1st Semester

To develop skills, knowledge and understanding in the areas of structural analysis and elementary stress analysis. The work is divided into 4 parts i) statics revision including shear force and bending moment diagrams ii) beams in bending iii) shear and torsion iv) 2D stress and strain.

2nd Semester

To provide students with the basic skills to analyse dynamics problems, associated with bodies and simple mechanisms, from first principles.

Learning Outcomes

On completion of the module the student is expected to be able to:

- LO1 understand the principles of dynamical analysis and be able to apply this understanding to the analysis of simple mechanical systems
- LO2 understand and apply linear vibration theory.
- LO3 have a basic understanding of elementary strength of materials with applications to simple determinate and indeterminate systems
- LO4 have an understanding of equilibrium and compatibility in relation to 2-dimensional stress and strain and be able to apply this knowledge to problems involving the analysis of stress and strain in the context of elementary design of engineering components.

Syllabus

The module will teach the following:

1st Semester

Tensile test – uniaxial systems, temperature and pre-load effects. Engineers' theory of bending. Direct and bending effects. Shear stress due to torsion and bending. Two dimensional stress and strain including Mohr's circle for stress and Von Mises and Tresca yield criterion.

2nd Semester

Rectilinear and angular motion where acceleration is a function of time, displacement and velocity. Centre of mass and moment of inertia of a composite object. Dynamic equivalence and connected systems. Free vibration analysis of an undamped single degree of freedom system – Simple Harmonic Motion.

Assessment of Learning Outcomes

Criteria

For each of the Module Learning Outcomes the following criteria will be used to make judgements on student learning:

LO1

C1 participation in the use of classroom communication system, classroom questions and discussions

C2 able to answer concept questions in the class

C3 in examinations and tutorials identify key aspects of the problem, identify relevant assumptions, draw correct free body diagrams, schematic diagrams and apply relevant mechanical principles including the use of calculus or conservation of energy to solve engineering problems.

LO2

C1 participation in the use of classroom communication system, classroom questions and discussions

C2 able to answer concept questions in the class

C3 in examinations and tutorials identify key aspects of the problem, identify relevant assumptions, draw correct free body diagrams and apply relevant mechanical principles leading to the generation of relevant differential equations of motion and the solution thereof.

C4 undertake lab experiments in a proficient manner and produce a clear readable lab report.

LO3

C1 in examinations, coursework and tutorials identify key aspects of the problem, identify relevant assumptions, draw correct free body diagrams and apply relevant mechanical principles

C2 undertake lab experiments in a proficient manner and produce a clear readable lab report. (Note:

LO4

C1 in examinations, coursework and tutorials identify key aspects of the problem, identify relevant assumptions, and apply relevant mechanical principles.

The standards set for each criterion per Module Learning Outcome to achieve a pass grade are indicated on the assessment sheet for all assessment.

Principles of Assessment and Feedback

(within Assessment and Feedback Policy at: <https://www.strath.ac.uk/staff/policies/academic/>)

Summative feedback will be provided by the return of examination marks to students after assessment.

Formative feedback will be provided at tutorial and laboratory sessions primarily through individual or group discussion of work prepared in advance by students (note: to receive this feedback students should participate in these tutorials but attendance is not mandatory).

Additional written feedback given on written coursework using problem solving.

Immediate self-directed feedback through in-class polling systems.

Assessment Method(s) Including Percentage Breakdown and Duration of Exams

Examination				Coursework		Practical		Project	
Number	Month(s)	Duration	Weighting	Number	Weighting	Number	Weighting	Number	Weighting
1	Apr/May	3hrs	80%	3	5% Dyn Lab 5% Stru Lab 10% c/work				
* All				* All		*		*	

* **L/Os:** Indicate which Learning Outcomes (L01, L02, etc) are to be assessed by exam/coursework/practical/project as required.

Coursework / Submissions deadlines (academic weeks):

1st Semester coursework to be submitted at end 1st week of semester 2.

Lab reports submitted 5/6 weeks after laboratory in semester 2.

Resit Assessment Procedures:

3hr examination in August diet.

PLEASE NOTE:

Students must gain a summative mark of 40% to pass the module. Students who fail the module at the first attempt will be re-examined during the August diet. This re-examination will consist entirely of exam. No marks from any previous attempts will be transferred to a new resit attempt.

Recommended Reading

*****Purchase recommended **Highly recommended reading *For reference (do NOT purchase)**

1st Semester

"Mechanics of Engineering Materials" by Benham, Crawford and Armstrong. ****Highly recommended reading**

2nd Semester

"Vector Mechanics for Engineers - Dynamics" by F P Beer, E R Johnston and W E Clausen,
McGraw Hill. 11th Edition in SI Units ***** Purchase recommended**

Additional Student Feedback

(Please specify details of when additional feedback will be provided)

Date	Time	Room No
Thursday tutorials	2-3 PM	Check timetable webpages for details

Session: 2020/21

Approved:

Course Director Signature: Dr Stuart Grey

Date of Last Modifications: 10 September 2020

(Updated June 2020)

MODULE TIMETABLE

Module Code:

16232

Module Title:

Engineering Mechanics 2

Brief Description of Assessment:

3hr Exam Apr/May (80%), 1 Coursework (10%), 2 lab reports (10% total). Resit 3hr exam in August.
Coursework submission is at end of 1st week of semester 2.
(Note: coursework set in week 10 of semester 1)

Submission of lab reports is 5/6 weeks after laboratory.

(Note: the laboratories will take place in semester 2 Consolidation Week, prior to teaching week 1 of the second semester)

Assessment Timing:-

Indicate on the table below the start/submission dates for each assignment/project and the timing of each exam/assessment using the dropdowns provided. Dropdowns can be left blank. Add extra notes below the dropdowns.

Please note: Timings can and will change, this should only be used as a guide.

Semester One	W&D Wk	WK1	WK2	WK3	WK4	WK5	WK6	WK7	WK8	WK9	WK10	WK11	Exam Period
	Choose an item. Choose an item.	Choose an item. Choose an item.	Choose an item. Choose an item.	Choose an item. Choose an item.	Choose an item. Choose an item.	Choose an item. Choose an item.	Choose an item. Choose an item.	Choose an item. Choose an item.	Choose an item. Choose an item.	Choose an item. Choose an item.	Choose an item. Choose an item.	Course work Set	Choose an item. Choose an item.

Semester Two	C&D Wk	WK1	WK2	WK3	WK4	WK5	WK6	WK7	WK8	WK9	WK10	WK11	Exam Period
	Lab Lab Choose an item.	Course work Submit	Choose an item. Choose an item.	Choose an item. Choose an item.	Choose an item. Choose an item.	Choose an item. Choose an item.	Lab Report Submission	Lab Report Submission	Choose an item. Choose an item.	Choose an item. Choose an item.	Choose an item. Choose an item.	Choose an item. Choose an item.	Choose an item. Choose an item.

Note: Laboratories usually take place in Consolidation Week prior to the start of the 2nd semester in January. Specific arrangements for the laboratories will be given to students during the 1st semester.