Course Outline

Semester 1 2015

MMAN1300
Engineering Mechanics 1

Contents

1. COURSE AT A GLANCE

Week	**Statics Content** M&K Statics	**Dynamics Content** M&K Dynamics	**Assessed Activities**
	Shared Content MK(S) or MK(D)		
1	**Introduction** MK(S)1/1 **Newton's Laws** MK(S)1/4, MK(D)1/3 **Fundamental Concepts** MK(S)1/2, MK(D)1/2 **Vectors** MK(S)C/7, MK(D)C/7 **Dimensions** MK(S)1/5, MK(D)1/4 **Forces** MK(S) 2/2,3,7 **Moments** MK(S)2/4,5,8		
2	**Free Body Diagrams** MK(S)3/2		Moodle Quiz Problem Solving Exercise
	Equilibrium 3/3,4		
3	**Equivalent loads** 2/6,9 **Determinacy** 3/3,4 **Trusses** 4/2-4	**1-D Kinematics** 2/2	

2. COURSE STAFF

Contact details and consultation times for course convener

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Aims of the course

The aim of this course can be stated simply: For everyone involved (staff, students, demonstrators) to progress further towards becoming really good engineers.

Our field of endeavour will be the concepts and applications of Introductory Engineering Mechanics.

Additionally, we will not measure our progress as the number of equations or facts or theories that we know. Rather as our degree of transformation into someone who sees, understands, can make relevant and accurate predictions, and communicates about the world around us through the lens of Engineering Mechanics.

Context

This is your first course in Engineering Mechanics, which is the study of the interaction of matter and forces in engineering contexts. It is evident that all objects in the world around us are composed of matter, and they are all subject to forces. As such, Engineering Mechanics is the foundational tool for engineers, and forms the underlying basis for understanding more advanced fields such as Solid Mechanics, Fluid Dynamics, Rigid Body Dynamics, Aerodynamics, Structures, Control and many aspects of Advanced Design.

For many of you, this course is a direct pre-cursor to two Year 2 courses: MMAN2400 Solid Mechanics 1 and MMAN2300 Engineering Mechanics 2.

Expected student learning outcomes

Students who successfully complete this course will be able to:	**UNSW graduate attributes**[1]
1. Explain and describe principles and components of Engineering Mechanics and their inter-relationships formally and informally, in writing and verbally, to technical experts, peers and lay people. Such principles and components include: vectors, forces, torques, mass and inertia, particles and rigid bodies, equilibrium conditions, free and constrained motion of particles and rigid bodies in two dimensions, balance of linear momentum, balance of angular momentum, mechanical work, kinetic and potential energy, mechanical power, and internal forces and bending moments in beams.	1.1, 1.3, 1.6

2.	Define engineering systems in a mechanically useful way and describe their equilibrium or motion in mathematical and graphical fashion and be able to relate this description to the principles of engineering mechanics. Engineering systems here may be as presented in a textbook or laboratory, or as observed in the everyday world around us.	1.4, 4.1
3.	Discern the relevant principles that must be applied to describe the equilibrium or motion of engineering systems and discriminate between relevant and irrelevant information in the context.	1.2, 1.3, 1.4

You are also encouraged to compare the learning outcomes with the Engineers Australia Stage 1 Competencies for Professional Engineers. Engineers Australia is the accrediting body for engineering education in Australia, and as such it is necessary that you are able to demonstrate these competencies by the time of your graduation in Engineering.

The Stage 1 Competencies can be found at:
http://www.engineersaustralia.org.au/sites/default/files/shado/Education/Program%20Accreditation/110318%20Stage%201%20Professional%20Engineer.pdf

4. TEACHING STRATEGIES

This course will be delivered both in the classroom and online. Full participation in the class means that you will participate fully in both arenas. That is, you will be held accountable for all content, instructions, information, etc. that is delivered either in class or online. There will also be laboratory or practical exercises that you may have to complete during your self-study time.

Online: The online forum for participation in this class is the Moodle Platform, specifically the Engineering Mechanics 1 course at http://moodle.telt.unsw.edu.au/course/view.php?id=13587. All official online interactions will take place or be linked clearly and appropriately from this site.

In class: There are three in-class activities in a typical week which we refer to as the Wednesday Lecture, Friday Lecture and Problem Solving Class based on the timetable above.

Both the online and in-

5. **Openness:** As much of the course as possible will be conducted in the open where all participants can be aware of it and comment upon it.
6. **Process:** The focus of the course will be on processes, not outcomes. The right outcomes will be a by-product of following the correct processes.

5. ASSESSMENT

As much as is practicable, assessment in the course will be used to see if students have gained new ways of seeing, not to differentiate them from each other or to sort them. This is naturally limited by University rules concerning the grading of students and students desire to understand where they stand in relation to their peers. Further details of individual assessment tasks will be provided on Moodle, including submission procedures and the criteria by which grades will be assigned.

Late Submission Policy

Late submission of Problem Solving Exercises (PSEs), Moodle Quizzes, Adaptive eLearning Tutorials, the Group Assignment and the Laboratory Report is **not** permitted in this course. Special consideration may be granted according to the policy listed in the section titled 'Administrative Matters' below.

Presentation Requirements

All assessed materials should be neat and clear, and demonstrate professionalism. Guidance can be found in the School's publications Standard Specification for the Presentation of Student Written Assignments and In a Nutshell, both of which are provided in The Guide (see School General Office if you do not have a copy).

Individual Problem Solving Exercises must be submitted to your demonstrators on paper during the problem solving session time and include your name and student number. All other assignments must be submitted to Moodle electronically.

Assessment Scheme

Marks	Assessment	Reason for assessment	Targeted student learning outcomes
15	3 x Tests (5 marks each)	To assess and provide feedback to you on your basic progress in Learning Outcomes 1-4 periodically throughout the term.	1, 2, 3, 4
6	Group Project	To give you experience in analysing trusses within the context of the real world, working in groups, and in presenting analysis and evaluating the analysis of your peers.	1, 2, 3, 4, 5

16	8 x Adaptive eLearning Tutorials (2 marks each)	These activities are designed to allow you to explore fundamental threshold concepts and to demonstrate your ability to think critically and solve problems related to these concepts.	3
12	4 x Moodle Quiz (3 marks each)	To provide you with rapid feedback on your ability to solve problems related to current topics in the course and to familiarize you with the format and types of questions to be found on the Final Exam. You will have unlimited chances to answer until the deadline.	1, 2, 3, 4
8	Shear Force & Bending Moment Lab Exercise	To provide you with hands-on experience with experimental rigs, and with writing formal engineering reports.	1, 2, 3, 4, 5
8	Problem Solving Exercises (PSEs) (1 mark each, but taking the best six marks and scaling them to a mark out of 8)	To provide you with feedback in demonstrating the correct processes for solving problems.	1, 2, 3, 4
35	**Final exam**	To provide you a final chance to show your achievement of Learning Outcomes 1-4.	1, 2, 3, 4
Total 100			

9	Problem Solving Exercise 5 Moodle Quiz 3 Adaptive eLearning: Work & Energy Laboratory is open for completion of the Shear Force & Bending Moment experiments during this week.	1 3 2	Friday 8/5,f

online resources, attend the Learning Centre, or sometimes resubmit your work with the problem fixed. However more serious instances in first year, such as stealing another student's work or paying someone to do your work, may be investigated under the Student Misconduct Procedures.

Repeated plagiarism (even in first year), plagiarism after first year, or serious instances, may also be investigated under the Student Misconduct Procedures. The penalties under the procedures can include a reduction in marks, failing a course or for the most serious matters (like plagiarism in an honours thesis) even suspension