MMAN3400

MECHANICS OF SOLIDS 2

Contents

Summary of the Course

This course will continue the development of a systematic approach to problem solving that commenced in earlier courses. It will focus on Membrane stresses in axisymmetric shells, simple bending, bending of composite and reinforced concrete beams, principal and cross moments of area, unsymmetrical bending, transverse shear stresses in beams, shear centre, column buckling, theory of elasticity: compatibility – equilibrium – constitutive equations – plane stress and strain, torsion of multiply connected thin-walled sections, deflection analysis based on the principle of virtual work, various modes of fracture, crack-tip stresses, stress intensity factor, fracture toughness, crack growth due to fatigue.

Aims of the Course

The course follows on from the basis of statics in MMAN1300 and elementary topics in MMAN2400 Mechanics of Solids 1 and applies the knowledge obtained to analysis of thin shells, beams and columns as well as introduces you to some advanced topics in mechanics of solids such as mechanics of fracture and fatigue.The lecture topics relate closely to mechanical engineering applications with a balance between theory and practice. Assessments will have a strong emphasis on problem solving skills to address practical applications.

Student learning outcomes

This course is designed to address the below learning outcomes and the

3. Teaching strategies

Effective learning is supported when you are actively engaged in the learning process and by a climate of enquiry, and these are best achieved through learning activities like lectures and problem solving classes using practical examples combined with laboratory demonstrations and hands-on activities.

You become more engaged in the learning process if you can see the relevance of your studies to professional, disciplinary and/or personal contexts. This relevance is shown in all parts of the course through lectures by way of examples drawn from industry.

Dialogue is encouraged between you, others in the class and the lecturer. Diversity of experiences is acknowledged. Your experiences are drawn on to illustrate various aspects, and this helps to increase motivation and engagement.
The teaching strategies that will be used include:

Presentation of the material in weekly lectures so that the students develop

4. Course schedule

Table 1: BLOCK 1 – Fundamental Topics				
Week – Day(venue)	**Topic**	**Suggested Readings**	**Ref & Questions**	**Problem Solving/Lab/Quiz**
1 - Tuesday(Rex Vowels) & Friday (Mathews A)	Membrane stresses in axisymmetric shells/vessels.	Moodle Notes + Hibbeler: Ch 8.1	Moodle -Web Questions + Hibbeler: 8-3, 8-4,8-5,8-8,8-12	No Problem Solving Class
2 - Tuesday(Rex Vowels)	Product of Inertia of an Area.			

5 – Tuesday(Rex Vowels	Shear Centre	Hibbeler: Ch 7.5	Hibbeler: 7-60,7-63,7-64,7-66,7-68,7

Table 2: BLOCK 2 – Advanced Topics				
Approx Week – Day	**Topic**	**Textbook - Notes**	**Ref & Questions**	**Problem Solving/Lab/Quiz**

Presentation

All submissions should have a standard School cover sheet which is available from this course's Moodle page.

All submissions are expected to be neat and clearly set out. Your results are the pinnacle of all your hard work. Presenting them clearly gives the marker the best chance of understanding your method; even if the numerical results are incorrect.

Submission

Late submissions will be penalised 5 marks per calendar day (including weekends). An extension may only be granted in exceptional circumstances. Where an assessment task is worth less than 20% of the total course mark and you have a compelling reason for being unable to submit your work on time, you must seek approval for an extension from the course convenor ***before the due date***. Special consideration for assessment tasks of 20% or greater must be processed through student.unsw.edu.au/special-consideration.

Students seeking additional resources can also obtain assistance from the UNSW Library. One starting point for assistance is:
http://info.library.unsw.edu.au/web/services/services.html

7 Course evaluation and development

Appendix A: Engineers Australia (EA) Professional Engineer Graduate Attributes

	Program Intended Learning Outcomes
PE1: Knowledge and Skill Base	PE1.1 Comprehensive, theory-based understanding of underpinning fundamentals
	PE1.2 Conceptual understanding of underpinning maths, analysis, statistics, computing
	PE1.3 In-depth understanding of specialist bodies of knowledge
	PE1.4 Discernment of knowledge development and research directions
	PE1.5 Knowledge of