CIVL 7001 ADVANCED APPLIED MECHANICS

Credit Points 10

Legacy Code 301010

Coordinator Baolin Wang (https://directory.westernsydney.edu.au/search/name/Baolin Wang/)

Description Applied mechanics deals with the mechanical responses of structural components under various loading and support conditions. This unit will introduce the theory of elasticity and study the bending, buckling and vibration behaviours of beams, plates and shells and their associated applications in engineering practices.

School Eng, Design & Built Env

Discipline Structural Engineering

Student Contribution Band HECS Band 2 10cp

Level Postgraduate Coursework Level 7 subject

Restrictions

Students must be enrolled in a postgraduate program

Assumed Knowledge

Students should have prior knowledge of strain, stress and deflection analysis of simple structures as well as knowledge of energy principle for structural analysis.

Learning Outcomes

On successful completion of this subject, students should be able to:

1. Explain the bending, buckling and vibration behaviours of structural components;
2. Derive the governing equations for the bending, buckling and vibration of structural components;
3. Solve the governing equations for simple bending, buckling and vibration cases of beams, plates and shells;
4. Use finite element package to solve the governing equations numerically for complex cases;
5. Apply the buckling and vibration analysis to solve practical engineering problems.

Subject Content

1. Introduction to theory of elasticity; bending of beams;
2 Introduction to buckling of structures; analytical solutions for simple column buckling cases;
3. Introduction to vibration of structures; analytical solutions for simple beam free vibration cases;
4. Introduction to thin plate theory; Governing equations for the bending, buckling and vibration of plates;
5. Analytical solutions for simple plate bending, buckling and vibration cases;
6. Analysis of buckling and vibration of composite plates;
7. Introduction to thin shell theories;
8. Analytical solutions for simple shell bending, buckling and vibration cases;
9. Introduction to numerical methods for bending, buckling and vibration analysis of structures;
10. Applications of numerical methods to solve complex buckling and vibration cases for beams, columns and plates.

Assessment

The following table summarises the standard assessment tasks for this subject. Please note this is a guide only. Assessment tasks are regularly updated, where there is a difference your Learning Guide takes precedence.

Item	Length	Percent	Threshold	Individual/ Group Task
2 x 1-hour in-class quiz (20% each)	1 hour each	40	N	Individual
Final exam (short answers)	2 hours	55	N	Individual
10 x tute assessment (0.5% each) (in-class)	2 pages each	5	N	Individual

Teaching Periods

Spring
Parramatta City - Macquarie St
Day
Subject Contact Baolin Wang (https://directory.westernsydney.edu.au/search/name/Baolin Wang/)

View timetable (https://classregistration.westernsydney.edu.au/even/timetable/?subject_code=CIVL7001_22-SPR_PC_D#subjects)