

MECH 3002 ADVANCED MECHANICS OF MATERIALS

Credit Points 10

Legacy Code 300761

Coordinator Baolin Wang ([https://directory.westernsydney.edu.au/search/name/Baolin Wang/](https://directory.westernsydney.edu.au/search/name/Baolin%20Wang/))

Description This subject builds on the Mechanics of Materials to provide students with knowledge about impacts of deformation, stresses, strains and strength on materials and components essential in understanding how to improve mechanical design. Students' analytic and problem solving skills are developed through analysis of impacts including non-elastic deformation, orientation of the reference axes, and how materials fail. Using knowledge about materials, students evaluate impacts on materials, the mechanisms to control properties of materials, and use mathematical calculations and techniques to determine stresses and strains on simple components. Overall, students develop the capacity to select appropriate materials and improve mechanical design.

School Eng, Design & Built Env

Discipline Mechanical Engineering

Student Contribution Band HECS Band 2 10cp

Check your fees via the Fees (https://www.westernsydney.edu.au/currentstudents/current_students/fees/) page.

Level Undergraduate Level 3 subject

Pre-requisite(s) MECH 2003

Learning Outcomes

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

1. Use mathematical calculations to determine a range of stresses
2. Use graphical techniques to represent transformation equations for stresses and angles
3. Evaluate failure of materials in demonstrating knowledge of the relationship between the structure of materials and mechanical properties
4. Outline the mechanisms associated with creep, fatigue, and stress concentrations
5. Determine appropriate methods for controlling the properties of materials such as an alloy

Subject Content

1. Stresses beyond the yield point
2. Residual stresses
3. Failure Theories
4. Non-elastic bending
5. Residual stress in bending
6. Strain energy, Castigliano's Theorem
7. Un-symmetric bending of beam
8. Shear centre
9. Transformation of stress, transformation of strain, state of three-dimensional stress
10. Eccentric load and buckling of column

11. Pressure vessels
12. Work - energy principle

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.

Type	Length	Percent	Threshold	Individual/ Group Task	Mandatory
Participation	2 hours (per class)	10	N	Individual	N
Numerical Problem Solving	15 minutes (per Quiz)	20	N	Individual	N
Practical	3 hours (per Practical)	20	N	Individual	N
Final Exam	2 hours	50	N	Individual	N

Teaching Periods

Sydney City Campus - Term 2 (2025)

Sydney City

On-site

Subject Contact Peter Lendrum ([https://directory.westernsydney.edu.au/search/name/Peter Lendrum/](https://directory.westernsydney.edu.au/search/name/Peter%20Lendrum/))

View timetable (https://classregistration.westernsydney.edu.au/odd/timetable/?subject_code=MECH3002_25-SC2_SC_1#subjects)

Spring (2025)

Penrith (Kingswood)

Hybrid

Subject Contact Baolin Wang ([https://directory.westernsydney.edu.au/search/name/Baolin Wang/](https://directory.westernsydney.edu.au/search/name/Baolin%20Wang/))

View timetable (https://classregistration.westernsydney.edu.au/odd/timetable/?subject_code=MECH3002_25-SPR_KW_3#subjects)

Parramatta City - Macquarie St

Hybrid

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View timetable (https://classregistration.westernsydney.edu.au/odd/timetable/?subject_code=MECH3002_25-SPR_PC_3#subjects)