

# 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/](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. Stress transformation, strain transformation
4. Failure Theories
5. Creep and fatigue
6. Stress concentrations
7. Alloys, heat treatments and phase diagrams
8. Shear stress in a beam, shear centre

## 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
Participation	2 hours (per class)	5	N	Individual
Numerical Problem Solving	15 minutes (per Quiz)	20	N	Individual
Practical	3 hours (per Practical)	10	N	Individual
Final Exam	2 hours	65	N	Individual

Teaching Periods

## Sydney City Campus - Term 2 (2023)

### Sydney City

#### On-site

**Subject Contact** Eileen An ([https://directory.westernsydney.edu.au/search/name/Eileen An/](https://directory.westernsydney.edu.au/search/name/Eileen%20An/))

View timetable ([https://classregistration.westernsydney.edu.au/odd/timetable/?subject\\_code=MECH3002\\_23-SC2\\_SC\\_1#subjects](https://classregistration.westernsydney.edu.au/odd/timetable/?subject_code=MECH3002_23-SC2_SC_1#subjects))

## Spring (2023)

### Penrith (Kingswood)

#### On-site

**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\\_23-SPR\\_KW\\_1#subjects](https://classregistration.westernsydney.edu.au/odd/timetable/?subject_code=MECH3002_23-SPR_KW_1#subjects))

## Parramatta City - Macquarie St

#### On-site

**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\\_23-SPR\\_PC\\_1#subjects](https://classregistration.westernsydney.edu.au/odd/timetable/?subject_code=MECH3002_23-SPR_PC_1#subjects))

## Sydney City Campus - Term 1 (2024)

### Sydney City

#### On-site

**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/even/timetable/?subject\\_code=MECH3002\\_24-SC1\\_SC\\_1#subjects](https://classregistration.westernsydney.edu.au/even/timetable/?subject_code=MECH3002_24-SC1_SC_1#subjects))

## Spring (2024)

### Penrith (Kingswood)

#### On-site

**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/even/timetable/?subject\\_code=MECH3002\\_24-SPR\\_KW\\_1#subjects](https://classregistration.westernsydney.edu.au/even/timetable/?subject_code=MECH3002_24-SPR_KW_1#subjects))

## **Parramatta City - Macquarie St**

### **On-site**

**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/even/timetable/?subject\\_code=MECH3002\\_24-SPR\\_PC\\_1#subjects](https://classregistration.westernsydney.edu.au/even/timetable/?subject_code=MECH3002_24-SPR_PC_1#subjects))

## **Sydney City Campus - Term 3 (2024)**

### **Sydney City**

#### **On-site**

**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/even/timetable/?subject\\_code=MECH3002\\_24-SC3\\_SC\\_1#subjects](https://classregistration.westernsydney.edu.au/even/timetable/?subject_code=MECH3002_24-SC3_SC_1#subjects))