

# MECH 2004 MECHANICS OF MATERIALS (WSTC ASSOCD)

**Credit Points** 10

**Legacy Code** 700116

**Coordinator** Abbas Ranjbar ([https://directory.westernsydney.edu.au/search/name/Abbas Ranjbar/](https://directory.westernsydney.edu.au/search/name/Abbas%20Ranjbar/))

**Description** Mechanics of Materials is the study of the stresses and deformation of a body made of any elastic solid material and how these are related to the body's shape and the load applied to it. This subject looks at how and why structural components including bars and beams deform and break. It concentrates on how these are affected by the geometry of the body and loading. Types of loadings considered include normal loads, torsional loads and bending loads. The main objective of the subject is to introduce students to the aspects of stress, strain and internal force development in the components and the methods to determine the deformation and deflections of the components. Energy methods and impact loadings are also considered. Offerings of alternate subjects are dependent on there being sufficient student enrolment numbers. If enrolments are low, the College may cancel delivery of the alternate subject.

**School** Eng, Design & Built Env

**Discipline** Mechanical And Industrial Engineering And Technology

**Student Contribution Band** HECS Band 2 10cp

Check your HECS Band contribution amount 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 2 subject

**Pre-requisite(s)** ENGR 1019

**Equivalent Subjects** MECH 2003 - Mechanics of Materials

## Restrictions

Students must be enrolled at Western Sydney University, The College in 7022 Associate Degree in Engineering.

## Learning Outcomes

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

1. Predict stress, strain and deformation in an axially loaded member.
2. Calculate support reactions in statically indeterminate an axially loaded member
3. Represent a general traction as stresses
4. Represent a general displacement as strains
5. Predict stress and angle of twist in a circular shaft undergoing torsion
6. Construct bending moment and shear force diagrams, for beams carrying point forces, distributed forces and couples
7. Calculate bending stresses and deflections for beams
8. Calculate transverse shear stresses in beams
9. Calculate strain energy in axially loaded columns, shafts under torsion and beams under bending
10. Predict stress, strain and deformation as a result of an impact loading
11. Use energy methods to calculate the deflection of a truss

12. Predict the buckling of columns
13. Observe, analyse and document the measurements in the real world and use them to verify the theory presented in the lectures.

## Subject Content

Normal stress, strain and deformation.  
Statically indeterminate components  
Representing a general traction as stresses  
Representing a general displacement as strains  
Torsional stresses and deformations  
2D stress transformations  
Bending moment and shear force diagrams  
Bending stresses and deflections  
Transverse shear stresses  
Energy methods  
Buckling of columns

## 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
Practical	6 hours	10	N	Both (Individual & Group)
Intra-session Exam	1 hour	15	N	Individual
Quiz	~0.5 hour each	25	N	Individual
Final Exam	2 hours	50	N	Individual

Prescribed Texts

- Hibbeler, R.C. & Fan, SC 2011. Mechanics of Materials, Prentice Hall. Singapore

Teaching Periods

## Quarter 2 (2022)

### Nirimba Education Precinct

#### Composite

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View timetable ([https://classregistration.westernsydney.edu.au/even/timetable/?subject\\_code=MECH2004\\_22-Q2\\_BL\\_C#subjects](https://classregistration.westernsydney.edu.au/even/timetable/?subject_code=MECH2004_22-Q2_BL_C#subjects))

## Quarter 2 (2023)

### Nirimba Education Precinct

#### Hybrid

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