MECH 2003 MECHANICS OF MATERIALS

Credit Points 10

Legacy Code 300040

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

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.

School Eng, Design & Built Env

Discipline Mechanical And Industrial Engineering And Technology

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 2 subject

Pre-requisite(s) ENGR 1018

Equivalent Subjects LGYA 5707 Mechanics and Materials MECH 2004 Mechanics of Materials (WSTC Assoc Deg)

Learning Outcomes

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

1. Represent a general traction as stresses and a general displacement as strains and predict stress, strain and deformation for an engineering component under a static/dynamic loading
2. Calculate support reactions, stress, strain and deformation in statically indeterminate an axially loaded member
3. Predict stress and angle of twist in a circular shaft undergoing torsion
4. Construct bending moment, shear force diagrams, bending stresses, deflections and transverse shear stresses for beams carrying point forces, distributed forces, and couples
5. Calculate strain energy in axially loaded columns, shafts under torsion and beams under bending and use energy methods to calculate the deflection of a truss
6. Predict the buckling of columns
7. Take measurements in the real world, and use them to verify the theory presented in the lectures
8. Predict stress, strain and deformation in an axially loaded member
9. Calculate support reactions in statically indeterminate an axially loaded member
10. Represent a General Traction as Stresses
11. Represent a General Displacement as Strains
12. Construct bending moment and shear force diagrams, for beams carrying point forces, distributed forces, and couples
13. Calculate bending stresses and deflections for beams
14. Calculate transverse shear stresses in beams
15. Calculate strain energy in axially loaded columns, shafts under torsion and beams under bending
16. Predict stress, strain and deformation as a result of an impact loading
17. Use energy methods to calculate the deflection of a truss

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	Two 3-hour practical labs for 4 different experiments.	10	N	Individual
Numerical Problem Solving	1-hour tutorial class from week 2 for 12 weeks.	10	Y	Individual
Numerical Problem Solving	4 x 20 minutes each	20	N	Individual
Final Exam	2 hours	60	N	Individual

Prescribed Texts

- Hibbeler, RC 2018, Mechanics of materials, 10th edn in SI units, Prentice Hall, Singapore
- Hibbeler, RC 2014, Mechanics of materials, 9th edn, Prentice Hall, Singapore.

Teaching Periods

Sydney City Campus - Term 2 (2023)

Sydney City

On-site

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

View timetable (https://classregistration.westernsydney.edu.au/odd/timetable/?subject_code=MECH2003_23-SC2_SC_1#subjects)

Sydney City Campus - Term 3 (2023)

Sydney City

On-site

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

View timetable (https://classregistration.westernsydney.edu.au/odd/timetable/?subject_code=MECH2003_23-SC3_SC_1#subjects)

Autumn (2024)

Penrith (Kingswood)

On-site

Subject Contact Leigh Sheppard (https://directory.westernsydney.edu.au/search/name/Leigh Sheppard/)

View timetable (https://classregistration.westernsydney.edu.au/even/timetable/?subject_code=MECH2003_24-AUT_KW_1#subjects)

Parramatta City - Macquarie St

On-site

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

View timetable (https://classregistration.westernsydney.edu.au/even/timetable/?subject_code=MECH2003_24-AUT_PC_1#subjects)

Sydney City Campus - Term 1 (2024)

Sydney City

On-site

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

View timetable (https://classregistration.westernsydney.edu.au/even/timetable/?subject_code=MECH2003_24-SC1_SC_1#subjects)

Sydney City Campus - Term 2 (2024)

Sydney City

On-site

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

View timetable (https://classregistration.westernsydney.edu.au/even/timetable/?subject_code=MECH2003_24-SC2_SC_1#subjects)

Sydney City Campus - Term 3 (2024)

Sydney City

On-site

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

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