

ENGR 1019 FUNDAMENTALS OF MECHANICS (WSTC ASSOC D)

Credit Points 10

Legacy Code 700113

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

Description This unit deals with the action and interaction of forces, moments and couples in two and three dimensions. It examines the equilibrium of single bodies, and of trusses and mechanisms. It then looks at the friction between bodies. It covers the dynamics of a non-rotating body, and a body rotating about a fixed axis. Finally, internal loadings are investigated - particularly within a transversely loaded beam. The unit makes extensive use of vector algebra.

School Eng, Design & Built Env

Discipline Other Engineering And Related Technologies

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/) page.

Level Undergraduate Level 1 subject

Equivalent Subjects ENGR 1020 - Fundamentals of Mechanics (WSTC)
ENGR 1018 - Fundamentals of Mechanics

Restrictions Students must be enrolled in 7022 Associate Degree in Engineering

Learning Outcomes

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

1. Manipulate vectors in 2 dimensions and 3 dimensions.
2. Use the equilibrium equations to evaluate unknown reactions and internal loads.
3. Evaluate the member forces in planar trusses.
4. Evaluate the inter-body forces in planar mechanisms.
5. Calculate the acceleration of a body under the action of an unbalanced force or couple.
6. Analyse static and kinetic friction.
7. Construct bending moment and shear force diagrams.
8. Replace a distributed force by a single equivalent force.
9. Identify under-constrained and statically indeterminate problems.
10. Take measurements in the real world and use them to verify the theory presented in the lectures.

Subject Content

1. Statics in two dimensions
 - Vectors
 - Forces Moments and Couples
 - Free body diagrams
 - Equilibrium
 - Friction
 - Trusses
 - Frames and Machines
2. Statics in three dimensions

- Vectors
- Forces Moments and Couples
- Free body diagrams
- Equilibrium
- 3. Translational Dynamics
 - Acceleration
 - The work-energy equation
 - Potential energy
- 4. Rotational Dynamics
 - Acceleration
 - The work-energy equation
- 5. Beam Diagrams
 - Internal loads
 - Bending moments and shear force diagrams
 - Distributed forces

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
Lab Practicals x5	6 hours	15	N	Both (Individual & Group)
Online Quizzes x10	10x0.5 hour= 5 hours	30	N	Individual
Intra-session exam	1 hours + 30 minutes for online submission	15	N	Individual
End of session exam (in parts): Part 1: written – problem solving/short answer Part 2: Viva Voce	Part 1: 2 hours + 30 minutes for online submission Part 2: 20 minutes per student	40	Y	Individual

Prescribed Texts

- Meriam, JL & Kraige, LG 2003, Engineering mechanics Volume 1 Statics SI version, 6th edn, Wiley
- Meriam, JL & Kraige, LG 2003, Engineering mechanics Volume 2 Dynamics SI version, 6th edn, Wiley
- Hibbeler, RC 2010, Engineering Mechanics Statics 12th edn in SI units, Pearson
- Hibbeler, RC 2010, Engineering Mechanics Dynamics 12th edn in SI units, Pearson

Teaching Periods

Quarter 4

Nirimba Education Precinct

Composite

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

View timetable (https://classregistration.westernsydney.edu.au/even/timetable/?subject_code=ENGR1019_22-Q4_BL_C#subjects)