

# MECH 2001 KINEMATICS AND KINETICS OF MACHINES

Credit Points 10

Legacy Code 300035

Coordinator Helen Wu (<https://directory.westernsydney.edu.au/search/name/Helen Wu/>)

**Description** Kinematics is the study of the motion of objects, and Kinetics is the study of the causes of the motion. The focus for this subject is on rigid body kinematics which involves the study of a solid body with little or no deformation in planar motion, such as those in machines. The motion of key machine components and the forces they generate gives rise to design problems. Students gain an understanding of the relevance of kinematics and kinetics in the analysis and design of mechanical systems and of methods to ensure machines operate efficiently and safely.

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 2 subject

Pre-requisite(s) MATH 1016 AND ENGR 1018

Equivalent Subjects MECH 2002 Kinematics and Kinetics of Machines (WSTC AssocD)

## Learning Outcomes

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

1. Interpret the kinematic structure of mechanisms
2. Identify freedom and constraint in machine
3. Apply graphical velocity and acceleration analysis techniques to mechanisms
4. Predict the movement of particles, a single rigid body
5. Analyse translational and angular displacements, velocities and accelerations of a single rigid body
6. Analyse multi-body mechanisms, gear trains, and cams
7. Verify measurements in the real world against theory presented in the lectures.

## Subject Content

Freedom and constraints in mechanisms

Velocity and acceleration analysis of mechanisms

Particle kinematics

Particle kinetics

Rigid body kinematics

Rigid body kinetics

Mechanism kinematics

Simple and epicyclic gear trains.

Involute geometry of gear teeth

The geometry of cams.

## 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	12 x 2 hours in class; 12x2 hours before class	5	N	Group/ Individual	Y
Quiz	15 minutes 20 (per Quiz)	20	N	Individual	Y
Practical	3 hours (per Practical)	15	N	Group/ Individual	Y
Final Exam	2 hours	60	N	Individual	Y

## Prescribed Texts

- Hibbeler, RC 2017, Engineering mechanics: dynamics, 14th SI Global edn, Pearson Education, Hoboken, NJ.

## Teaching Periods

### Autumn (2025)

#### Penrith (Kingswood)

##### On-site

Subject Contact Helen Wu (<https://directory.westernsydney.edu.au/search/name/Helen Wu/>)

View timetable ([https://classregistration.westernsydney.edu.au/odd/timetable/?subject\\_code=MECH2001\\_25-AUT\\_KW\\_1#subjects](https://classregistration.westernsydney.edu.au/odd/timetable/?subject_code=MECH2001_25-AUT_KW_1#subjects))

### Parramatta City - Macquarie St

##### On-site

Subject Contact Helen Wu (<https://directory.westernsydney.edu.au/search/name/Helen Wu/>)

View timetable ([https://classregistration.westernsydney.edu.au/odd/timetable/?subject\\_code=MECH2001\\_25-AUT\\_PC\\_1#subjects](https://classregistration.westernsydney.edu.au/odd/timetable/?subject_code=MECH2001_25-AUT_PC_1#subjects))

### Sydney City Campus - Term 1 (2025)

#### Sydney City

##### On-site

Subject Contact Peter Lendum (<https://directory.westernsydney.edu.au/search/name/Peter Lendum/>)

View timetable ([https://classregistration.westernsydney.edu.au/odd/timetable/?subject\\_code=MECH2001\\_25-SC1\\_SC\\_1#subjects](https://classregistration.westernsydney.edu.au/odd/timetable/?subject_code=MECH2001_25-SC1_SC_1#subjects))

### Sydney City Campus - Term 3 (2025)

#### Sydney City

##### On-site

Subject Contact Peter Lendum (<https://directory.westernsydney.edu.au/search/name/Peter Lendum/>)

View timetable ([https://classregistration.westernsydney.edu.au/odd/timetable/?subject\\_code=MECH2001\\_25-SC3\\_SC\\_1#subjects](https://classregistration.westernsydney.edu.au/odd/timetable/?subject_code=MECH2001_25-SC3_SC_1#subjects))