MECH 3004 DYNAMICS OF MECHANICAL SYSTEMS

Credit Points 10

Legacy Code 300480

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

Description This subject looks at how non-rigid components deform and oscillate. It looks at undamped and damped systems undergoing free vibration, steady state forced vibration and transient forced vibration. The principles of virtual work are used to investigate the equilibrium and dynamics of mechanisms.

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/) page.

Level Undergraduate Level 3 subject

Pre-requisite(s) MECH 2001 AND
MECH 2003

Equivalent Subjects LGYA 5694 - Dynamics and Mechanical Systems

Learning Outcomes

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

1. Use Virtual work to determine the equilibrium position of a mechanism.
2. Calculate the acceleration of a mechanism subjected to an applied force or torque.
3. Model a real world system as a collection of simple mechanical components.
4. Determine the equation(s) of motion for a system of simple mechanical components.
5. Solve the equation of motion for a free, 1dof system.
6. Calculate the response to a forced vibration.
7. Balance a rotating disk.
8. Use Laplace transforms to determine the response to impulse and step forces.
9. Take measurements in the real world, and use them to verify the theory presented in the lectures.

Subject Content

Virtual work, and the equilibrium position of a mechanism.
Acceleration of a mechanism subjected to an applied force or torque.
Modelling a real world system as a collection of simple mechanical components.
Determining the equation(s) of motion for a system of simple mechanical components.
Solution of the equations of motion for a free, 1dof system.
Calculation of the response to a forced vibration.
Balancing a rotating disk.
Using Laplace transforms to determine the response to impulse and step 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.

Type	Length	Percent	Threshold	Individual/ Group Task	Mandatory
Quiz	Tutorials weekly and 4 quizzes of 20 minutes each.	30	N	Individual	Y
Practical	3 hours x 2	10	N	Individual	Y
Final Exam	2 hours	60	N	Individual	Y

Prescribed Texts

- Rao, SS 2011, Mechanical vibrations, 5th edn in SI units, Prentice Hall, Upper Saddle River, NJ.
- Hibbeler, RC 2016, Engineering mechanics : dynamics in SI Units, 14th Global edn, Pearson Education Limited, Harlow, Essex, England

Teaching Periods

Sydney City Campus - Term 2 (2025)
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=MECH3004_25-SC2_SC_1#subjects)

Spring (2025)
Penrith (Kingswood)
Hybrid
Subject Contact Helen Wu (https://directory.westernsydney.edu.au/search/name/Helen Wu/)

View timetable (https://classregistration.westernsydney.edu.au/odd/timetable/?subject_code=MECH3004_25-SPR_KW_3#subjects)

Parramatta City - Macquarie St
Hybrid
Subject Contact Helen Wu (https://directory.westernsydney.edu.au/search/name/Helen Wu/)

View timetable (https://classregistration.westernsydney.edu.au/odd/timetable/?subject_code=MECH3004_25-SPR_PC_3#subjects)