

MECH 4001 COMPUTATIONAL FLUID DYNAMICS

Credit Points 10

Legacy Code 300999

Coordinator Ming Zhao (<https://directory.westernsydney.edu.au/search/name/Ming Zhao/>)

Description This subject introduces students to the fundamentals of computational fluid dynamics. The subject covers the conventional methods for solving the ordinary and partial differential equations. The numerical method for solving the inviscid flow and the viscous flow problems will be introduced. The students learn the application of the commercial software in the engineering problems.

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 4 subject

Pre-requisite(s) ELEC 1006 AND
MECH 3007

Assumed Knowledge

Numerical methods, thermal dynamics and fluid mechanics.

Learning Outcomes

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

1. Solve flow equations using the basic concepts of Computational Fluid Dynamics;
2. Analyse laminar flow, turbulent flow and heat transfer using numerical method;
3. Apply computational methods to solve simple flow and heat transfer problems;
4. Use commercial CFD software to analyse practical flows.

Subject Content

1. Flow topics governed by ordinary differential equations;
2. Numerical simulation of inviscid fluid flows;
3. Numerical simulation of viscous flows;
4. Heat transfer;
5. CFD modelling using commercial software;
6. Engineering applications of CFD.

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	2 hour Tutorial class each week	10	N	Individual	N

Quiz	40 minutes	20	N	Individual	N
Report	2000 word	30	N	Individual	N
Practical	2500 word	40	N	Individual	Y

Prescribed Texts

- Birtingen, S 2011, An introduction to computational fluid mechanics by example, 2nd edn, Wiley, Hoboken, N.J.

Teaching Periods

Autumn (2025)

Penrith (Kingswood)

On-site

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

View timetable (https://classregistration.westernsydney.edu.au/odd/timetable/?subject_code=MECH4001_25-AUT_KW_1#subjects)

Parramatta City - Macquarie St

On-site

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

View timetable (https://classregistration.westernsydney.edu.au/odd/timetable/?subject_code=MECH4001_25-AUT_PC_1#subjects)

Sydney City Campus - Term 1 (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=MECH4001_25-SC1_SC_1#subjects)

Sydney City Campus - Term 3 (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=MECH4001_25-SC3_SC_1#subjects)