# 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 report | 30 | N | Individual | N |
| Practical | 2500 word report | 40 | N | Individual | Y |

Prescribed Texts

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

Teaching Periods

## 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=MECH4001_24-SC2_SC_1#subjects)

## 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)