

# MECH 7001 ADVANCED COMPUTATIONAL FLUID DYNAMICS

**Credit Points** 10

**Legacy Code** 301023

**Coordinator** Ming Zhao ([https://directory.westernsydney.edu.au/search/name/Ming\\_Zhao/](https://directory.westernsydney.edu.au/search/name/Ming_Zhao/))

**Description** This subject introduces students to commonly used numerical methods used in computational fluid dynamics (CFD). The subject covers the theory and the application of CFD for solving engineering problems. The numerical methods for solving the in viscid flow and the viscous flow problems will be introduced. The students learn the application of the engineering software in the engineering problems.

**School** Eng, Design & Built Env

**Discipline** Mechanical Engineering

**Student Contribution Band** HECS Band 2 10cp

**Level** Postgraduate Coursework Level 7 subject

**Restrictions**

Students must be enrolled in a postgraduate program

**Assumed Knowledge**

Finite element methods, Thermal dynamics and Fluid mechanics.

## Learning Outcomes

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

1. Solve flow equations using numerical methods;
2. Analyse laminar flow, turbulent flow and heat transfer using CFD;
3. Design computer code for simulating flow problems;
4. Apply computational methods to solve simple flow and heat transfer problems;
5. Analyse practical flows using commercial CFD software.

## Subject Content

1. Numerical methods for in viscid fluid flows;
2. Numerical methods for vicious flows;
3. Heat transfer;
4. Numerical stability analysis;
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
Practical	3000 word written report	35	N	Individual

Practical	3000 word written report	35	N	Individual
Quiz	1 hour	30	N	Individual

Prescribed Texts

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

Teaching Periods

## Autumn (2022)

**Parramatta City - Macquarie St**

**Day**

**Subject Contact** Ming Zhao ([https://directory.westernsydney.edu.au/search/name/Ming\\_Zhao/](https://directory.westernsydney.edu.au/search/name/Ming_Zhao/))

View timetable ([https://classregistration.westernsydney.edu.au/even/timetable/?subject\\_code=MECH7001\\_22-AUT\\_PC\\_D#subjects](https://classregistration.westernsydney.edu.au/even/timetable/?subject_code=MECH7001_22-AUT_PC_D#subjects))

## Autumn (2023)

**Parramatta City - Macquarie St**

**On-site**

**Subject Contact** Ming Zhao ([https://directory.westernsydney.edu.au/search/name/Ming\\_Zhao/](https://directory.westernsydney.edu.au/search/name/Ming_Zhao/))

View timetable ([https://classregistration.westernsydney.edu.au/odd/timetable/?subject\\_code=MECH7001\\_23-AUT\\_PC\\_1#subjects](https://classregistration.westernsydney.edu.au/odd/timetable/?subject_code=MECH7001_23-AUT_PC_1#subjects))