MECH 4001 COMPUTATIONAL FLUID DYNAMICS

Credit Points 10

Legacy Code 300999

Coordinator Peter Lendrum (https://directory.westernsydney.edu.au/search/name/Peter Lendrum/)

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 HECS Band contribution amount 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
Practical	2500 word written report	50	N	Individual
Participation	Students complete the CFD assignment on computers.	5	N	Individual
Practical	written assignment equivalent to 2500 words	45	N	Individual

Prescribed Texts

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

Teaching Periods

Autumn (2022)
Penrith (Kingswood)
Day
Subject Contact Ming Zhao (https://directory.westernsydney.edu.au/search/name/Ming Zhao/)

View timetable (https://classregistration.westernsydney.edu.au/even/timetable/?subject_code=MECH4001_22-AUT_KW_D#subjects)

Parramatta - Victoria Rd
Day
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_22-AUT_PS_D#subjects)

Sydney City Campus - Term 2 (2022)
Sydney City
Day
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_22-SC2_SC_D#subjects)

Autumn (2023)
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_23-AUT_KW_1#subjects)

Parramatta City - Macquarie St
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_23-AUT_PC_1#subjects)

Sydney City Campus - Term 1 (2023)
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_23-SC1_SC_1#subjects)

Sydney City Campus - Term 3 (2023)
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_23-SC3_SC_1#subjects)