MCEN30018 Thermodynamics and Fluid Mechanics

Credit Points:	12.50
Level:	3 (Undergraduate)
Dates & Locations:	2013, Parkville This subject commences in the following study period/s: Semester 1, Parkville - Taught on campus.
Time Commitment:	Contact Hours: 36 hrs of lectures, 15 hours of tutorials and laboratories Total Time Commitment: 120 hours
Prerequisites:	

Subject	Study Period Commencement:	Credit Points:
ENGR20004 Engineering Mechanics	Not offered 2013	12.50

AND either

Subject	Study Period Commencement:	Credit Points:
MAST20029 Engineering Mathematics	Not offered 2013	12.50

OR both of the following subjects -

Subject	Study Period Commencement:	Credit Points:
MAST20009 Vector Calculus	Not offered 2013	12.50
MAST20030 Differential Equations	Not offered 2013	12.50

MAST20009 or MAST20030 may be taken concurrently.

Corequisites:	
Recommended Background Knowledge:	PHYC10003 Physics 1 and PHYC10004 Physics 2
Non Allowed Subjects:	Credit will not be given for this subject and ENGR30001 Fluid Mechanics and Thermodynamics, or MCEN30015 Thermofluids.
Core Participation Requirements:	For the purposes of considering request for Reasonable Adjustments under the Disability Standards for Education (Cwth 2005), and Student Support and Engagement Policy, academic requirements for this subject are articulated in the Subject Overview, Learning Outcomes, Assessment and Generic Skills sections of this entry. It is University policy to take all reasonable steps to minimise the impact of disability upon academic study, and reasonable adjustments will be made to enhance a student's participation in the University's programs. Students who feel their disability may impact on meeting the requirements of this subject are encouraged to discuss this matter with a Faculty Student Adviser and Student Equity and Disability Support: http://services.unimelb.edu.au/disability
Coordinator:	Assoc Prof Nicholas Hutchins
Contact:	**nhu@unimelb.edu.au (mailto:nhu@unimelb.edu.au)**

Subject Overview:	Topics include fluid statics, static forces on submerged structures, stability of floating bodies; fluid dynamics; streamlines; pathlines and streaklines; conservation of mass, momentum and energy; Euler's equation and Bernoulli's equation; control volume analysis; heat and work, ideal non-flow and flow processes; laws of thermodynamics; Carnot's principle; Clausius inequality; direct and reversed heat engines; thermal efficiencies; properties of pure substances; change of phase; representation of properties; steam and air tables; and vapour equation of state, ideal gases; dimensional analysis; incompressible flow in pipes and ducts; boundary layers; flow around immersed bodies; and drag and lift.
Objectives:	At the conclusion of this subject students should be able to - • Determine the thermodynamic and physical properties of numerous substances; • Determine the hydrostatic pressure in fluids; • Analyse simple, incompressible and inviscid fluid flows; • Apply the first and second laws of thermodynamics to several engineering devices.
Assessment:	Laboratory reports and assignments during semester, not exceeding 1500 words (equal weight) (40%) One 50 minute written test in week 6 or 7 (10%) One 3 hour examination at the end of semester (50%)
Prescribed Texts:	None
Breadth Options:	This subject potentially can be taken as a breadth subject component for the following courses: # **Bachelor of Arts (https://handbook.unimelb.edu.au/view/2013/B-ARTS)** # **Bachelor of Biomedicine (https://handbook.unimelb.edu.au/view/2013/B-BMED)** # **Bachelor of Commerce (https://handbook.unimelb.edu.au/view/2013/B-COM)** # **Bachelor of Music (https://handbook.unimelb.edu.au/view/2013/B-MUS)** You should visit **learn more about breadth subjects (http://breadth.unimelb.edu.au/breadth/info/index.html)** and read the breadth requirements for your degree, and should discuss your choice with your student adviser, before deciding on your subjects.
Fees Information:	Subject EFTSL, Level, Discipline & Census Date, http://enrolment.unimelb.edu.au/fees
Generic Skills:	On completion of this subject, students should have developed the following generic skills - • Ability to apply knowledge of science and engineering fundamentals • Ability to undertake problem identification, formulation, and solution • Ability to utilise a systems approach to complex problems and to design and operational performance • Ability to function effectively as an individual and in multidisciplinary and multicultural teams, as a team leader or manager as well as an effective team member
Related Majors/Minors/ Specialisations:	B-ENG Mechanical Engineering stream Master of Engineering (Mechanical) Master of Engineering (Mechatronics) Mechanical Systems Science-credited subjects - new generation B-SCI and B-ENG. Core selective subjects for B-BMED.