436-201 Thermofluids 1

Credit Points:	12.50
Level:	2 (Undergraduate)
Dates & Locations:	2009, This subject commences in the following study period/s: Semester 2, - Taught on campus.
Time Commitment:	Contact Hours: Thirty-four hours of lectures and 14 hours of tutorials and laboratory Total Time Commitment: Not available
Prerequisites:	**620-141** Maths A or **620-121** Maths A (Advanced); and **620-143** Applied Maths or **620-123** Applied Maths (Advanced).
Corequisites:	None
Recommended Background Knowledge:	None
Non Allowed Subjects:	None
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 Michael John Brear
Subject Overview:	Unit 1, Fluid Mechanics: 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; dimensional analysis; incompressible flow in pipes and ducts; boundary layers; flow around immersed bodies; and drag and lift. Unit 2, Thermodynamics: Topics include 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.
Objectives:	Unit 1, Fluid Mechanics: Students should develop a fundamental understanding of basic principles of fluid statics and dynamics; gain experience in practical methodologies applied to the solution of engineering flow problems; have an ability to perform force and stability analysis in fluid statics; analyse control volumes analysis for continuity, energy and momentum balances; perform dimensional analysis; and understand fluid resistance, drag and lift. Unit 2, Thermodynamics: Students should develop an understanding of laws of thermodynamics and thermodynamic property relationships and how to apply these principles to engineering systems; understand non-flow and steady flow processes; understand second law limitations; formulate equations for process performance and cycle efficiency; and carry out combustion analysis.
Assessment:	One 3-hour end of semester written examination (80%), laboratory work (5 experiments with reports, each up to 5000 words, scheduled throughout the semester) (20%).
Prescribed Texts:	None

Recommended Texts:	Information Not Available
Breadth Options:	This subject is not available as a breadth subject.
Fees Information:	Subject EFTSL, Level, Discipline & Census Date, http://enrolment.unimelb.edu.au/fees
Generic Skills:	# ability to apply knowledge of basic science and engineering fundamentals # ability to communicate effectively, not only with engineers but also with the community at large # in-depth technical competence in at least one engineering discipline # ability to undertake problem identification, formulation and solution # ability to utilise a systems approach to design and operational performance # understanding of the social, cultural, global and environmental responsibilities of the professional engineer, and the need for sustainable development # understanding of the principles of sustainable design and development # expectation of the need to undertake lifelong learning, capacity to do so # capacity for independent critical thought, rational inquiry and self-directed learning # intellectual curiosity and creativity, including understanding of the philosophical and methodological bases of research activity # openness to new ideas and unconventional critiques of received wisdom # profound respect for truth and intellectual integrity, and for the ethics of scholarship
Related Course(s):	Bachelor of Engineering (Biomedical) Biomechanics