MCEN90015 Thermodynamics

Credit Points:	12.5
Level:	9 (Graduate/Postgraduate)
Dates & Locations:	2015, Parkville This subject commences in the following study period/s: Semester 1, Parkville - Taught on campus.
Time Commitment:	Contact Hours: 36 hours of lectures, 12 hours of tutorials and up to 4 hours of laboratory work. Total Time Commitment: 200 hours
Prerequisites:	

Subject	Study Period Commencement:	Credit Points:
MCEN30018 Thermodynamics and Fluid Mechanics	Semester 1, Semester 2	12.50

(OR prior to 2013 - ENGR30001 Fluid Mechanics & Thermodynamics)

AND either

Subject	Study Period Commencement:	Credit Points:
MAST20029 Engineering Mathematics	Summer Term, Semester 1, Semester 2	12.50

OR both of the following subjects

Subject	Study Period Commencement:	Credit Points:
MAST20009 Vector Calculus	Semester 1, Semester 2	12.50
MAST20030 Differential Equations	Semester 2	12.50

MAST20030 Differential Equations may be taken concurrently.

Corequisites:	None
Recommended Background Knowledge:	None
Non Allowed Subjects:	Students cannot enrol in and gain credit for this subject and: # MCEN30004 Thermofluids 2 # MCEN30005 Thermofluids 3
Core Participation Requirements:	For the purposes of considering request for Reasonable Adjustments under the Disability Standards for Education (Cwth 2005), and Students Experiencing Academic Disadvantage Policy, academic requirements for this subject are articulated in the Subject Description, Subject Objectives, Generic Skills and Assessment Requirements of this entry. The University is dedicated to provide support to those with special requirements. Further details on the disability support scheme can be found at the Disability Liaison Unit website: http://www.services.unimelb.edu.au/disability/
Coordinator:	Dr Yi Yang
Contact:	**yi.yang@unimelb.edu.au (mailto:yi.yang@unimelb.edu.au)**

Subject Overview:	**AIMS** There are 2 related, major topics of study in this subject. Each of these topics will analyse aspects of important thermodynamic devices and will then be integrated to analyse their combined effects in selected devices: # Cycle analysis: gas turbines, refrigeration and steam cycles # Heat transfer: conduction, convection, radiation and heat exchangers **INDICATIVE CONTENT** # Heat transfer: 1-D conduction, external convection, internal convection, heat exchangers and thermal radiation # Cycle analysis: Brayton cycles, turboject cycles, Rankine cycles, refrigeration cycles
Learning Outcomes:	**INTENDED LEARNING OUTCOMES (ILOs)** Having completed this subject the student is expected to be able to: 1 Apply the fundamental principles of thermodynamics, heat and mass transfer to numerous engineering devices 2 Quantify and analyse the performance of various devices in which energy and mass transfer occur 3 Use a systems approach to simplify a complex problem.
Assessment:	Three written assignments, two worth 15% each and one worth 10% and not exceeding 1500 words, in weeks 4 to 12, requiring 35-40 hours of work in total (40% total). Assignments 1 and 2 are associated with ILOs 1 and 2, assignment 3 is associated with ILOs 1, 2 and 3. One 3-hour end of semester examination (60%). Assesses ILOs 1, 2 and 3. Hurdle Requirement - students must pass the exam component to pass this subject.
Prescribed Texts:	None
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:	After completing this unit, students should have # The ability to apply knowledge of science and engineering fundamentals # The ability to undertake problem identification, formulation, and solution # An understanding of social, cultural, global, and environmental responsibilities and the need to employ principles of sustainable development # The ability to utilise a systems approach to complex problems and to design and operational performance # The capacity for creativity and innovation.
Notes:	**LEARNING AND TEACHING METHODS** The subject will be delivered through a combination of lectures and tutorials. Students will also complete one experiment which will reinforce the material covered in lectures. **INDICATIVE KEY LEARNING RESOURCES** Students will have access to the following textbooks, and lecture notes. Theodore L. Bergman, Adrienne S. Lavine, Frank P. Incropera, David P. DeWitt, *Fundamentals of Heat and Mass Transfer*, *7 th ed.,* Wiley (2011). Yonus A. Cengel and Michael A. Boles, *Thermodynamics: An Engineering Approach*, *4 th ed.,* McGraw-Hill (2010). **CAREERS / INDUSTRY LINKS** This subject is linked to many industries, including oil refining, power generation, chemical production, industrial processing, etc.
Related Majors/Minors/ Specialisations:	B-ENG Mechanical Engineering stream Master of Engineering (Mechanical with Business)

	Master of Engineering (Mechanical) Master of Engineering (Mechatronics)