ENGR90024 Computational Fluid Dynamics

Credit Points:	12.50
Level:	9 (Graduate/Postgraduate)
Dates & Locations:	This subject is not offered in 2013.
Time Commitment:	Contact Hours: 3 x one hour lectures + 1 x two hour workshop per week Total Time Commitment: Estimated 120 hours
Prerequisites:	Students must have passed ONE OF the following subjects: **Subject** / **Study Period Commencement:** / **Credit Points:** ENGR30002 Fluid Mechanics / Not offered 2013 / 12.50 ENGR30001 Fluid Mechanics and Thermodynamics and ONE OF the following subjects: **Subject** / **Study Period Commencement:** / **Credit Points:** MAST20029 Engineering Mathematics / Not offered 2013 / 12.50 MAST20009 Vector Calculus / Not offered 2013 / 12.50
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 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
Contact:	Email: **m.davidson@unimelb.edu.au (mailto:m.davidson@unimelb.edu.au)**
Subject Overview:	Ordinary Differential Equations: explicit and implicit methods, stability, systems of ODEs, boundary value problems, MATLAB. Partial Differential Equations: overview, types of equations, boundary conditions, convection-diffusion equations, differencing schemes, finite volume method, stability - von Neumann analysis, error analysis - dispersion, diffusion errors, solving Laplace and Poisson equations, methods for solving Navier-Stokes equations. OpenFoam: fundamentals of OpenFoam - examples, solving simple 2D problems, Laplace and Poisson equations with OpenFoam, solving complex 2D fluid flow problems. C and C++ programming.
Objectives:	On completion of this subject students should be able to: # Apply the differential equations governing fluid flow, heat transfer and mass transport to formulate strategies for the solution of engineering problems # Use basic methods for solving these equations numerically using a computer # Use a Computational Fluid Dynamics software package to solve engineering problems

Assessment:	Class tests and assignments during the semester contributing 40% to the final mark An end of semester examination not exceeding three hours contributing 60% to the final mark A pass in the end of semester examination is required to pass the subject
Prescribed Texts:	None
Recommended 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:	# 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 complex problems and to design and operational performance # Capacity for lifelong learning and professional development
Related Course(s):	Master of Philosophy - Engineering Ph.D.- Engineering
Related Majors/Minors/ Specialisations:	B-ENG Mechanical Engineering stream Master of Engineering (Biomolecular) Master of Engineering (Chemical) Master of Engineering (Mechanical)