ENGR30003 Numerical Programming for Engineers

Credit Points:	12.5
Level:	3 (Undergraduate)
Dates & Locations:	2016, Parkville This subject commences in the following study period/s: Semester 2, Parkville - Taught on campus.
Time Commitment:	Contact Hours: 36 hours, comprising 24 x 1 hr lectures and 12 x 1 hr workshops. Total Time Commitment: Estimated 170 hours
Prerequisites:	

Subject	Study Period Commencement:	Credit Points:
COMP20005 Engineering Computation	Semester 1, Semester 2	12.5
MAST20029 Engineering Mathematics	Summer Term, Semester 1, Semester 2	12.5
ENGR20004 Engineering Mechanics	January, Semester 1, Semester 2	12.5

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:	Prof Richard Sandberg
Contact:	**richard.sandberg@unimelb.edu.au (mailto:richard.sandberg@unimelb.edu.au)**
Subject Overview:	The aim of this subject is to equip students with computational tools for solving common physical engineering problems. The focus of the lectures is on archetypical physical engineering problems and their solutions via the effective implementation of classical algorithms. Indicative content: asymptotic notation, abstract data structures, sorting and searching, numerical integration of ordinary differential equations and two-point boundary value problems, numerical stability and convergence.
Learning Outcomes:	Intended Learning Outcomes (ILOs) At completion of this subject students should be able to: 1 Estimate and measure the numerical complexity of programs 2 Numerically solve a system of ordinary differential equation representing physical, nonlinear, multi-domain systems 3 Numerically solve a two-point boundary value problem 4 Numerically solve an optimisation problem.

Assessment:	One written two hour closed book end of semester examination (40%). ILOs 1 to 4 are addressed in the exam. The examination is a hurdle and must be passed to pass the subject. Two assignments (maximum of 50 pages for both assignments and total time commitment approximately 72 hours), due in Weeks 5 and 11 (60%). ILOs 1 to 4 are addressed in the assignments. Assignment 1, due Week 5 (25%) Assignment 2, due Week 11 (35%)
Prescribed Texts:	Numerical Recipes in C. (Press et al).
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:	1 Application of knowledge of basic science and engineering fundamentals 2 Effective communication about computational efficiency 3 Capacity to reason and solve problems 4 Ability to undertake problem identification, formulation and solution 5 Capacity for creativity and innovation 6 Profound respect for truth and intellectual integrity, and for the ethics of scholarship.
Related Majors/Minors/ Specialisations:	Master of Engineering (Mechatronics) Mechatronics Systems Science-credited subjects - new generation B-SCI and B-ENG. Selective subjects for B-BMED