600-617 Systems Modelling and Simulation

Credit Points:	12.50
Level:	9 (Graduate/Postgraduate)
Dates & Locations:	2009, This subject commences in the following study period/s: Semester 1, - Taught on campus.
Time Commitment:	Contact Hours: 48 hours comprising 2 one-hour lecture per week and 1 two-hour computer laboratory session per week. Total Time Commitment: Not available
Prerequisites:	None
Corequisites:	None
Recommended Background Knowledge:	Students should have completed Calculus 2 (620-155) or an equivalent and an introductory probability/statistics subject such as 620-201 or 620-205. The latter may be taken concurrently with this subject.
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:	Dr Owen Dafydd Jones
Subject Overview:	Modern science and business makes extensive use of computers for simulation, because complex real-world systems often cannot be analysed exactly, but can be simulated. Using simulation we can perform virtual experiments with the system, to see how it responds when we change parameters, which thus allows us to optimise its performance. We use the language R, which is one of the most popular modern languages for data analysis.
Objectives:	After completing this subject students should: • Program in R; • Develop and analyse simulations of deterministic and stochastic processes, with an emphasis on those arising in business and management settings; • Apply local optimisation techniques to simulated processes.
Assessment:	Up to 50 pages of written assignments (45%: three assignments worth 15% each, due early, mid and late in semester), a 3-hour written examination (55%, in the examination period).
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:	At the completion of this subject, students should gain the following generic skills: # Problem-solving skills (especially through tutorial exercises and assignments), including engaging with unfamiliar problems and identifying relevant strategies; # Analytical skills, in particular the ability to construct and express logical arguments and to work in abstract or general terms to increase the clarity and efficiency an analysis; # The ability to work in a team, through interactions with other students.

Notes:	Students will be expected to regularly access a computer running the programming language R. (R is freeware. Instructions on obtaining and installing R will be provided.)
Related Majors/Minors/ Specialisations:	R05 PB Master of Science (Biotechnology) R05 PE Master of Science (Environmental Science) R05 PM Master of Science (Management Science) R05 PN Master of Science (Nanotechnology) R05 RA Master of Science - Geography (not offered until 2010) R05 RB Master of Science - Botany R05 RC Master of Science - Chemistry R05 RH Master of Science - Biomedical and Health Sciences R05 RI Master of Science - Information Systems R05 RM Master of Science - Mathematics and Statistics R05 RP Master of Science - Physics R05 RZ Master of Science - Zoology