MAST90045 Systems Modelling and Simulation

Credit Points:	12.50
Level:	9 (Graduate/Postgraduate)
Dates & Locations:	2011, Parkville This subject commences in the following study period/s: Semester 1, Parkville - Taught on campus.
Time Commitment:	Contact Hours: 48 hours comprising 2 one-hour lectures 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 equivalent.
Non Allowed Subjects:	None
Core Participation Requirements:	For the purposes of considering requests 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 for 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 Owen Jones
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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 be able to: # Program in R; # Develop and analyse simulations of deterministic and stochastic processes, with an emphasis on those arising in business and management settings; and # Apply local optimisation techniques.
Assessment:	Up to 15 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:	"Introduction to Scientific Programming and Simulation Using R" by O. Jones, R. Maillardet and A. Robinson. CRC Press, 2009
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.

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 Course(s):	Master of Biotechnology Master of Operations Research and Management Science Master of Science (Botany) Master of Science (Chemistry) Master of Science (Computer Science) Master of Science (Earth Sciences) Master of Science (Epidemiology) Master of Science (Geography) Master of Science (Information Systems) Master of Science (Mathematics and Statistics) Master of Science (Physics) Master of Science (Vision Science) Master of Science (Zoology)
Related Majors/Minors/ Specialisations:	Environmental Science Environmental Science