620-644 Mathematical Biology

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. On-campus
Time Commitment:	Contact Hours: 36 hours comprising 2 one-hour lectures per week and 1 one-hour practice class per week. Total Time Commitment: 3 contact hours and 7 hours private study per week.
Prerequisites:	None.
Corequisites:	None.
Recommended Background Knowledge:	It is recommended that students have completed a third year subject in partial differential equations (equivalent to 620-331 [2008] Applied Partial Differential Equations).
Non Allowed Subjects:	None.
Core Participation Requirements:	It is University policy to take all reasonable steps to minimise the impact of disability upon academic study and reasonable steps will be made to enhance a student's participation in the University's programs. Students who feel their disability may impact upon their participation are encouraged to discuss this with the subject coordinator and the Disability Liaison Unit.
Coordinator:	Prof Kerry Anne Landman
Subject Overview:	Modern techniques have revolutionised biology and medicine, but interpretative and predictive tools are needed. Mathematical modelling is such a tool. It provides explanations for counter intuitive results and predictions leading to new experimental directions. Mathematical techniques are beginning to play a key role in tackling challenges in the medical sciences. Mathematical biology has been applied to many applications and covers a large range of mathematical techniques, for example discrete time models, ordinary differential equations, partial differential equations, stochastic models and cellular automata. The broad flavour of the area will be discussed, with particular areas highlighted in more detail. Applications will be drawn from many areas including population growth, epidemic modelling, biological invasion, pattern formation, tumour modelling, developmental biology and tissue engineering.
Objectives:	After completing this subject, students will: # appreciate the context in which continuum and discrete modelling may arise in mathematical modelling; # have high level mathematical tools and knowledge that can be used to model a range of problems in mathematical biology; # have the ability to implement physically justified approximations to solve complex problems; # have been exposed to both computational and analytical tools, and understand the various contexts in which they can be applied; # have the ability to pursue further studies in this and related areas.
Assessment:	Up to 60 pages of written assignments (75%: three assignments worth 25% each, due early, mid and late in semester), a 2 hour written examination (25%, in the examination period).
Prescribed Texts:	TBA
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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:	Upon completion of this subject, students should gain the following generic skills: # problem-solving skills including the ability to engage with unfamiliar problems and identify relevant solution strategies # analytical skills through the ability to construct and express logical arguments and to work in abstract or general terms to increase the clarity and efficiency of analysis; # through interactions with other students, the ability to work in a team; and # time management skills: the ability to meet regular deadlines while balancing competing commitments.
Related Majors/Minors/ Specialisations:	R05 RM Master of Science - Mathematics and Statistics