MAST90011 Modelling: Mathematical Biology

Credit Points:	12.50
Level:	9 (Graduate/Postgraduate)
Dates & Locations:	2012, Parkville This subject commences in the following study period/s: Semester 2, Parkville - Taught on campus. On-campus
Time Commitment:	Contact Hours: 36 hours comprising two 1-hour lectures per week and one 1-hour practice class per week. Total Time Commitment: 3 contact hours and 7 hours private study per week.
Prerequisites:	The following subject, or equivalent:

Subject	Study Period Commencement:	Credit Points:
MAST30029 Partial Differential Equations	Semester 2	12.50

Corequisites:	None
Recommended Background Knowledge:	None
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:	Prof Kerry Landman
Contact:	Prof Kerry A Landman **Email: kerryl@unimelb.edu.au (mailto:kerryl@unimelb.edu.au)**
Subject Overview:	Modern techniques have revolutionised biology and medicine, but interpretative and predictive tools are needed. Mathematical modelling is such a tool, providing explanations for counter-intuitive results and predictions leading to new experimental directions. The broad flavour of the area and the modelling process will be discussed. Applications will be drawn from many areas including population growth, epidemic modelling, biological invasion, pattern formation, tumour modelling, developmental biology and tissue engineering. A large range of mathematical techniques will be discussed, for example discrete time models, ordinary differential equations, partial differential equations, stochastic models and cellular automata.
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
Recommended Texts:	Edelstein-Keshet, L. Mathematical Models in Biology. McGraw Hill, 1987. Murray, J. D. Mathematical Biology. Springer Verlag, 1990 (or the new 2 Volume Third edition, 2003). Britton, N. F. Essential Mathematical Biology, Springer, 2003. Dr Vries, G., Hillen T., Lewis, M., Muller, J. and Schonfisch, B. A Course in Mathematical Biology. SIAM, 2006.
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 addition to learning specific skills that will assist students in their future careers in science, they will have the opportunity to develop generic skills that will assist them in any future career path. These include: # problem-solving skills: the ability to engage with unfamiliar problems and identify relevant solution strategies; # analytical skills: the ability to construct and express logical arguments and to work in abstract or general terms to increase the clarity and efficiency of analysis; # collaborative skills: the ability to work in a team; # time-management skills: the ability to meet regular deadlines while balancing competing commitments.
Related Course(s):	Master of Science (Mathematics and Statistics)
Related Majors/Minors/ Specialisations:	Mathematics and Statistics