MATH 570
MATHEMATICAL BIOLOGY
Winter, 2004

Time and Place:	TR 12:30–1:50, CAB 457.
Instructor:	Mark Lewis
Offices:	CAB 545A
Phone:	2-0197
email:	mlewis@math.ualberta.ca
Office Hours:	TR 11:15-12:00.
Text:	M. Kot *Elements of Mathematical Ecology*, Cambridge 2001.
Supplemental Text:	J. D. Murray *Mathematical Biology*, Springer-Verlag 1989 (on reserve in Cameron).
Supplemental Text:	J. Keener and J. Sneyd. *Mathematical Physiology*, Springer-Verlag 1998 (in Cameron).

The Course. Math 570 is for students with a graduate level of math background who are interested in the interplay between biology and mathematics. It is assumed that students have a background in ordinary and partial differential equations at the introductory graduate student level.

The Text. The main text is by Mark Kot. The focus of the applications of the mathematical methods in this text is ecology. The two supplemental texts (on reserve) cover physiology, developmental biology, and related subjects.

Homework. Homework problems will be handed out throughout the course (approximately two problems per lecture, starting in the second week of the quarter). Students are asked to solve 15 of these problems from the first half of the course and 15 from the second half. Certain longer problems will be assigned double weight. The first set of solutions is due on February 24; the second set is due on April 8.

Homework Policy. Feel free to discuss approaches and ideas for solving the problems with me and with other students. This is a crucial part of the learning process. However, the actual solution of the homework problem, and the writing up of solution to the problems is to be done independently by each student.

Grading. The solved problems will be graded and a percentage will be assigned. The percentage will be translated into a grade as follows: A+: 90+, A: 85–90, A-: 80–85, B+: 75–80, B:70–75, B-:65–70, C+: 60–65, C: 55–60, C-: 50–55, D: 45–50, F: 45-.

Subjects Covered. Subjects will be chosen from

1. Single species: continuous-time models, harvesting, stochastic birth-death processes, discrete-time models, and dynamics with time delays.
2. Interacting dynamics: ecological models, physiological models, enzyme kinetics
3. Biological waves: biological invasions, electrical waves, nonlinear PDE and integro-difference models.
4. Spatial patterning: diffusion-driven instabilities, territorial patterns, morphogenesis
5. Age structured population growth models.

Required Course Outline Statement. Policy about course outlines can be found in Section 23.4(2) of the University Calendar. The University of Alberta is committed to the highest standards of academic integrity and honesty. Students are expected to be familiar with these standards regarding academic honesty and to uphold the policies of the University in this respect. Students are particularly urged to familiarize themselves with the provisions of the Code of Student Behaviour (online at www.ualberta.ca/secretariat/appeals.htm) and avoid any behaviour which could potentially result in suspicions of cheating, plagiarism, misrepresentation of facts and/or participation in offence. Academic dishonesty is a serious offense and can result in suspension or expulsion from the University.