SYLLABUS

MATH 4010/6010 **MATHEMATICAL BIOLOGY** **SPRING 2009**
BIO 4930/6930 COURSE REFERENCE # 16854

Dates: MW 03:00 – 04:15pm
Place: Aderhold Learning Center #330
Instructor: Dr. Andrey Shilnikov
Office: # 724, College of Education
Phone: (404) 413 6423
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Web page: http://www2.gsu.edu/~matals/
Office hours: MW 1:45–2:45 pm, or by appointment

Prerequisite: Grade of C or higher in Math 2212 or Math 1220

Textbook: Leah Edelstein-Keshet, "Mathematical Models in Biology," SIAM Press, ISBN-13: 978-0-898715-54-5. http://www.amazon.com/Mathematical-Biology-Classics-Applied-Mathematics/dp/0898715547

I will supplement this text extensively with my own lecture notes as well as with handouts and selected readings from the mathematical biology literature. There will be a few other texts available throughout the semester, including:

"Dynamic Models in Biology" by Stephen Ellner and John Guckenheimer, Princeton University Press, 2006, ISBN13: 978-0-691-12589-3.
"A Course in Mathematical Biology: Quantitative Modeling with Mathematical and Computational Methods" by Gerda de Vries, Thomas Hillen, Mark Lewis, Birgitt Schonfisch, and Johannes Muller. SIAM, ISBN-10: 0898716128

At the end of the course you will have gained sufficient background to read much of the current mathematical and theoretical biology literature.

Description: This course provides an introduction to the use of continuous and discrete differential equations, probability theory and cellular automata in the biological sciences. Biological topics will include single species and interacting population dynamics, modeling infectious and dynamic diseases, regulation of cell function, molecular interactions, neural and biological oscillators, and an introduction to biological pattern formation. Mathematical tools such as phase portraits, bifurcation diagrams, perturbation theory, and parameter estimation techniques that are necessary to analyze and interpret biological models will also be covered.

Course content: Part1, Chapters 1, 2, 3, 5, 6, and 7, as well as 9-11 if the time permits.

Administrative Drop Policy: During the first two weeks of the semester the Department of Mathematics and Statistics checks the computer records to determine whether or not each student has met the prerequisites for the course. If you do not have the prerequisites, please so inform your instructor and change to another course right away. If our computer search finds that you do not have the prerequisite, you must drop this course or you will be dropped automatically. If you do not attend the class during the first two weeks you will be administratively dropped.

Attendance policy: A student is considered present only if he/she has arrived on time and remains

until the class is dismissed. Coming to class late or leaving early is disruptive and thus discouraged. The instructor may drop a student from the roll for exceeding four class absences. Students are responsible for all material covered in the book and in class. Those who have excellent attendance but are on a grade borderline will get extra consideration at the end of the class.

Examinations: Two class tests will be given this semester, the dates of each of these tests will be announced about one week in advance. There will also be a final exam, which is scheduled for **April 29 at 2:45 p.m.** Books and notes will not be allowed on all tests. *There will be no make-up exams except in an extreme verifiable emergency.* Absence from the final exam will result in a grade of F for the course unless arrangements are made *prior* to its administration.

Grading: Grades will be determined on the basis of 2 tests and a final exam which may be replaced by a research project. The final grade will be awarded as follows.

For non-biology students:

90%-100% of the maximum = **A**
87%-89% = **B+**
80%-86% = **B**
77%-79% = **C+**
70%-76% = **C**
60%-69% = **D**
0%-59% = **F**

For biology students:

90%-100% of the maximum = **A**
80%-89% = **B**
70%-79% = **C**
60%-69% = **D**
0%-59% = **F**

Withdrawal: March, 3 is the last day to withdraw and receive a possible grade of W except for hardship withdrawal. A grade of W will only be assigned to a withdrawing student, if the student is passing at the time of withdrawal.

Procedures: Class meets twice a week. Taking good notes during the class is of significant importance. Homework will be assigned in each class. After the class, read the book, read your notes and do as many of the homework problems as you can prior to the next class. Try to get the remaining problems explained in the next class. You are responsible for all material covered in class, whether or not you attended this class.

Academic Dishonesty: Plagiarism and cheating are serious offenses and may be punished by failure on the exam. Repeated cheating will result in a grade F for the course.

Homework: Working on the homework assignments is an essential part of the course. It is critical for your success on the exams.

This course syllabus provides a general plan for the course; deviations may be necessary.