

SYLLABUS

MATH 4010/6010

MATHEMATICAL BIOLOGY
COURSE REFERENCE # 83466

Fall 2019

11:00 – 12:15 PM, TR

ROOM: Langdale Hall 501

Instructor: Dr. Igor Belykh

Office: 25 Park Place, office # 1309

Office Hours: TR 2:30-3:30 pm, other times by appointment

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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.

I will supplement this text extensively with my own lecture notes and with many handouts and selected readings from the mathematical biology literature. There will be several optional texts available throughout the semester, including

- Gerda de Vries, Thomas Hillen, Mark Lewis, Birgitt Schonfisch, and Johannes Muller, "A Course in Mathematical Biology: Quantitative Modeling with Mathematical and Computational Methods", SIAM Press, ISBN-10: 0898716128
- Steven Strogatz, "Nonlinear Dynamics and Chaos: With Applications to Physics, Biology, Chemistry and Engineering", Publisher: Perseus Books Publishing, ISBN-10: 0-7382-0453-6.

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 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. 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: Chapters 1-8. In addition, we will cover topics from the optional texts, including various computational models for complex biological systems.

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 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 **Thursday, December 12th at 10:45-1:15 p.m.** *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 graded homework, two tests, one project and a final exam.

Graded homework: 100 pts

Test 1: 100 pts

Test 2: 100 pts

Project: 50 pts

Final: 150 pts

Max: 500 pts

The final grade will be awarded as follows:

97%-100% of the maximum = **A+**

93%-96% of the maximum = **A**

90%-92% = **A-**

87%-89% = **B+**

83%-86% = **B**

80%-82% = **B-**

77%-79% = **C+**

73%-76% = **C**

70%-72% = **C-**

60%-69% = **D**

0%-59% = **F**

Withdrawal Policy: If you withdraw from this class on or before W-Day (**October 15th**) you will receive a W regardless of your performance. If you hardship withdraw after this date (a regular withdrawal at this point gives you an automatic WF) you will receive a **W ONLY** if you are passing (70 average or better); otherwise you will receive a WF (which averages into your GPA just like an F).

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.