

SYLLABUS

MATH 4275/6275

APPLIED DYNAMICAL SYSTEMS

SPRING 2011

COURSE REFERENCE # 14599

MW 01:30 – 02:45 PM

ROOM: Aderhold 204

Instructor: Dr. Andrey Shilnikov
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Office hours: MW 3:00 pm – 4:00 pm, or by appointment

Prerequisite: Grade of C or higher in Math 3260 and Math 3435

Textbook: Steven Strogatz, "Nonlinear Dynamics and Chaos: With Applications to Physics, Biology, Chemistry and Engineering"
Publisher: Perseus Books Publishing
ISBN-10: 0-7382-0453-6
ISBN-13: 978-0-7382-0453-6

I will supplement this text extensively with my own lecture notes and with handouts and selected readings from the applied dynamical systems literature.

At the end of the course you will have gained sufficient background to read much of the current dynamical systems literature.

Description: An introduction to discrete and continuous dynamical systems. Topics include: phase space; linear and nonlinear systems; structural stability; classification of equilibrium states, invariant manifolds; Poincaré maps, fixed points and period orbits; stability boundaries; local bifurcations; homoclinic orbits; routes to chaos in dissipative systems; applications from physics, biology, population dynamics, economics.

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 midterm 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 **Wednesday, April 27 at 13:30 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 several quizzes and home taken projects. The final grade will be awarded as follows.

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

90%-96% = **A**

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

80%-86% = **B**

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

70%-76% = **C**

60%-69% = **D**

0%-59% = **F**

Withdrawal: February, 21 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.