San Francisco State University
Department of Mathematics
Course Syllabus

MATH 376

Ordinary Differential Equations I

Instructor: Javier Arsuaga
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Office Hours:
F: 10:00-11:00 or by appointment

1.- MATH 376: Ordinary Differential Equations

i.- Prerequisites: Grade of C or better in MATH 227 (Calculus III) and in MATH 325 (Linear Algebra).

ii.- Textbook: Differential Equations (2nd edition), Dynamical Systems and an Introduction to Chaos (2nd edition), by M. W. Hirsch, S. Smale and R. L. Devaney. Problems or specific sections may be from other textbooks. In these cases notes will be given in class. We will read several chapters from the book “Chaos: Making a New Science” by James Gleick.

iii.- Bulletin Description: First order differential equations, second-order linear equations with constant coefficients, graphical and numerical methods, systems of differential equations and phase plane analysis, existence and uniqueness theorems.

iv.- Description:
We will start by learning how to solve first order differential equations and how to draw the solutions on the phase line. We will study population models and their applications. Next we will present the algebraic and topological tools needed for analyzing higher dimensional systems and study planar linear and non-linear systems. We will finish by learning methods to analyze systems of non-linear equations, including some basic methods from numerical analysis. All throughout the we will study applications to biology (infectious diseases, predator/Prey systems) and physics (circuits and mechanics).

v.- Course Goals:
Upon successful completion of the course, students should be able to do the following:

1.- Model certain physical/biological systems using differential equations
2.- Solve first and second order differential equations
2.- Graph and interpret the direction field associated with first and second order Differential equations
3.- Use software to investigate differential equations and their phase Planes
4.- Implement numerical methods for solving differential equations
5.- Apply existence theorems to determine if an equation can be solved
GRADES AND TEST POLICIES:

i.- Exams and Grading
Grading will be based on quizzes (10% of the grade), homework (10% of the grade), tests (30% of the final grade), Final project (20% of the final grade) and one final (30% of the final grade).

Homework: Will be collected every Tuesday

Quizzes: Will be given every Tuesday and will be based on the collected homework.

Tests: There will be one test at the end of each chapter:

Final Project: Group project with presentation in class

Students will be evaluated on their ability to devise, organize and present complete solutions to problems. Solutions need to be presented in a neat and organized way; cryptic answers or untidy assignments will not be graded.

Complete answers to all problems is required;

A correct answer with no reasoning or with wrong reasoning will result in partial or no credit

The grade distribution is as follows: A (90%-100%), B (80%-89%), C (70%-79%), D (60%-69%), F (0%-59%).

ii.- Calculators: Will not be permitted on the exams unless previously announced.

iii.- CR/NCR Grading
Most Mathematics classes allow CR/NCR grading, but many majors—including Mathematics—do not count CR/NCR grades towards the major. Mathematics majors should not take their Mathematics classes CR/NCR. All other majors should check with their academic advisors before deciding to take a Mathematics class CR/NCR.

If--after checking with your advisor--you want to apply for CR/NCR grading, you must log onto the web site www.sfsu.edu/student and sign up for CR/NCR grading before the October 23 deadline (see below-Important dates). Your instructor will not pass out a CR/NCR sheet in class.

iv.- Incompletes
The Incomplete grade (I) is assigned only to students doing satisfactory work until the last few weeks of a course, when events beyond the students’ control prevented them from completing the course. If this happens to you, discuss with
your instructor the possibility of taking an Incomplete rather than withdrawing from a class that you cannot finish.

Incompletes must be made up within twelve months of the date they are assigned. Your instructor will tell you how to make up your incomplete. Do not enroll in the same course again. You can only take a course once.

v.- Late and Retroactive Withdrawals
Petitions for withdrawal from a class after the November 17th deadline, either before the end of the semester (late withdrawal) or after the semester ends (retroactive withdrawal) must be justified by events that occurred after the withdrawal deadline. In general, only petitions for withdrawal from all courses will be approved. Late withdrawal from your math course alone is usually not approved.

vi.- Policy on make-up exams and late assignments:
No make up exams. If you know you will be missing a quiz/exam, please arrange to take the quiz/exam early. If you miss an exam AND you have an excused absence (medical excuse), your Final Exam grade will determine your midterm exam grade. This replacement policy applies only to missing one exam.

vii.- Exam re-grades
If you wish to have an exam answer re-graded, you must attach a written statement explaining how your answer deserves a higher score and submit the note along with the exam to the instructor within one week of receipt of your graded exam. The re-grade procedure will result in an increase, decrease, or no change in the grade.

3.- CLASS POLICIES

i.- Attendance:
While I do not require attendance it is to your advantage to come to class as attending lectures is the best way to learn the material. From the SFSU bulletin: “Students are expected to attend classes regularly because classroom work is one of the necessary and important means of learning and of attaining the educational objectives of the institution.” Regular attendance is suggested and encouraged. Please note that class BEGINS at 12:35 pm and ENDS at 13:50 pm. If you miss a class, it is your responsibility to obtain lecture notes and find out about any missed announcements from your fellow class members.

Attendance is REQUIRED on quiz and exam days.

NO LATE ARRIVALS OR EARLY DEPARTURES. IF YOU NEED TO LEAVE THE CLASS EARLY LET ME KNOW IN ADVANCE. REPEATED FAULTS MAY AFFECT YOUR FINAL GRADE.
ii.- Additional classroom policies:
Cell phone and pager sounds are disruptive to the class and will not be tolerated. While you are in class, your cell phone and/or pager must be silenced (turned off or set on vibrate mode). If you must answer your phone, please leave the lecture room before doing so.

iii.- E-mail etiquette
I welcome E-mail questions from students. Whenever e-mailing, each student must identify herself/himself by signing the message with his/her full name.

4.- IMPORTANT DATES:

Here is a short version of the University calendar for Fall 2006. Note that the Mathematics Department strictly enforces the deadlines for CR/NCR grading and withdrawals.

<table>
<thead>
<tr>
<th>Date</th>
<th>Event</th>
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<tbody>
<tr>
<td>September 8</td>
<td>Last day to add classes</td>
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<tr>
<td>September 25</td>
<td>Last day to drop classes online</td>
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<tr>
<td>October 23</td>
<td>Last day to select CR/NCR grading</td>
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<tr>
<td>November 10</td>
<td>Veterans Day</td>
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<tr>
<td>November 17</td>
<td>Last day to withdraw from a course</td>
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<td>November 20-25</td>
<td>Thanksgiving Recess</td>
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<td>December 15</td>
<td>Last Day of Instruction</td>
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<tr>
<td>December 18-22</td>
<td>Final Exams</td>
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<td>January 3</td>
<td>Grades due for Instructors</td>
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<tr>
<td>January 11</td>
<td>Transcripts available</td>
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5.- REASONABLE ACCOMODATIONS

i.- Students with Disabilities
Students with disabilities needing reasonable accommodations must bring an official written request to their instructor from the Disability Programs and Resource Center (Student Services Building, Room 110, (415) 338-1041, drc@sfsu.edu). The DRPC is available to facilitate the reasonable accommodations process.

ii.- Religious Holidays
Reasonable accommodations will be made for you to observe religious holidays when such observances require you to be absent from class activities. It is your responsibility to inform the instructor during the first two weeks of class, in writing, about such holidays.
6.- CHANGES IN SYLLABUS
The syllabus is subject to change upon agreement between students and instructor. If you are absent from class, it is your responsibility to check on announcements made while you were absent.