Differential Equations
Math 181, Fall 2009

Class Web Page: http://zimmer.csufresno.edu/~doreendl/181.09f

Instructor: Dr. Doreen De Leon
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Office hours: M 10-10:45 a.m., W 4-5:15 p.m., Th 2-4 p.m., or by appointment.

Text (required): *Elementary Differential Equations*, 2d ed., by Warner Kohler and Lee Johnson, Pearson (2006).

Units: 3.

Prerequisites: Math 81 or Math 123.

Meeting Time and Location: MWF 3:00-3:50 p.m. in S2 108.

Course Description

The purpose of this course is to continue the study of differential equations. In this course, you will learn to classify differential equations, and we will further discuss techniques for solving differential equations, including power series solutions. There will also be an introduction to existence and uniqueness theory. In addition, qualitative methods for analyzing systems of differential equations will be discussed. Throughout the course, applications of various types of differential equations will be examined.

Course Objectives

To learn:

- how to classify differential equations;
- various techniques for solving homogeneous and nonhomogeneous differential equations;
- some basic existence and uniqueness theory for differential equations, which should give you some understanding of how to determine when a differential equation can be expected to have a solution (existence) and when a solution will be unique (uniqueness); and
- qualitative methods for analyzing systems of equations, including the determination of the stability of critical points and the implications of stability.

To continue learning how to understand, construct, verbalize, write, and use mathematical arguments and reasoning in areas to which they apply (including, but not limited to, course work) and how to evaluate the validity of an argument or of an approach to solving a problem.

Learning Outcomes

Upon completion of this course, students should be able to:

- determine if a differential equation or a system of differential equations can be solved;
- identify and apply the best technique to solve a differential equation;
- analyze and solve a system of linear differential equations; and
- qualitatively analyze the solution properties of a nonlinear system of equations.

Grading

Your grade will be based on the following percentage weights: 25% for the homework, 15% for each of the three midterms, and 30% for the final. Grades on each individual homework assignment and exam will be given as a total number of points out of a specified maximum. If your score on the final exam demonstrates significant improvement, then your lowest midterm score will be dropped and the final exam will be weighted 45%. Your final grade in the class will be computed from your weighted average, scaled to a maximum of 100 points.

The tentative breakdown of points for the final grade is as follows:

Grade	A	B	C	D	F
Points, p	$p \geq 85$	$70 \leq p < 85$	$50 \leq p < 70$	$35 \leq p < 50$	$p < 35$

Exams

There will be three midterms and one final exam. The tentative schedule for these exams is:

- Midterm 1: Wednesday, September 23, 2009.
- Midterm 2: Wednesday, October 28, 2009.
- Midterm 3: Wednesday, December 2, 2009.
- Final exam: Monday, December 14, 2009, 3:30-5:30 p.m.

Each midterm will be returned in the lecture following the exam, and the exam will be discussed at that time. If you wish to request a regrade, you must submit a signed written request and return your exam to the instructor before leaving that lecture. No regrades will be allowed after you leave class, with the exception of mistakes in totaling scores. Permission in advance is required to miss a midterm, in which case the final exam will count an additional 15%. A missed exam is graded as a score of 0 unless prior arrangements are made with the instructor.
The final exam must be taken at the time listed above unless you receive permission from the instructor by September 14, 2009. In order to pass the class, you **must** take the final exam.

Attendance

Although attendance is not required, it is **strongly suggested** so that you may have the opportunity to ask questions regarding material presented in class, in the homework, and/or in the text. The class time devoted to discussing homework problems will be limited, however, due to time constraints.

NOTE: You are responsible for checking the class web page **every** day for announcements.

Homework

Homework will be assigned approximately every lecture. The homework will be due in one packet on Friday of the following week by the beginning of the class period (i.e., by 3:00 p.m.). More problems will be assigned than will be graded. The problems to be graded will be chosen by the instructor each week, but will not be announced until after the homework has been graded. For full credit, homework solutions must follow the format set forth in *Communicating Mathematics through Homework*, which can be found at http://zimmer.csufresno.edu/∼doreendl/homework.html. Homework assignments will be announced in class and posted on the class web page. **No late homework will be accepted.**

You are encouraged to discuss aspects of the course with other students, and you may discuss the homework assignments in general terms with others. **You may not, however, copy any part of a solution written by someone else.** You are also encouraged to consult the instructor for help in completing the assignments or for any other course-related questions.

General Course Outline

A tentative schedule of the topics to be covered, and the chapters in which these subjects can be found, follows. Each chapter listed below may not be covered in its entirety. In addition, material may be added or removed, depending on time constraints. Reading assignments will be announced in class and posted on the course web page.

Topics	**Chapter in Kohler and Johnson**
Classification of differential equations	Chapter 1
First order differential equations	Chapter 2
Second and higher order linear differential equations	Chapter 3
Series solutions of linear differential equations	Chapter 8
First order linear systems	Chapter 4
Nonlinear systems	Chapter 6
Numerical methods	Chapter 9

Classroom Behavior

In order to maintain a respectful learning environment, please: (1) make sure that all cell phones and pagers are turned off for the duration of class, and (2) do not talk, whisper, or engage in other distracting behavior. Any student conduct which disrupts the learning process will not be tolerated and may lead to removal from class and/or other disciplinary action. University policies on disruptive behavior are followed and enforced in every instance.

Academic Dishonesty

Academic dishonesty will not be tolerated in any form. The Honor Code, which requires all members of the CSU Fresno academic community to adhere to principles of academic integrity and mutual respect while engaged in university work and related activities, can be found at http://www.csufresno.edu/aps/documents/apm/236.pdf. You should:

(1) understand or seek clarification about expectations for academic integrity in this course (including no cheating, plagiarism and inappropriate collaboration);
(2) neither give nor receive unauthorized aid on examinations or other course work that is used by the instructor as a basis of grading; and
(3) take responsibility to monitor academic dishonesty in any form and to report it to the instructor or other appropriate official for action.

For more information on the University's policy regarding cheating and plagiarism, refer to the Class Schedule (Legal Notices on Cheating and Plagiarism) or the University Catalog (Policies and Regulations).

Students with Disabilities

University student disability policies are followed. Contact the Disabled Student Services office (located in the Madden Library) for specific arrangements and information.

Computers

At California State University, Fresno, computers and communication links to remote resources are recognized as being integral to the education and research experience. Every student is required to have his/her own computer or have other personal access to a workstation (including a modem and a printer) with all the recommended software. The minimum and recommended standards for the workstations and software, which may vary by academic major, are updated periodically and are available from Information Technology Services (http://www.csufresno.edu/ITS/) or the University Bookstore. Students are presumed to have 24-hour access to a computer workstation and the necessary communication links to the University's information resources.

Copyright Policy

For the required syllabus statements referring to copyright policy, please see the Required Syllabus Policy Statements page (http://www.csufresno.edu/academics/documents/RequiredSyllabusPolicyStatements.doc).