Kent Pearce	Differential Equations I

Kent Pearce
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Differential Equations I
    Math 3354-001
    MWF 9:00-9:50
    MCOM 152

Office Hours:
    Fixed Hours
        TRF 2:00 - 3:00
    Other Hours
        By Appointment

Text:
    Zill & Wright
    Differential Equations with Boundary Value Problems
    8th Ed., Brooks/Cole

Website:
    www.math.ttu.edu/~pearce/courses.shtml

Chapters:
    1(1-2), 2(1-6),3(1-2), 4(1-4,6-7), 5(1), 7(1-5), 6(1-3)

Learning Objectives

Students will
- obtain a working knowledge of standard solution techniques for first-order equations
- obtain a thorough knowledge of solution techniques for second- and higher-order constant coefficient linear homogenous and nonhomogeneous initial value problems using
  - standard methods of undetermined coefficients and
  - variation of parameters.

In addition, the students will
- acquire a general understanding of how to apply the Laplace transform in solving initial value problems and convolution integral equations.
- will gain an appreciation for some of the applications of ordinary differential equations in biology and engineering.

Assessment of Learning Outcomes

    Assessment will be achieved through one or more activities, non-graded and graded, such as: attendance, class discussion, board work, electronic homework, examinations and other optional activities deemed appropriate by the instructor. It is important to note that these assessments are for your learning benefit. Class grades will be assigned according to the following rubric:

Grading

Mid-term Exams:	300 pts.
3 Exams @ 100 pts.	
Dates: 15 Feb, 22 Mar, 26 Apr	
WeBWorK:	150 pts.
6 Electronic Homework @ 25 pts.	
Dates: See Calendar	
Web Address: http://webwork.math.ttu.edu/webwork2/spr13kpearcem3354s001	
Final Exam:	200 pts.
Comprehensive	
Date: Friday, 10 May, 7:30 am - 10:00 am	
Grade Total	650 pts.

Grading Scale

    A...100% - 90%   B...89% - 80%   C...79% - 70%   D...69% - 60%   F...59% - 0%

Curricular Content

Chapter 1 - Introduction
    a. Definitions and Terminology
    b. Initial Value Problems (IVP)

Chapter 2 - First-Order Differential Equations
    a. Direction Fields
    b. Separable Equations
    c. Linear Equations
    d. Exact Equations
    e. Solution by Substitution
    f. Intro to Numerical Methods

Chapter 3 - Modeling with First-Order Differential Equations
    g. Linear Models
    h. Non-linear Models

Chapter 4 - Higher-Order Differential Equations
    a. Linear Equations
        i. Initial-value and Boundary-Value Probems
        ii. Homogeneous Equations
        iii. Non-homogeneous Equations
    b. Reduction of Order
    c. Homogeneous Linear Constant-Coefficient Equations
    d. Undetermined Coefficients
    e. Variation of Parameters
    f. Cauchy-Euler Equations

Chapter 5 - Modeling with Higher-Order Differential Equations
    a. Linear Models

Chapter 7 - Laplace Transform
    a. Definition
    b. Inverse Transforms and Transforms of Derivatives
    c. Translation Theorems
    d. Operational Properties
        i. Derivatives of Transforms
        ii. Transforms of Integrals
        iii. Transforms of Periodic Functions
    e. Dirac-Delta Function

Chapter 6 - Series Solutions of Linear Differential Equations
    a. Review of Power Series
    b. Solutions about Ordinary Points
    c. Solutions about Singular Points

Technology

Graphing calculators (TI-83, TI-84, TI-89 or equivalent) and/or computer algebra software (Maple, Mathematica, Matlab) can be invaluable aids for facilitating learning. On the other hand, the course objectives are not centered around calculator proficiency nor computer expertise. Students may use a graphing calculator or computer algebra software while doing webwork assignments to facilitate: (1) learning of concepts; (2) understanding the material; (3) checking calculation details. The emphasis on mid-term exams and the final exam will be oriented towards assessing mastery of the concepts stated in the Learning Objectives section. To that end, calculators will <u>not</u> be allowed in the mid-term exams nor in the final exam.

Critical Dates

Wednesday, 16 January, First Day of Spring Classes
Wednesday, 21 January, Martin Luther King Day, University Holiday
Monday-Friday, 11 March - 15 March, Spring Break
Wednesday, 20 March, Mid-Semester Grades Due
Monday, 1 April - Day of No Classes
Tuesday, 7 May - Last Day of Spring Classes.
Friday, 10 May - Comprehensive Final Exam (7:30 am - 10:00 am)

Notices

Academic Integrity (Extracted from OP 34.12)

It is the aim of the faculty of Texas Tech University to foster a spirit of complete honesty and high standard of integrity. The attempt of students to present as their own any work not honestly performed is regarded by the faculty and administration as a most serious offense and renders the offenders liable to serious consequences, possibly suspension.

"Scholastic dishonesty" includes, but it not limited to, cheating, plagiarism, collusion, falsifying academic records, misrepresenting facts, and any act designed to give unfair academic advantage to the student (such as, but not limited to, submission of essentially the same written assignment for two courses without the prior permission of the instructor) or the attempt to commit such an act.

Observance of Religious Holiday (Extracted from OP 34.19)

A student who intends to observe a religious holy day should make that intention known to the instructor prior to the absence. A student who is absent from classes for the observance of a religious holy day shall be allowed to take an examination or complete an assignment scheduled for that day within a reasonable time after the absence.

Accommodation for Students with Disabilities (Extracted from OP 34.22)

Any student who, because of a disability, may require special arrangements in order to meet the course requirements should contact the instructor as soon as possible to make any necessary arrangements. Students should present appropriate verification from Student Disability Services during the instructor's office hours. Please note: instructors are not allowed to provide classroom accommodations to a student until appropriate verification from Student Disability Services has been provided. For additional information, please contact Student Disability Services in West Hall or call 806-742-2405.