Kent Pearce  
Office: Math 201-A  
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Higher Mathematics for Engineers and Scientists I  
Math 3350-006  
MA 109 MWF 11:00-11:50

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

Text:  
Zill & Cullen  
*Advanced Engineering Mathematics*  
Third Ed., Jones & Bartlett

Website:  
[www.math.ttu.edu/~pearce/courses.shtml](http://www.math.ttu.edu/~pearce/courses.shtml)

Learning Objectives  
Students will understand the concept of differential equations, their solutions, and applications to physical sciences and engineering. In particular the students will learn to:

- recognize a differential equation and its solution  
- compute solutions of first order differential equations  
- compute solutions of linear differential equations  
- use Laplace transforms  
- recognize Fourier series  
- find numerical solutions

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:

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  
g. Linear Models  
h. Non-linear Models
Chapter 3 - Higher Order Differential Equations
   a. Linear Equations
      i. Initial-value and Boundary-Value Problems
      ii. Homogeneous Equations
   b. Reduction of Order
   c. Homogeneous Linear Constant-Coefficient Equations
   d. Undetermined Coefficients
   e. Variation of Parameters
   f. Cauchy-Euler Equations
   g. Linear Models

Chapter 4 - 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 5 - Series Solutions of Linear Differential Equations
   a. Solutions about Ordinary Points
      i. Review of Power Series
      ii. Power Series Solutions
   b. Special Functions
      i. Bessel Functions
      ii. Legendre Functions

Grading

Competency Exam
   Wed-Fri, 12-14 Jan
   100 pts.

Mid-term Exams:
   3 Exams @ 100 pts.
   Dates: 16 Feb, 23 Mar, 20 Apr
   400 pts.

WeBWorK:
   6 Electronic Homework @ 25 pts.
   Dates: See Calendar
   150 pts.

Final Exam:
   Comprehensive
   Date: Friday, 6 May, 4:30 pm
   200 pts.

Grade Total
   750 pts.

Grading Scale
   A...100% - 90%  B...89% - 80%  C...79% - 70%  D...69% - 60%  F...59% - 0%
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 not be allowed in the mid-term exams nor in the final exam.

Critical Dates
Monday, 17 January, University Holiday
Wednesday, 9 March, Mid-Semester Grades Due
Wednesday, 23 March - Last day to drop a course
Tuesday, 3 May - Last day of classes.
Friday, 6 May - Comprehensive Final Exam (4:30-7:00)

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.