

Kent Pearce

Office: Math 201-A

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Office Hours:

Fixed Hours

TRF 2:00 - 3:00

Other Hours

By Appointment

Website:

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

Higher Mathematics for Engineers  
and Scientists I

Math 3350-014

Math 015 TR 11:00-12:20

Text:

Zill & Cullen

*Advanced Engineering Mathematics*

Fourth Ed., Jones & Bartlett

Chapters:

1(1-2), 2(1-8),

3(1-6,8), 4(1-5),

5(1,3)

### 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
- the fundamental properties of power series, and how to use them to solve linear differential equations

### 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	100 pts.
Thu-Fri, 19-20 Jan	
Mid-term Exams:	300 pts.
3 Exams @ 100 pts.	
Dates: 23 Feb, 29 Mar, 1 May	
WeBWorK:	150 pts.
6 Electronic Homework @ 25 pts.	
Dates: See Calendar	
Web Address: <a href="http://webwork.math.ttu.edu/webwork2/spr12kpearcem3350s014">http://webwork.math.ttu.edu/webwork2/spr12kpearcem3350s014</a>	
Final Exam:	200 pts.
Comprehensive	
Date: Thursday, 10 May, 1:30-4:00 pm	
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**

Thursday, 19 January, First Day of Classes  
Wednesday, 21 March, Mid-Semester Grades Due  
Wednesday, 28 March - Last day to drop a course  
Tuesday, 8 May - Last day of classes.  
Thursday, 10 May - Comprehensive Final Exam (1:30-4:00)

## **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.