

King Fahd University of Petroleum and Minerals
Department of Mathematics & Statistics
Math 202 – Syllabus
2016-2017 (161)
Coordinator: Dr. Khalid Alshammari
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Title: Elements of Differential Equations.

Credit: 3-0-3

Textbook: A First Course in Differential Equations by D.G.Zill, 10th edition, 2013

Description: First-order and first -degree differential equations. Linear Models. Homogeneous differential equations with constant coefficients. Undetermined coefficients (Annihilator Approach), reduction of order, variation of parameters, and Cauchy-Euler equation. Series solutions. Systems of linear first-order differential equations

Learning outcomes: At the end of this subject, students should be able to:

1. Define the terminology which are commonly used in differential equations.
2. Verify that the given function is a solution of the given differential equation.
3. Differentiate between linear and nonlinear, ordinary and partial and different degree differential equations.
4. Identify and solve exact separable and homogeneous differential equations.
5. Solve the problems of ordinary differential equations.
6. Apply the knowledge of differential equations in order to solve engineering problems.
7. Solve second-degree homogeneous linear equations with constant coefficients.
8. Solve second-degree non-homogeneous linear differential equations by the principle of superposition, undetermined coefficients, and the method of variation of parameters.
9. Use the Wronskian and characteristic equations to solve higher order differential equations.
10. Use Series Function to solve differential equations.
11. Use Eigenvalue and Eigenvector to solve linear system of differential equations.

Grading Policy:

1. Exam I	Materials: 1.1 -----3.1	Place: Building 54	25% (100 points)
	Date: October 20, 2016	Time: 06:00 pm	
2. Exam II	Materials: 4.1 ----- 6.3	Place: Building 54	25% (100 points)
	Date: December 01, 2016	Time: 05:30 pm	
3. Final Exam	Date: January 12, 2017	Place: Building 54	35% (140 points)
		Time: 07:00 pm	
4. Class Work	ii) Class Activities: It is based on quizzes, class tests, or other class activities determined by the instructor. Any quiz or test under class activity should be of written type and not of multiple-choice type. The average x (out of 60) of class activities of the sections taught by the same instructor should be in the interval $[42, 45]$.		15% (60 points)

Exam Questions:

The questions of the common exams are based on the examples, homework problems and the exercises of the textbook.

Missing Exam I or Exam II:

No makeup exam will be given under any circumstance. When a student misses Exam I or Exam II for a legitimate reason (such as medical emergencies), his grade for this exam will be determined based on the existing formula, which depends on his performance in the non-missing exam and in the final exam.

Attendance:

Attendance is a University Requirement. A DN grade will be awarded to any student who accumulates 9 unexcused absences.

Academic Integrity: All KFUPM policies regarding ethics apply to this course.

Week	Dates (2016-17)	Sec.	Topics
1	Sep 18-21	1.1	Definitions and Terminology
		1.2	Initial Value Problems
2	Sep 25-29	2.2	Separable Variables
		2.3	Linear Equations
3	Oct 2-6	2.4	Exact Equations
4	Oct 9-13	2.5	Solutions by Substitutions
		3.1	Linear Models: Growth and Decay, Newton's Law of cooling
5	Oct 16-20	4.1	Preliminary Theory: Linear Equations
		4.1.1	Initial Value and Boundary value problems
		4.1.2	Homogeneous Equations
		4.1.3	Nonhomogeneous Equations
Exam I : Oct -20, 6:00Pm -8:00Pm			
6	Oct. 23-27	4.2	Reduction of Order
		4.3	Homogeneous Linear equations with constant coefficient
		4.5	Undetermined Coefficients-Annihilator Approach
7	Oct. 30 – Nov 3	4.6	Variation of Parameters
		4.7	Cauchy- Euler Equations (Both methods)
8	Nov 6-10	6.1	Review of Power Series
		6.2	Solutions about Ordinary Points
Nov 13-17 Mid Term Break			
9	Nov 20-24	6.3	Solutions about Singular Points
		App I	Matrices and Linear Systems
10	Nov 27- Dec 1	App II	The Eigenvalue Problem
		8.1	Preliminary Theory- Linear System
Exam II : Dec – 01, 5:30Pm – 8:00Pm			
11	Dec 4 - 8	8.2	Homogeneous Linear Systems
		8.2.1	Distinct Real Eigenvalues
12	Dec 11 - 15	8.2.2	Repeated Eigenvalues
		8.2.3	Complex Eigenvalues
13	Dec 18 - 22	8.3	Nonhomogeneous Linear System
		8.3.2	Variation of Parameters
14	Dec 25 - 29		Continued
		8.4	Matrix Exponential (No Laplace Transform)
15	Jan 1-5		Catch up and/or Review
		Final Exam:	January 12, 2017.

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Homework

Section	Homework Problems
1.1	5,13,14,18,20,22,29,32
1.2	2,6,13,19,22,24,26,30,
2.2	6,10,12,21,26,30,32,48,
2.3	4,12,15,18,20,22,28,30,36
2.4	5,8,12,20,28,30,31,34,42,43
2.5	2,6,8,10,12,16,22,25,28,29
3.1	4,8,10,15,16,18,20
4.1.1	2,4,6,10,12,13,14
4.1.2	16,22,24,25,28,30
4.1.3	31,34,36 (b,c)
4.2	4,6,10,13,16,18,19
4.3	5,8,12,14,18,22,28,32,36,42,49,50
4.5	2,8,14,20,25,28,32,34,44,48,50,61,64,68,71
4.6	2,6,11,12,18,22,24,26,28
4.7	1,6,8,12,16,18,22,24,29,32,36,38,40
6.1	2,3,4,8,10,12,16
6.2	2,4,11,12,16,21,22
6.3	1,4,8,12,14,16,19,24,30,32
App I	12,18,22,23,26,30(d,g),36,40,44
App II	48,49,53,54,56,59,60,61
8.1	3,6,8,10,14,15,16,19,22,24,26
8.2.1	2,7,9,10,14
8.2.2	22,24,26,27,29,30
8.2.3	34,37,38,42
8.3.2	12,14,15,28,30,31
8.4	2,5,6,8,9,10,12

Tips on how to enhance your problem-solving abilities:

1. Please do all the homework assignments on time.
2. You are urged to practice (but not memorize) more problems than the above lists.
3. You should always try to solve a problem on your own before reading the solution or asking for help.
4. If you find it difficult to handle a certain type of problems, you should try more problems of that type.
5. You are encouraged to solve some of the review problems at the end of each chapter.
6. The practice you get doing homework and reviewing the class lectures will make exam problems easier to tackle.
7. Try to make good use of the office hours of your instructor.