King Fahd University of Petroleum and Minerals
Department of Mathematics & Statistics

Math 202 – Syllabus

2016-2017 (162)

Coordinator: Dr. Husain Al-Attas
halattas@kfupm.edu.sa

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 for MATH 202

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

1) Understand some basic definitions and terminology associated with differential equations and their solutions.
2) Determine a region in which a first-order initial-value problem has a unique solution.
3) Identify and solve first-order differential equations of type: Separable, Linear, Exact, Homogeneous, and of Bernoulli's type.
4) Solve some real-life linear models.
5) Find solutions to initial-value and boundary-value problems from a given family of solutions.
6) Understand the superposition principals for linear higher-order homogeneous or nonhomogeneous differential equations.
7) Understand the meaning of a Fundamental Set of Solutions of a higher-order linear homogenous differential equation.
8) Apply the method of Reduction of Order to homogeneous linear second-order differential equations.
9) Determine the general solution of a homogeneous linear nth-order differential equations with real constant coefficient.
10) Use the method of Undetermined Coefficients-Annihilator Approach to find a particular solution of a nonhomogeneous nth-order differential equation with real constant coefficients.
11) Use the method of Variation of Parameters to find a particular solution of a second-order linear nonhomogeneous differential equation.
12) Solve a Cauchy -Euler Equation.
13) Find Power Series solutions of linear second-order differential equations about ordinary points.
14) Find Series solutions of linear second-order differential equations about regular singular points.
15) Find the Eigenvalues and the Eigenvectors of a square matrix.
16) Solve systems of linear homogeneous or nonhomogeneous differential equations using matrix techniques and eigenvalues.
17) Use a Matrix Exponential as a Fundamental Matrix of a linear system of differential equations.

Grading Policy:

1. Exam I	Materials: 1.1--3.1	Place: Bldg. 57	25%
	Date : Thursday March 9,2017	Time: 6:15 PM	(100 points)
2. Exam II	Materials: 4.1--4.7	Place: Bldg. 57	25%
	Date : Tuesday April 18,2017	Time: 6:30 PM	(100 points)
3. Final Exam	Material: Comprehensive	Place: TBA	35%
	Date: TBA	Time: TBA	(140points)
4. Class Work			
	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 one of the TwoCommonMajorExams-I or 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:

KFUPM attendance policy will be enforced. 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.

KING FAHD UNIVERSITY OF PETROLEUM & MINERAL
Department of Mathematics & Statistics
SYLLABUS
MATH 202 (162)
Coordinator: Dr. Husain Al-Attas

Week#	Date	Text Sections	Topic	Suggested Review Exercises
1	February 5-9	1.1	Definitions and Terminology	5, 13, 14, 18, 20, 22, 29, 32, 36, 38
		1.2	Initial Value Problems	2, 6, 13, 19, 22, 24, 26, 30
2	February 12-16	2.2	Separable Variables	6, 10, 12, 21, 26, 30, 32, 48
		2.3	Linear Equations	4, 12, 15, 18, 20, 22, 28, 30, 36
3	February 19-23	2.4	Exact Equations	5, 8, 12, 20, 28, 30, 31, 34, 42(b), 43
		2.5	Solutions by Substitutions	2, 6, 8, 10, 12, 16, 22, 25, 28, 29
4	Feb-March 26-2	2.5	Continuation	
		3.1	Linear Models: Growth and Decay, Newton's Law of Cooling	4, 8, 10, 15, 16, 18, 20
5	March 5-9	4.1.1	Initial-Value and Boundary-Value Problems	2, 4, 6, 10, 12, 13(c), 14(d)
		4.1.2	Homogeneous Equations	16, 22, 24, 25, 28, 30
Major Exam I, Thursday March 9,2017 at 6:15 PM Material 1.1—3.1				
6	March 12-16	4.1.3	Nonhomogeneous Equations	31, 34, 36 (b, c)
		4.2	Reduction of Order	4, 6, 10, 13, 16, 18, 19
7	March 19-23	4.3	Homogeneous Linear Equations with constant coefficients	5, 8, 12, 14, 18, 22, 28, 32, 36, 42, 49, 50
		4.5	Undetermined Coefficients- Annihilator Approach	2, 8, 14, 20, 25, 28, 32, 34, 44, 48, 50, 61, 64, 68, 71
8	March 26 - 30	4.5	Continuation	
		4.6	Variation of Parameters	2, 6, 11, 12, 18, 22, 24, 26, 28
Mid Term Vacation (2 – 6 April 2017)				
9	April 9-13	4.7	Cauchy-Euler Equations(Both Methods)	1, 6, 8, 12, 16, 18, 22, 24, 29, 32, 36, 38, 40
		6.1	Review of Power Series	2, 3, 4, 8, 10, 12, 16
10	April 16-20	6.2	Solutions About Ordinary Points	2, 4, 11, 12, 16, 21, 22
Major Exam II, Tuesday April 18,2017 at 6:30 PM Material 4.1—4.7				
11	April 23 - 27	6.3	Solutions About Singular Points	1, 4, 8, 12, 14, 16, 19, 24, 30, 32
		App II.1, App II.2	Matrices and Linear Systems (review)	12, 18, 22, 23, 26, 30(d,g), 36, 40, 44
12	April-May 30 - 4	App II.3	The Eigenvalue Problem	48, 49, 53, 54, 56, 59, 60, 61
		8.1	Preliminary Theory-Linear System	3, 6, 8, 10, 14, 15, 16, 19, 22, 24, 26
13	May 7 - 11	8.2	Homogeneous Linear System	
		8.2.1	Distinct Real Eigenvalues	2, 7, 9, 10, 14
		8.2.2	Repeated Eigenvalues	22, 24, 26, 27, 29, 30
14	May 14 - 18	8.2.3	Complex Eigenvalues	34, 37, 38, 42, 46
		8.3.2	Variation of Parameters	12, 14, 15, 28, 30, 31
15	May 21 - 25	8.4	Matrix Exponential (No Laplace Transform)	2, 5, 6, 8, 9, 10, 12
			+ **Pace Adjustment and/or Review**	
	Final Exam Material: Comprehensive Date,Time,and Place will be Announced by the Registrar			