

King Fahd University of Petroleum and Minerals
Department of Mathematics & Statistics
Syllabus Math 260
Semester I, 2015-2016 (151)
Coordinator: Dr. Ashfaque H. Bokhari

Course Title: Math 260 (Introduction to Differential Equations and Linear Algebra)

Credits: 3-0-3

Text Book: Differential Equations and Linear Algebra, C. Henry Edwards and David E. Penny, Prentice Hall, Third Edition (2014).

Objectives: This course introduces elementary differential equations and linear algebra to students of Computer Science, Computer Engineering, System Engineering and Earth Sciences.

Learning Outcomes:

Upon successful completion of this course, a student should be able to:

- Solve systems of linear algebraic equations by elimination of variables.
- Write systems of linear equations in the form of matrices and solve them by performing elementary row operations.
- Find inverse and eigenvalues & eigenvectors of matrices.
- Clearly understand vector spaces, subspaces, bases and their dimensions.
- Apply eigenvalues and eigenvectors to diagonalize matrices and construct block diagonal and Jordan forms for matrices where eigenvalues have incomplete multiplicity.
- Recognize and solve linear first order, separable and exact differential equations and apply them to mixture, growth and decay problems.
- Solve homogeneous differential equations with constant coefficients.
- Apply Wronskian to determine linear independence/dependence of solutions of differential equations.
- Apply methods of undetermined coefficients and variation of parameters to solve non-homogeneous differential equations.
- Write systems of differential equations in matrix form and solve them by applying method of eigenvalues and eigenvectors.

Grading Policy

- Major Exam I (25%)
- Major Exam II (25%)
- Final Exam (35%) (Comprehensive):
- Quizzes + Homework (15%): At least three quizzes.

Final Exam

- Date of Exam: December 24, 2015 at 8.00 AM
- The Final Exam will be comprehensive.

Use of Software

- MATLAB will be used whenever possible.

Attendance Policy

- KFUPM attendance policy will be enforced.

DN Grade

A DN grade will be awarded to a student who accumulates **Nine** unexcused absences.

Missing one of the Two Common Major Exams I and 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.

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WEEK-WISE BREAK OF SYLLABUS

Week	Date	Section	Topic	Suggested Homework
1	Aug. 23-27	1.1 1.2	Differential Equations & Mathematical Models Integrals as General & Particular Solutions	6, 13, 20, 28, 35, 38 2, 9, 14, 17
2	Aug.30-Sep.03	1.4 1.5	Separable Equations & Applications Linear First-Order Equations	2, 9, 14, 21, 27, 34,49
3	Sep. 06-10	1.5 1.6	Linear First-Order Equations (contd.) Substitution Methods & Exact Equations	2, 9, 23, 27, 32, 34 1, 8, 28, 39, 59
4	Sep. 13-17	3.1 3.2	Introduction to Linear Systems Matrices and Gaussian Elimination	6, 18, 20, 23, 28 1, 4, 10, 16, 22, 28
Sep. 20 - Oct. 03: Eid Al-Adha Vacation				
5	Oct. 04 - 08	3.3 3.4	Reduced Row-Echelon Matrices Matrix Operations	4, 8, 22, 32
6	Oct. 11- 15	3.4 3.5 3.6	Matrix Operations (contd.) Inverse of Matrices Determinants	2, 8, 9, 16, 22, 25 2, 10, 19, 24, 26
7	Oct. 18 - 22	3.6 4.1 4.2	Determinants (contd.) The Vector Space \mathbb{R}^3 The Vector Space \mathbb{R}^n & Subspaces	1, 4, 14, 28, 38, 44 2, 7,14, 18, 20, 28, 32,34 2, 7, 15, 20
Exam I: 12 October 2015				
8	Oct. 25- 29	4.3 4.4	Linear Combinations & Independence of Vectors Bases & Dimension for Vector Spaces	2, 5, 12, 14, 17, 24 2, 6, 12, 5, 23
9	Nov. 01- 05	5.1 5.2	Second-Order Linear Equations General Solutions of Linear Equations	2,12,15,18, 26, 28,33, 44 2, 5, 14, 22, 25, 26
10	Nov. 08 - 12	5.3 5.5	Homogeneous Equations with Constant Coefficients Nonhomogeneous Equations and Method of Undetermined Coefficients	2, 5, 12, 26, 33, 38 1, 4, 13, 26,29, 34, 40
Exam II: 5 November 2015				
11	Nov. 15 - 19	5.5 6.1	Method of Variation of Parameters Introduction to Eigenvalues	48, 52, 57, 58 4, 14, 26, 30, 36
12	Nov. 22 - 26	6.2 6.3	Diagonalization of Matrices Applications involving Powers of Matrices	1, 15, 18, 28 4, 8, 20, 28, 37
13	Nov. 29 – Dec03	7.1 7.2	First-Order Systems & Applications Matrices & Linear Systems	1, 3, 8, 14, 20, 21 1,6, 12, 16, 20, 24
14	Dec.06 - 10	7.3 7.5	The Eigenvalue Method for Linear Systems Multiple Eigenvalue Solutions	2, 8, 18, 24, 26
15	Dec. 13- 17	7.5	Multiple Eigenvalue Solutions (contd.) & Catch-up & Review	2, 4, 10, 16, 28, 30, 31
Final Exam : Thursday December 24, 2015: 8:00am				