

KING FAHD UNIVERSITY OF PETROLEUM & MINERALS

Department of Mathematics & Statistics

Math208 Course Syllabus

Term – 202

Coordinator: **Abdulilah Kadri**

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Course Title: Math208 (Introduction to Differential Equations and Linear Algebra)

Credits: 3-0-3

Textbook: Differential Equations and Linear Algebra, C.H. Edwards and D.E. Penny, Prentice Hall, Third Edition (2014)

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

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

- Find bases of vector spaces.
- Use linear algebra in systems of linear equations.
- Solve the eigenvalue problem.
- Perform diagonalization and compute the Jordan form of matrices.
- Solve first order differential equations and related models.
- Solve linear ordinary differential equations.
- Solve systems of ordinary differential equations.

Grading Policy:

Midterm Exam Common Exam	Date: March 15	Place: Online	25% (75 Points)
	Time: TBA	Material: 1.1 – Ch 4	
Final Exam Common Exam Comprehensive	Date: TBA	Place: TBA	40% (120 Points)
	Time: TBA	Material: Comprehensive	
Class Work	The average x (out of 60) of class work activities of each section should be in the interval $[42, 45]$		20% (60 Points)
Homework			15% (45 Points)

Missing The Midterm Exam:

No makeup exam will be given under any circumstance. In case, a student misses the Midterm Exam 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 final exam.

Attendance:

Attendance is a University Requirement (see p. 38 of the Undergraduate Bulletin 2006-2009). A DN grade will be awarded to any student who accumulates 09 unexcused absences.

Academic Integrity:

All KFUPM policies regarding ethics apply to this course.

Pacing Schedule

Week	Section	Topic	Suggested Homework
1	1.1	Differential Equations & Math. Models (Only Decay & Growth)	2,6, 8,10,14,20,35,38
	1.2	Integrals as General & Particular Solutions	2, 4, 6, 8, 11, 17
2	1.4	Separable Equations (Without Applications)	2, 8, 10, 24, 26, 34,40
	1.5	Linear First Order Equations	
3	1.5	Linear First Order Equations (Cont.)	2, 8, 10, 21, 28, 32
	1.6	Substitution Methods & Exact Eqs. (Only Exact Eqs)	
4	1.6	Substitution Methods & Exact Eqs (Only Exact Eqs.)	32, 36, 40, 42
	3.1-3.6	Review only: Linear Systems, Matrices & Gaussian Elimination, Reduced Row-Echelon Form, Matrix Operations, Inverse Matrices, Determinants	Sec 3.1: 4, 13, 18, 24, 28 Sec 3.2: 2, 10, 15, 28 Sec 3.3: 2, 6, 10, 26, 28 Sec 3.4: 1, 10, 14, 25 Sec 3.5: 3, 8, 23
	3.6	Inverse & the Adjoint Matrix	Sec 3.6: 2,7,17,21 33, 38
5	4.1	The Vector Space \mathbb{R}^3	1, 4, 6, 8, 10, 16, 19, 20
	4.2	The Vector Space \mathbb{R}^n & Subspaces	2, 8, 12, 14, 17, 26
	4.3	Linear Combination & Independence of Vectors	2, 6, 12, 17, 25
6	4.4	Bases & Dimension for Vector Spaces	2, 9, 12, 13, 16, 23
	4.5	Row & Column Spaces (Rank of Matrices Only)	1,4,8,12,14,16
	5.1	Introduction: Second Order Linear Equations	2, 10, 15, 19, 26, 28, 43
7	5.2	General Solutions of Linear Equations	3, 9, 14, 22, 26
	5.3	Homogeneous Eqs. With Constant Coefficients	3,4,14,19,22,28,31,33,39
8	5.5	Nonhomogeneous Eqs. & Undetermined Coefficients	1, 4, 8, 16, 21, 27, 42, 44
	5.5	Method of Variation of Parameters	48, 52, 57, 58, 62
9	7.1	First Order Systems & Applications	1,3,8,14,20,21
	7.2	Matrices & Linear Systems	1, 6, 12, 16, 20, 24
10	6.1	Introduction to Eigenvalues	3, 7, 14, 25,31
	7.3	The Eigenvalue Method for Linear Systems	
11	7.3	The Eigenvalue Method for Linear Systems (Cont.)	1, 3, 9, 18, 25, 26
	6.2	Diagonalization of Matrices	2, 10, 15, 18, 27
12	6.3	Only The Caley Hamilton Theorem	2, 15, 18, 22
	7.5	Multiple Eigenvalue Solutions	
13	7.5	Multiple Eigenvalue Solutions (Cont.)	4, 9, 13, 16, 25, 28, 31
		Jordan Normal Form	38, 40, 43
14	8.1	Matrix Exponentials & Linear Systems	2, 6, 10, 24, 26
	8.2	Nonhomogeneous Linear Systems (Only Variation of Parameters Method)	
15	8.2	Nonhomogeneous Linear Systems (Cont.) Catch-up and Review	17, 19, 26, 32