KING FAHD UNIVERSITY OF PETROLEUM & MINERALS

Department of Mathematics

Math208 Course Syllabus
Term – 212

Coordinator: **Bader Al Humaidi**
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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.

The Course Grading Policy:

	Date	Time	Place	Materials	Percentage
Exam I (MCQ + written)	17/2/22	TBA	TBA	1.1-3.6	25% (75 pts)
Exam II (MCQ + written)	TBA	TBA	TBA	4.1-5.5	25% (75pts)
Final Exam (MCQ + written)	TBA	TBA	TBA	Comprehensive	35% (105 pts)
Class Work	▪ It is based on quizzes, class tests, or other class activities determined by the instructor. ▪ The average x (out of 45) of the class work of each section Should be in the interval [31.5, 33.75] ([70%, 75%] of the class work grade).				15% (45pts)

Missing The Midterm Exam:

In case a student misses an exam (Exam I, Exam II, or the Final Exam) for a legitimate reason (such as medical emergencies), he must bring an official excuse from Students Affairs. Otherwise, he will get zero in the missed 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
		Review only:	**Sec 3.1:** 4, 13, 18, 24, 28
	3.1-3.6	Linear Systems, Matrices & Gaussian Elimination,	**Sec 3.2:** 2, 10, 15, 28
		Reduced Row-Echelon Form, Matrix Operations,	**Sec 3.3:** 2, 6, 10, 26, 28
		Inverse Matrices, Determinants	**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 R^3	1, 4, 6, 8, 10, 16, 19, 20
	4.2	The Vector Space 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)**	
Eid Al-Fitr Holidays: April 24-May 05			
15	8.2	Nonhomogeneous Linear Systems (Cont.)	17, 19, 26, 32
		Catch-up and Review	