KING FAHD UNIVERSITY OF PETROLEUM & MINERALS

Department of Mathematics & Statistics

Math208 Course Syllabus
Term – 211
Coordinator: **Dr. Abdulilah Kadri**
(akadri@kfupm.edu.sa)

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 from various colleges.

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

- Find bases of vector spaces.

- Use linear algebra to solve 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.

- Use linear algebra to solve linear systems of ordinary differential equations.

Grading Policy:

Exam I Common Exam (Written)	**Date:** September 30	**Place:** TBA	25% (75 Points)
	Time: TBA	**Material:** 1.1 – 3.6	
Exam II Common Exam (Written)	**Date:** November 4	**Place:** TBA	25% (75 Points)
	Time: TBA	**Material:** 4.1 – 7.2	
Final Exam Common Exam Comprehensive	**Date:** TBA	**Place:** TBA	35% (105 Points)
	Time: TBA	**Material:** Comprehensive	
Class Work	**Class Activities:** It is based on HW, quizzes, class tests, or other class activities determined by the instructor. Any quiz or test under class activity should be of written type. The average x (out of 45) of class activities of the sections taught by the same instructor should be in the interval [31.5,33.75].		15% (45 Points)

Grading Method: Curved grading system will be applied.

Exam Questions: Questions of the common exams are based on examples, homework problems and exercises in the text book.

Missing Exam I or Exam II: No makeup exam will be given under any circumstance. In case, 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 (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	Date	Section	Topic	Suggested Homework
1	Aug. 29 – Sep. 2	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	Sep. 5 – 9	1.4	Separable Equations **(Without Applications)**	2, 8, 10, 24, 26, 34,40
		1.5	Linear First Order Equations	
3	Sep. 12 – 16	1.5	Linear First Order Equations (Cont.)	2, 8, 10, 21, 28, 32
		1.6	Substitution Methods & Exact Eqs. **(Only Exact Eqs)**	
4	Sep. 19 – 22	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
	23 September:		**National Day Holiday**	
5	Sep. 26 – Sep. 30	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
	First Major Exam:		***September 30***	
6	Oct. 3 - Oct. 7	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	Oct. 10 - Oct. 14	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	**Oct. 19** – Oct. 21 *(Oct. 17: Student Break)*	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	Oct. 24 – Oct. 28	7.1	First Order Systems & Applications	1,3,8,14,20,21
		7.2	Matrices & Linear Systems	1, 6, 12, 16, 20, 24
10	Oct. 31 – Nov. 4	6.1	Introduction to Eigenvalues	3, 7, 14, 25,31
		7.3	The Eigenvalue Method for Linear Systems	
	Second Major Exam:		***November 4***	
11	Nov. 7 – Nov. 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	Nov. 14 – Nov. 18	6.3	**Only** The Caley Hamilton Theorem	2, 15, 18, 22
		7.5	Multiple Eigenvalue Solutions	
13	Nov. 21 – Nov. 25	7.5	Multiple Eigenvalue Solutions (Cont.)	4, 9, 13, 16, 25, 28, 31
			Jordan Normal Form	38, 40, 43
14	Nov. 28 – Dec. 2		**Midterm Break**	
15	Dec. 5 – Dec. 9	8.1	Matrix Exponentials & Linear Systems	2, 6, 10, 24, 26
		8.2	Nonhomogeneous Linear Systems **(Only Variation of Parameters Method)**	
16	Dec. 12 – Dec. 16	8.2	Nonhomogeneous Linear Systems (Cont.)	17, 19, 26, 32
			Catch-up and Review	
17	Dec. 20		Normal Thursday Class	
	Final Exam:		***TBA***	