KING FAHD UNIVERSITY OF PETROLEUM & MINERALS

Department of Mathematics

Math208 Course Syllabus
Term – 221

Coordinator: **Bader Al Humaidi**
(humaidib@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 of Computer Science, Computer Engineering, System Engineering and Earth Science

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

- Solve various types of ordinary differential equations.
- Apply differential equations to solve certain real-world problems.
- Discuss basic concepts of linear algebra.
- Use linear algebra techniques to solve linear systems of differential equations with constant coefficients.

The Course Grading Policy:

	Date	Time	Place	Materials	Percentage
Exam I (MCQ+ written)	3/10/22	6:00 PM	BLD 54	1.1-3.6	25% (100 pts)
Exam II (MCQ + written)	7/11/22	6:00 PM	BLD 54	4.1-5.5	25% (100pts)
Final Exam (TBA)	TBA	TBA	TBA	comprehensive	35% (140 pts)
Class Work	▪ It is based on quizzes, class tests, or other class activities determined by the instructor. ▪ The average x (out of 40) of the class work of each section should be in the interval [28, 30] ([70%, 75%] of the class work grade).				10% (40pts)
HW	The Homework will be online through the blackboard				5% (20 pts)

Missing an 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: Students are expected to attend all classes.

- If a student misses a class, he is responsible for any announcement made in that class.
- A DN grade will be awarded to any student who accumulates
  - 9 unexcused absences in lecture classes.
  - 15 excused and unexcused absences in lecture classes.

(Note: the general rule for DN: 20% unexcused absences of the number of classes, and 33% excused and unexcused absences of the number of classes.)

Academic Integrity:
All KFUPM policies regarding ethics apply to this course.

Exam Questions: The questions of the exams are based on examples, homework problems, and exercises.

Cheating in Exams: Cheating or any attempt of cheating by use of illegal activities, techniques and forms of fraud will result in a grade of DN in the course along with reporting the incident to the higher university administration. Cheating in exams includes (but is not limited to)

- Looking at the papers of other students
- Talking to other students
- Using mobiles or any other electronic devices

Important Exam Rules:

- No student will be allowed to take the exam if he doesn't bring his KFUPM, National, or Iqama ID card with him to the exam hall.
- Students are not allowed to carry mobiles, smart watches, or electronic devices to the exam halls/rooms.
- Students must take the exam in the place assigned to them.

Letter Grades: The letter grades are based on curve grading, which will depend on the average of all students taking the course.

Week	Dates	Section	Topic	Suggested Review Exercises
1	Aug. 28-Sep.1	1.1 1.2	Differential Equations & Math. Models **(Only Decay & Growth)** Integrals as General & Particular Solutions	2,6, 8,10,14,20,35,38 2, 4, 6, 8, 11, 17
2	Sep. 4-8	1.4 1.5	Separable Equations **(Without Applications)** Linear First Order Equations	2, 8, 10, 24, 26, 34,40
3	Sep. 11-15	1.5 1.6	Linear First Order Equations (Cont.) Substitution Methods & Exact Eqs. **(Only Exact Eqs)**	2, 8, 10, 21, 28, 32 32, 36, 40, 42
4	Sep. 18-21	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
National Day Holiday: Sep. 22				
5	Sep. 25-29	3.6 4.1 4.2	Inverse & the Adjoint Matrix The Vector Space R^3 The Vector Space R^n & Subspaces	**Sec 3.6:** 2,7,17,21 33,38 1, 4, 6, 8, 10, 16, 19, 20 2, 8, 12, 14, 17, 26
6	Oct. 2-6	4.3 4.4 4.5	Linear Combination & Independence of Vectors Bases & Dimension for Vector Spaces Row & Column Spaces	2,6,12,17,25 2, 9, 12, 13, 16, 23 1,4,8,12,14,16
7	Oct. 9-13	5.1 5.2	Introduction: Second Order Linear Equations General Solutions of Linear Equation	2, 10, 15, 19, 26,28,43 3, 9, 14, 22, 26
8	Oct. 16-20	5.3 5.5	Homogeneous Eqs. With Constant Coefficients Nonhomogeneous Eqs. & Undetermined Coefficients	3,4,14,19,22,28,31,33,39 1, 4, 8, 16, 21, 27, 42, 44
9	Oct. 23-27	5.5 7.1	Method of Variation of Parameters First Order Systems & Applications	48, 52, 57, 58, 62 1,3,8,14,20,21
10	Oct.30-Nov .3	7.2 6.1	Matrices & Linear Systems Introduction to Eigenvalues	1, 6, 12, 16, 20,24 3, 7, 14, 25,31
11	Nov. 6-10	7.3	The Eigenvalue Method for Linear Systems	1, 3, 9, 18, 25, 26
12	Nov. 13-17	6.2 6.3	Diagonalization of Matrices **Only** The Caley Hamilton Theorem	2, 10, 15, 18, 27 2, 15, 18, 22
13	Nov. 20-24	7.5	Multiple Eigenvalue Solutions Jordan Normal Form	4, 9, 13, 16, 25, 28, 31 38, 40, 43
Midterm Break: Nov. 27-Dec. 01				
14	Dec. 4-8	8.1	Matrix Exponentials & Linear Systems	2, 6, 10, 24, 26
15	Dec. 11-15	8.2	Nonhomogeneous Linear Systems (only Variation of Parameters Method)	17, 19, 26, 32
16	Dec. 18	8.2	Catch-up and Review	Normal Thursday Classes