King Fahd University of Petroleum and Minerals

Department of Mathematics & Statistics

Math 201 – Syllabus

Semester 201

Coordinator: Dr. Khalid Alanezy
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Title : Calculus III

Credit : 3-0-3

Textbook : J. Stewart, Calculus (Early Transcendental) 8th edition, Brooks/Cole.

Description : Polar coordinates, polar curves, area in polar coordinates. Vectors, lines, planes, and surfaces. Cylindrical and spherical coordinates. Functions of two and three variables, limits, and continuity. Partial derivatives, directional derivatives. Extrema of functions of two variables. Double integrals, double integrals in polar coordinates. Triple integrals, triple integrals in cylindrical and spherical coordinates.

Learning Outcomes:

Upon completion of the course, students should be able to:

1. Describe curves given by parametric and polar equations in the plane.
2. Calculate areas, slopes, surface area, arc length for curves in parametric and polar equations in the plane.
3. Explain and apply the techniques of analytic geometry of space.
4. Perform vector operations in space.
5. Find the equations of lines and planes in the space.
6. Sketch and identify basic quadric surfaces.
7. Calculate the limits of multivariable functions, and analyze their continuity and differentiability.
8. Calculate the partial derivatives, directional derivatives, tangent planes, and the gradient vector.
9. Find and classify extreme values of functions of several variables.
10. Evaluate and apply multiple integrals in rectangular, polar, cylindrical, and spherical coordinate systems.

Grading Policy:

Online Assessment I Common MCQ Test	**Date:** October 7, 2020 **Time:** 6:00 - 8:00 PM	**Material:** 10.1 – 12.2	15% (45 Points)
Midterm Exam Common MCQ Test	**Date:** October 21, 2020 **Time:** 6:00 - 8:00 PM	**Material:** 12.3 – 14.2	15% (45 Points)
Online Assessment II Common MCQ Test	**Date:** November 11, 2020 **Time:** 6:00 - 8:00 PM	**Material:** 14.3 – 14.8	15% (45 Points)
Final Exam Common MCQ Test	**Date:** TBA **Time:** TBA	**Location:** TBA **Material:** Comprehensive	25% (75 Points)
Study Plan	Study Plan is provided through Blackboard		15% (45 Points)
Class Work	It is based on quizzes, assignments, or other activities determined by the instructor. The average x (out of 45) of Class Work of the sections taught by an instructor must be in the interval [31.5, 33.75]		15% (45 Points)

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

Cheating: Cheating or any attempt of cheating by use of illegal activities, techniques and forms of fraud will result in a grade of **F** 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
- Violating any online exams regulations

Academic Integrity: All KFUPM policies regarding ethics apply to this course. (See the Undergraduate Bulletin).

Remark: **In case of a face-to-face Midterm and a face-to-face Final exams are decided, a different scheme of grade distribution will be announced.**

Pacing Schedule

Week	Section	Topics (24 Sections)
1	10.1 10.2	Curves Defined by Parametric Equations Calculus with Parametric Curves
2	10.3	Polar Coordinates
3	10.4 12.1	Areas and Lengths in Polar Coordinates Three-Dimensional Coordinates Systems
4	12.2	Vectors Review
Wednesday-Thursday, Sep. 23-24, 2020: The National Day Holiday		
5	12.3 12.4	The Dot Product The Cross Product
6	12.5 12.6	Equations of Lines and Planes Cylinders and Quadric Surfaces
7	14.1 14.2	Functions of Several Variables Limits and Continuity
8	14.3 14.4	Partial Derivatives Tangent Planes & Linear Approximation
9	14.5 14.6	The Chain Rule Directional Derivatives and the Gradient Vector
10	14.7	Maximum and Minimum Values
11	14.8	Lagrange Multipliers Review
12	15.1 15.2	Double Integrals over Rectangles Double Integrals over General Regions
13	15.3	Double Integrals in Polar Coordinates
14	15.6 15.7	Triple Integrals Triple Integrals in Cylindrical Coordinates
15	15.8	Triple Integrals in Spherical Coordinates Review / Catching up

Suggested Practice Problems

10.1	2, 3, 5, 7, 8, 10, 12, 14, 19, 24
10.2	4, 6, 8, 11, 15, 17, 19, 31, 41, 42, 61, 63, 66
10.3	1, 3, 5, 9, 10, 11, 13, 15, 17, 25, 35, 39, 40, 57, 61
10.4	3, 5, 8, 9, 24, 27, 29, 31, 37, 38, 45
12.1	3, 5, 6, 7, 8, 11, 12, 13, 22, 23, 31, 35, 45
12.2	2, 3, 4, 6, 7, 9, 13, 15, 17, 19, 21, 23, 25, 26, 29, 41, 43, 45
12.3	1, 3, 5, 7, 9, 11, 17, 19, 22, 23, 25, 26, 39, 43, 45, 47, 55, 64.
12.4	1, 3, 5, 14, 17, 19, 28, 29,33, 36, 37, 43, 44
12.5	1, 3, 4, 5, 6, 7, 10, 11, 13, 15, 16, 20, 23, 25, 26, 27, 30, 31, 33, 35, 45, 48, 53
12.6	4, 6, 11, 13, 21-28, 32, 33, 35, 38, 47
14.1	9, 11, 13, 15, 16, 17, 19, 45, 47
14.2	1, 9, 11, 15, 33, 34, 36, 43
14.3	15, 16, 19, 29, 21, 22, 25, 27, 29, 31, 33, 34, 35, 41, 53, 61, 63, 69
14.4	3, 5, 11, 13, 19, 21, 25
14.5	1, 3, 5, 7, 9, 10, 21, 23, 31, 34, 39
14.6	7, 9, 11, 12, 15, 17, 20, 21, 24, 27, 28, 29, 38, 41
14.7	6, 9, 11, 16, 31, 33, 41, 43, 48, 51, 53
14.8	4, 6, 7, 15, 20, 21, 31, 34
15.1	2, 10, 11, 12, 19, 23, 30, 32, 42, 43, 48
15.2	3, 5, 7, 9, 11, 12, 15, 17, 19, 21, 25, 27, 29, 45, 49, 50, 52, 61
15.3	5, 8, 12, 13, 16, 19, 20, 26, 30, 33, 39
15.6	5, 6, 7, 8, 9, 11, 13, 14, 19, 21, 22, 29, 33
15.7	1, 3, 5, 6, 7, 9, 11, 15, 19, 21, 24, 29
15.8	2, 4, 5, 7, 10, 13, 17, 22, 23, 29, 30, 35, 41, 43

Tips on how to enhance your problem-solving abilities:

- ✓ Do all homework assignments on time.
- ✓ Practice (but not memorize) more problems than those in the above list.
- ✓ Solve review problems available at the end of each chapter.
- ✓ Solve the problems on your own before reading the solution or asking for help.
- ✓ If you find it difficult to handle a certain type of problems, you should try more problems of the same type.
- ✓ Review the last lecture before each class.
- ✓ Practicing homework problems and reviewing the class lectures will make exam problems easier to tackle.
- ✓ Visit your instructor in his office hours. Always bring partial solution of the questions that you want to discuss with your instructor.