King Fahd University of Petroleum and Minerals

Department of Mathematics & Statistics

MATH 201 – Syllabus Term 163

Coordinator: Dr. Khairul Saleh

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 this course, students should be able to

- Explain the techniques of analytic geometry in the plane and in the space;
- Explain the concept of vectors and parametric equations in the plane and in the space;
- Graph essential surfaces, compute limits and continuity, partial derivatives, directional derivatives, and the gradient vector;
- Explain the concept of differentiability, tangent planes, and chain rule;
- Find and classify extreme values of functions of two variables, including Lagrange multipliers for constrained optimization problems;
- Compute multiple integrals with rectangular, polar, cylindrical, and spherical coordinates and identify some applications of the double and triple integrals.

Grading Policy:

Exam I Common Exam (Written)	Date: Tuesday. July 25, 2017 Time: 07:00 PM - 09:00 PM	Place: TBA **Material:** 10.1 – 12.4	25% (100 Points)
Exam II Common Exam (Written)	Date: Wednesday. Aug 9, 2017 Time: 07:00 PM - 09:00 PM	Place: TBA **Material:** 12.5 – 14.6	25% (100 Points)
Final Exam Common Exam Comprehensive	Date: Monday. Aug 21, 2017 Time: 12:30 PM	Place: TBA **Material:** Comprehensive	35% (140 Points)
Class Work	**Online Homework:** Online homework is provided through BlackBoard		5% (20 Points)
	Class Activities: It is based on quizzes, class tests, or other class activities determined by the instructor. Any quiz or test under class activity should be of written type and not of multiple choice type. The average x (out of 40) of class activities of the sections taught by the same instructor should be in the interval $[28, 30]$.		10% (40 Points)

Passing Grade: A student should achieve at least **50% (200 Points)** to pass this course.

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 miss 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 8 unexcused absences.

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

Pacing Schedule

Week	Date (2017)	Section	Topics (25 Sections)
1	July 9 – 13	10.1 10.2 10.3 10.4	Curves Defined by Parametric Equations Calculus with Parametric Curves Polar Coordinates Areas and Lengths in Polar Coordinates
2	July 16 – 20	12.1 12.2 12.3 12.4 12.5	Three-Dimensional Coordinates Systems Vectors The Dot Product The Cross Product Equations of Lines and Planes
3	July 23 – 27	12.6 14.1 14.2 14.3	Cylinders and Quadric Surfaces Functions of Several Variables Limits and Continuity Partial Derivatives
Major Exam I (10.1 – 12.4). Tuesday. July 25, 2017 at 07:00 PM			
4	July 30 – August 3	14.4 14.5 14.6 14.7	Tangent Planes & Linear Approximation The Chain Rule Directional Derivatives and the Gradient Vector Maximum and Minimum Values
5	August 6 – 10	14.8 15.1 15.2 15.3	Lagrange Multipliers Double Integrals over Rectangles Iterated Integrals Double Integrals over General Regions
Major Exam II (12.5 – 14.6). Wednesday. August 9, 2017 at 07:00 PM			
6	August 13 – 17	15.4 15.7 15.8 15.9	Double Integrals in Polar Coordinates Triple Integrals Triple Integrals in Cylindrical Coordinates Triple Integrals in Spherical Coordinates
7	August 20		Review and Catch up
Final Exam (Comprehensive). Monday. August 21, 2017 at 12:30 PM			

Suggested Practice Problems

10.1	2, 3, 5, 7, 8, 10, 12, 14, 19, 23, 24
10.2	4, 6, 8, 11, 15, 17, 20, 23, 31, 41
10.3	1, 3, 9, 10, 11, 14, 17, 25, 35, 39, 40, 57, 61
10.4	3, 5, 8, 9, 24, 31, 37, 38
12.1	7, 11, 13
12.2	2, 3, 4, 6, 7, 9, 13, 15, 17, 19, 21, 23, 25, 26, 29, 43, 44, 45
12.3	1, 3, 5, 7, 9, 11, 12, 17, 19, 22, 23, 25, 26, 39, 41, 43, 55, 61, 64.
12.4	1, 3, 5, 13, 14, 15, 17, 19, 27, 28, 29, 31
12.5	3, 4, 5, 6, 7, 9, 10, 11, 13, 15, 16, 17, 23, 25, 26, 27, 31, 33, 35, 45, 47, 48
12.6	4, 6, 11, 13, 32, 33, 41, 43, 47
14.1	9, 11, 13, 15, 17, 45, 47
14.2	1, 9, 11, 33, 34, 36
14.3	15, 16, 19, 29, 21, 22, 25, 27, 29, 31, 33, 34, 35, 41, 43, 53, 55, 61, 63, 69
14.4	3, 5, 11, 13, 19, 21
14.5	1, 3, 5, 7, 9, 10, 21, 23, 25, 35, 39
14.6	7, 9, 11, 12, 15, 17, 20, 21, 25, 26, 27, 29, 31, 34, 35, 38
14.7	6, 9, 11, 16, 30, 33, 40, 43, 44, 51
14.8	4, 6, 7, 15, 20, 21, 30, 34
15.1	2, 11, 12, 14
15.2	3, 5, 7, 9, 11, 15, 17, 19, 21, 25, 27, 29
15.3	5, 8, 12, 13, 16, 19, 20, 30, 38
15.4	5, 6, 7, 8, 9, 11, 13, 14, 19, 21, 22, 24, 25, 29, 31
15.7	3, 5, 6, 7, 9, 11, 13, 15, 19, 21
15.8	17, 19, 21, 22, 23, 29, 30
15.9	5, 6, 9, 15, 17, 21, 23, 25, 26, 27, 30, 39, 41

❖ **Tips on how to enhance your problem-solving abilities (**by compliments of **Dr. Al-Rasasi, I)**

- ✓ Do all homework assignments on time.
- ✓ Practice (but not memorize) more problems than those in the above list.
- ✓ Solve some of review problems available in the end of each chapter.
- ✓ Try to solve a problem 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 that type.
- ✓ Review the last lecture before coming to 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.