

King Fahd University of Petroleum and Minerals

Department of Mathematics & Statistics

MATH 201 – Syllabus Term 191

Coordinator: Dr. Mohammad Kafini

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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 this 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:

Exam I Common Exam 15 (MCQ)	Date: Wednesday, 09 Oct, 2019	Place: BLG: 57	25% (75 Points)
	Time: 06:00-07:30 pm	Material: 10.1 – 12.4	
Exam II Common Exam 15 (MCQ)	Date: Wednesday, 13 Nov, 2019	Place: BLG: 54	25% (75 Points)
	Time: 05:30-07:00 pm	Material: 12.5 – 14.6	
Final Exam Common Exam Comprehensive 21 (MCQ)	Date: Wednesday, 18 Dec, 2019	Place: TBA	35% (105 Points)
	Time: 08:00-10:15 am	Material: Comprehensive	
Class Work	Online Homework: Online homework is provided through BlackBoard		5% (15 Points)
	Class Activities: It is based on quizzes, class tests, attendance, 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 30) of class activities of the sections taught by the same instructor should be in the interval [21, 22.5].		10% (30 Points)

The Course Passing Grade: A student must score at least **50% (150 Points)** to pass the course.

Upgrade Policy: The upgrade policy is applied when 3 points out of 300 are needed to get the next higher grade. For instance, the passing grade (D) starts at 150/300. If a student gets 148/300 or 149/300, then his grade will be automatically upgrade from (F) to (D). However, if a student gets 147/300 his grade will be upgraded to (D) only if his final exam score percentage is greater than or equal 50% i.e. (52.5/105).

Exams:

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

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 **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

Missing an Exam:

Exam I or II: No make-up exam will be given under any circumstances. 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 of his performance in the non-missed exam and in the final exam.

Final Exam: If a student misses the final exam for a legitimate reason (such as medical emergencies), he will be given a make-up final exam.

Attendance: Students are expected to attend all lecture classes.

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

Note: the general rule for DN: (See p. 38 of the Undergraduate Bulletin 2006- 2009).

- 20% unexcused absences of the number of classes, and
- 33% excused and unexcused absences of the number of classes.

The Usage of Mobiles in Class: Students are not allowed to use mobiles for any purpose during class time. Students who want to use electronic devices to take notes must take permission from their instructor. Violations of these rules will result in a penalty decided by your instructor.

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

Pacing Schedule

Week	Date (2019)	Section	Topics (24 Sections)
1	Sept. 01-05	10.1 10.2	Curves Defined by Parametric Equations Calculus with Parametric Curves
2	Sept. 08-12	10.3	Polar Coordinates
3	Sept. 15-19	10.4 12.1	Areas and Lengths in Polar Coordinates Three-Dimensional Coordinates Systems
4	Sept. 22-26	12.2 12.3	Vectors The Dot Product
5	Sept. 29 – Oct. 3	12.4	The Cross Product Review for Exam I
6	Oct. 06-10	12.5 12.6	Equations of Lines and Planes Cylinders and Quadric Surfaces
Major Exam I (10.1 – 12.4) Wednesday, 09 Oct. 2019 at 06:00-08:00 pm			
7	Oct. 13-17	14.1 14.2	Functions of Several Variables Limits and Continuity
8	Oct. 20-24	14.3 14.4	Partial Derivatives Tangent Planes & Linear Approximation
9	Oct. 27-31	14.5 14.6	The Chain Rule Directional Derivatives and the Gradient Vector
10	Nov. 03-07	14.7	Maximum and Minimum Values Review for Exam II
11	Nov. 10-14	14.8	Lagrange Multipliers
Major Exam II (12.5 – 14.6) Wednesday, 13 Nov, 2019 at 05:30-07:30 pm			
12	Nov. 17-21	15.1 15.2	Double Integrals over Rectangles Double Integrals over General Regions
13	Nov. 24-28	15.3	Double Integrals in Polar Coordinates
14	Dec. 01-05	15.6 15.7	Triple Integrals Triple Integrals in Cylindrical Coordinates
15	Dec. 08-12	15.8	Triple Integrals in Spherical Coordinates
Final Exam (Comprehensive) Wednesday, December 18, 2019 at 8:00 AM			

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, 61, 63
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, 23, 31, 45
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, 45, 47, 55, 64.
12.4	1, 3, 5, 13, 14, 15, 17, 19, 27, 28, 29, 31, 33, 36, 37, 43, 44
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, 19, 23, 30, 32, 41, 43, 48
15.2	3, 5, 7, 9, 11, 15, 17, 19, 21, 25, 27, 29, 45, 50, 52, 55, 61
15.3	5, 8, 12, 13, 16, 19, 20, 26, 30, 33, 38
15.6	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, 24, 29
15.8	7, 9, 17, 19, 21, 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 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.