

**King Fahd University of Petroleum and Minerals**  
**Department of Mathematics & Statistics**  
**Math 201 – Syllabus**  
**2015-2016 (Term 152)**  
**Coordinator: Dr. Ibrahim Al-Rasasi**

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<b>Title:</b>	Calculus III
<b>Credit:</b>	3-0-3
<b>Textbook:</b>	Thomas Calculus (Early Transcendentals) by G. Thomas, M. Weir and J. Hass. 12 <sup>th</sup> edition, Pearson (2010).
<b>Description:</b>	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 successful completion of Math 201, the student should be able to

1. Graph plane curves defined by parametric and polar equations.
2. Compute arc lengths (of parametric and polar curves) and areas (bounded by parametric and polar curves).
3. Perform and apply vector operations (vector algebra, dot product, cross product).
4. Find equations of lines, planes, and tangent planes to surfaces in space.
5. Identify cylinders and quadric surfaces in space.
6. Find the domain, level curves and level surfaces for functions of two and three variables.
7. Compute limits, partial derivatives and directional derivatives for functions of several variables.
8. Apply partial derivatives to find and classify extreme values of functions of two and three variables.
9. Evaluate multiple integrals in appropriate coordinate systems such as rectangular, cylindrical, and spherical coordinate systems.
10. Apply multiple integrals to solve problems involving areas and volumes.

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**Grading Policy:**

1. <b>Exam I</b>	<b>Material: 11.1 – 12.4</b>	<b>Place: TBA</b>	25% (100 points)
	<b>Date: Sat., Feb. 20, 2016</b>	<b>Time: TBA</b>	
2. <b>Exam II</b>	<b>Material: 12.5 – 14.6</b>	<b>Place: TBA</b>	25% (100 points)
	<b>Date: Sat., April 2, 2016</b>	<b>Time: TBA</b>	
3. <b>Final Exam</b>	<b>Material: Comprehensive</b>	<b>Place: TBA</b>	35% (140 points)
	<b>Date: Wed., May 11, 2016</b>	<b>Time: 7:00 – 10:00 pm</b>	
4. <b>Class Work</b>	<b>i) Online Homework:</b> The web address for online homework is <a href="http://kfupm.mylabsplus.com">kfupm.mylabsplus.com</a>		5% (20 points)
	<b>ii) Class Activities:</b> 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. <b>The average <math>\bar{x}</math> (out of 40) of class activities of the sections taught by the same instructor should be in the interval [24, 30].</b>		10% (40 points)

**Exam Questions:**

The questions of the common exams are based on the examples, homework problems, and the exercises of the textbook.

**Missing Exam I or Exam II:**

No makeup exam will be given under any circumstance. When 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 9 unexcused absences

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

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**Pacing Schedule**

Week	Dates (2016)	Sec.	Topics
1	Jan. 17 - 21	11.1	Parameterization of Plane Curves
		11.2	Calculus with Parametric Curves
2	Jan. 24 - 28	11.3	Polar Coordinates
		11.4	Graphing in Polar Coordinates
3	Jan. 31- Feb. 4	11.5	Areas and Lengths in Polar Coordinates
		12.1	Three-Dimensional Coordinate System
4	Feb. 7 – 11	12.2	Vectors
		12.3	The Dot Product The Cross Product
5	Feb. 14 – 18	12.4	The Cross Product
		12.5	Lines and Planes in Space
6	Feb. 21- 25	12.6	Cylinders and Quadric Surfaces
			Catch up / Revision
		<b>Exam I</b>	<b>Date: Sat., Feb. 20, 2016; Time: TBA; Place: TBA; Material: 11.1 – 12.4</b>
7	Feb. 28- March 3	14.1	Functions of Several Variables
		14.2	Limits and Continuity in Higher Dimensions
8	March 6 - 10	14.3	Partial Derivatives
		14.4	The Chain Rule
<b>March 13-17, 2016 Midterm Vacation</b>			
9	March 20 – 24	14.5	Directional Derivatives and Gradient Vectors
		14.6	Tangent Planes and Differentials
10	March 27- 31	14.6	Continued
		14.7	Extreme Values and Saddle Points
11	April 3 – 7	14.7	Continued
		14.8	Lagrange Multipliers
		<b>Exam II</b>	<b>Date: Sat., April 2, 2016; Time: TBA; Place: TBA; Material: 12.5 – 14.6</b>
12	April 10 – 14	15.1	Double and Iterated Integrals over Rectangles
		15.2	Double Integrals over General Regions
13	April 17 – 21	15.3	Area by Double Integration
		15.4	Double Integrals in Polar Form
14	April 24- 28	15.4	Continued
		15.5	Triple Integrals in Rectangular Coordinates
15	May 1 – 5	15.7	Triple Integrals in Cylindrical and Spherical Coordinates
			Catch up / Revision
<b>Final Exam (Comprehensive): Wed., May 11, 2016; 7:00 – 10:00 pm; Place: TBA</b>			

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**Suggested Homework Problems**

Section	Problems
11.1	2,5,9,13,19,21,24,26
11.2	5,8,11,16,18,22,23,25,28,32
11.3	3,5,7,14,22,34,40,59,62
11.4	4,8,10,13,20,22,29
11.5	5,7,9,14,16,21,24,28
12.1	8,12,19,24,28,30,36,42,48,53,57,62
12.2	9,12,13,19,29,37
12.3	2,6,11,14,27,45,49
12.4	3,12,17,20,36,39,43,47,48
12.5	1,4,9,15,22,24,27,30,34,41,47,54,58
12.6	1-12,16,18,23,30,40
14.1	3,6,11,14,23,26,30,44,50,59,64
14.2	9,13,16,27,32,39,34,43,48,51,58,60,62
14.3	12,16,26,31,44,49,52,59,65,78
14.4	2,7,10,12,17,26,30,36,39,40
14.5	5,8,12,16,20,26,30,32,35
14.6	2,10,15,19,26,33,36,41,46,52,53
14.7	5,8,27,31,36,43,52,55
14.8	1,9,14,24,33,34,38
15.1	7,10,14,18,20,24,27
15.2	3,6,13,17,19,23,37,41,48,51,52,60,63,64
15.3	3,5,9,13,18,19,21
15.4	2,5,6,12,17,19,23,25,29,33,35
15.5	3,5,9,12,16,23,26,33,35,38,42,44
15.7	2,5,14,17,18,21,24,37,38,40,43,49,55,64

**Tips on how to enhance your problem-solving abilities:**

1. Please do all the homework assignments on time.
2. You are urged to practice (but not memorize) more problems than the above lists.
3. You should always try to solve a problem on your own before reading the solution or asking for help.
4. If you find it difficult to handle a certain type of problems, you should try more problems of that type.
5. You should try the recitation problems before coming to class.
6. You are encouraged to solve some of the review problems at the end of each chapter.
7. The practice you get doing homework and reviewing the class lectures and recitations will make exam problems easier to tackle.
8. Try to make good use of the office hours of your instructor.