

**King Fahd University of Petroleum and Minerals**  
**Department of Mathematics & Statistics**  
**Math 201 – Syllabus**  
**2015-2016 (151)**  
**Coordinator: Dr. Izhar Ahmad**

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**Title:** Calculus III

**Credit:** 3-0-3

**Textbook:** Thomas Calculus (Early Transcendentals) by G. B. Thomas, M. D. Weir and J. Hass, 12th edition, Pearson (2010)

**Description:** Polar coordinates, polar curves, area in polar coordinates, vectors, lines, planes and surfaces, cylindrical and spherical coordinates, functions of two and three variables, limit 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:** The emphasis is on understanding the geometry of plane and space, and the differential and integral calculus of several variables. Upon successful completion of this course, 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.

## Grading Policy:

<b>1. Exam I</b> A common exam	<b>Material: (11.1—12.4) Place: TBA</b> <b>Date : Oct 14, 2015 (Wednesday) Time: 6.00-8.00PM</b>	25% (100 points)
<b>2. Exam II</b> A common exam	<b>Material: (12.5--14.6) Place: TBA</b> <b>Date: Nov 11, 2015 (Wednesday) Time: 5.15PM-7.15PM, B#54</b>	25% (100 points)
<b>3. Final Exam</b> A comprehensive common exam	<b>Material: (Comprehensive) Place: TBA</b> <b>Date: Dec 23, 2015 (Wednesday) Time:</b>	35% (140 points)
<b>4. 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> These are 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 x (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, online 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 the missed 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

**Math 201 Syllabus  
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**Note:** The pace of coverage given in the syllabus is tentative and may be adjusted by each instructor as per need.

<b>Week</b>	<b>Date</b>	<b>Sec.</b>	<b>Topics (25 sections)</b>
1	Aug.23-27	11.1 11.2	Parameterizations of Plane Curves Calculus with Parametric Curves
2	Aug. 30-Sep. 3	11.3 11.4	Polar Coordinates Graphing in Polar Coordinates
3	Sep. 6-10	11.5	Areas and Lengths in Polar Coordinates
4	Sep.13-17	12.1 12.2	Three-Dimensional Coordinate Systems Vectors
<b>∅ Id al-Adha Vacations: Sep 18-Oct 03, 2015</b>			
5	Oct. 4-8	12.3 12.4	The Dot Product The Cross Product
6	Oct. 11-15	12.5 12.6	Lines and Planes in Space Cylinders and Quadric Surfaces
<b>∅ Exam I: Wednesday, Oct 14, 2015; Material: [11.1 – 12.4]</b>			
7	Oct. 18-22	14.1 14.2	Functions of Several Variables Limits and Continuity in Higher Dimensions
8	Oct. 25-29	14.3 14.4	Partial Derivative The Chain Rule
9	Nov. 1-5	14.5 14.6	Directional Derivatives and Gradient Vectors Tangent Planes & Differentials
10	Nov. 8-12	14.7	Extreme Values and Saddle Points Review for Exam II
<b>∅ Exam II: Wednesday, Nov 11, 2015; Material: [12.5 – 14.6]</b>			
11	Nov. 15-19	14.8	Lagrange Multipliers
12	Nov.22-Nov .26	15.1 15.2	Double and Iterated Integrals over Rectangles Double Integrals over General Regions
13	Nov. 29-Dec. 3	15.2 15.3	Double Integrals over General Regions (continued) Area by Double Integration
14	Dec. 6-10	15.4 15.5	Double Integrals in Polar Form Triple Integrals in Rectangular Coordinates
15	Dec. 13-17	15.7	Triple Integrals in Cylindrical and Spherical Coordinates Review/Catch up

## Home Practice Problems

Section	Problems
<b>11.1</b>	2,5,9,13,19,21,24,26
<b>11.2</b>	5,8,11,16,18,22,23,25,28,32
<b>11.3</b>	3,5,7,14,22,34,40,59,62
<b>11.4</b>	4,8,10,13,20,22,29
<b>11.5</b>	5,7,9,14,16,21,24,28
<b>12.1</b>	8,12,19,24,28,30,36,42,48,53,57,62
<b>12.2</b>	9,12,13,19,29,37,52
<b>12.3</b>	2,6,11,14,27,45,49
<b>12.4</b>	3,12,17,20,36,39,43,47,48
<b>12.5</b>	1,4,9,15,22,24,27,30,34,41,47,54,58, 61
<b>12.6</b>	1-12,16,18,23,30,40
<b>14.1</b>	3,6,11,14,23,26,30
<b>14.2</b>	9,13,16,27,32,34,43,48,51,58,60,62
<b>14.3</b>	12,16,26,31,44,49,52,59,65
<b>14.4</b>	2,7,10,12,17,26,30,36,38
<b>14.5</b>	5,8,12,16,20,26,30,32,35
<b>14.6</b>	2,10,15,26,33,36,41,46,52
<b>14.7</b>	1,5,8,20,27,31,33,36,43,52
<b>14.8</b>	1,9,14,24,33,34,38
<b>15.1</b>	1,5,10,14,18,20,24,27
<b>15.2</b>	3,6,13,17,19,24,37,42,48,51,52,60,63,64
<b>15.3</b>	3,5,9,13,16,18, 19,21
<b>15.4</b>	2,5,6,12,17,19,23,25,29,33,35
<b>15.5</b>	3,5,9,12,16,23,26,33,35,38,42,44
<b>15.7</b>	2,5,9,14,17,18,21,24,28,37,38,40,49

\* CAS problems require the use of a technology tool (e.g., graphing calculators or a computer). You are encouraged to do these problems in order to enhance your understanding of the concepts involved

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

- Do all the homework assignments on time and practice more problems than the above lists.
- Try to solve a problem on your own before reading the solution or asking for help.
- If you find difficulty to handle some type of problems, you try more problems of same type.
- Review the previous lecture before coming to the class.
- Solve some of the review problems at the end of each chapter.
- 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, which you want to discuss with your instructor.