Calculus III
Math 223, Spring 2015

Meeting Time and Location: MW 9:30am-10:45am, F 9:00am-9:50am, Trumbower 140

Professor: Yusra Naqvi
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Office Hours: M 11:00am-12:00pm, W 3:30pm-5:00pm, F 10:00am-11:30am
Additional office hours are available by appointment!

Prerequisites: Calculus II

Textbook: *Multivariable Calculus* (Early Transcendentals, 2nd Edition) by Jon Rogawski, published by W. H. Freeman and Company, 2012. (ISBN-13: 978-1429231879)

Calculator: You should have a graphing calculator, such as a TI-83 or TI-84, available in class and while doing homework. If you do not wish to purchase one, it is possible to rent one from the department for a small fee. TI-89's and TI-92's will not be allowed for exams.

Course Webpage: http://mathcs.muhlenberg.edu/~naqvi/math223sp15/

Course topics: This course extends the ideas of previous calculus courses to functions which depend on more than one variable or have outputs in more than one dimension. It will cover geometry of the plane and space, partial derivatives, optimization techniques, line and surface integrals, and Green's Theorem.

This course will continue the development of computational skills and the use of analytic tools, quantitative methods, technological tools and algorithms to solve problems in mathematics. We will also emphasize reading and comprehending technical material; writing and communicating effectively using the language of mathematics; knowing key definitions and theorems in the subject; and using these tools to model applications.

This course satisfies the Natural Sciences and Mathematics Distribution Requirement (SC) - you will explore mathematical theories and paradigms, and use quantitative and scientific problem solving skills to investigate natural phenomena.

Homework: Homework will be assigned each week and will take on a variety of formats, such as readings, WeBWorK, written solutions to problems, Maple labs, and presentations. You are required to read the relevant sections from the texbook that we cover each day. It is also important to look at homework problems for each class before the start of the next class in order to keep up with the class effectively. The best way to understand mathematics is to solve a lot of problems.

WeBWorK will typically be due on Tuesday night. Written solutions to assigned homework problems will also be collected periodically. Most written work will be done in groups, and the solutions should have the names of all contributing group members. The responsibility for writing will rotate among all members of the group. Each group member will receive the same grade on the homework, so please make sure that you understand all the work your group has done and are satisfied with the final draft that is submitted. Submitted work should be neat, organized and stapled, and will be graded for both correct solutions and also a clear explanation of your work.

Occasionally, groups may also be asked to present their work to the class, and your presentation grade will count towards your overall homework grade.

Absences: You are expected to attend every class and arrive on time for class. An absence due to emergency may be excused, provided that you can supply acceptable written evidence if required, and that you notify me *as soon as possible*. Two late arrivals will be treated as an absence. Students with no more than two unexcused absences will be given 10 extra points towards their homework grade.

A short informal quiz may be given during any class meeting. These will primarily be used to keep track of attendance and to gauge student progress and understanding. In addition, there will be several in-class assignments that may be collected at the end of the day.

Exams: There will be two in-class midterm exams and a three-hour cumulative final exam. All exams must be taken at the scheduled time. Make-up exams will only be allowed if you can supply *acceptable* written evidence, and that you notify me *before the end of the missed exam*. The midterm exams are tentatively scheduled as follows:

Midterm Exam 1:	Monday, February 16
Midterm Exam 2:	Monday, March 30

The final exam will be scheduled by the registrar at some point in the middle of the semester. Please make sure that you are available until 3pm on Friday, May 8 to take the final exam.

Grading: The overall grade will be based on the results of exams, the scores on homework, and on class participation, which will be measured in various ways, including attendence, participation in group work, in-class assignments and short quizzes. It will be determined using the following point distribution:

Homework & Class Participation	200
1st Midterm Exam	100
2nd Midterm Exam	100
Final Exam	200
Total	600

Academic Integrity Code: Please read the AIC which is printed in full in the Student Handbook. Homework must represent your or your group's own efforts, as appropriate. Do not copy from another group's work or other source. Use of an unapproved source, collaboration outside of ones group, or cheating on an exam may result in zero credit and referral to the Dean of Academic Life. On all exams, quizzes, and assignments you must write "AIC" and sign your name to indicate that the exam, quiz, or assignment was completed in compliance with the academic integrity code. On group assignments, this means that the only people who contributed to the assignment signed the paper, and each person listed on the assignment made a contribution.

Accomodations for Students with Disabilities: Students with disabilities requesting classroom or course accommodations must complete a multi-faceted application/approval process through the Office of Disability Services prior to the development and implementation of an Accommodation Plan. Each Accommodation Plan is individually and collaboratively developed with the Directors or staff of the following Departments, as appropriate: Academic Resource Center, Office of Counseling Services, Student Health Services, and the Office of Disability Services. If you have not already done so, please contact the appropriate Department to have a dialogue regarding your academic needs and the recommended accommodations, auxiliary aides, and services. Then, when you have all the proper paperwork for instructors from that office, please come see me right away so that we can make any necessary arrangements.

Course Outline: The following plan for the course is tentative and may be subject to change.

Lecture	Date	Sections	Topics
1	M 1/12	12.1	Vectors in the Plane
		12.2	Vectors in Three Dimensions
2	W 1/14	12.3	The Dot Product
		12.4	The Cross Product
3	W 1/21	11.1	Parametric Equations
4	M 1/26	12.2	Lines in Three-Space
		12.5	Planes in Three-Space
5	W 1/28	13.1	Vector-Valued Functions
6	M 2/2	13.2	Calculus of Vector-Valued Functions
7	W 2/4	13.3	Arc Length and Speed
		13.5	Motion in Three-Space
8	M 2/9	14.1	Functions of Several Variables
		14.2	Limits and Continuity in Several Variables
9	W 2/11	14.3	Partial Derivatives
		14.4	Differentiability and Tangent Planes
10	M 2/16		**FIRST MIDTERM EXAM**
11	W 2/18	14.5	The Gradient
12	M 2/23	14.7	Directional Derivatives
13	W 2/25	14.6	Chain Rule
14	M 3/9	14.7	Optimization in Several Variables
15	W 3/11	14.8	Lagrange Multipliers
16	M 3/16	15.1	Integration in Several Variables
		15.2	Double Integrals over General Regions
17	W 3/18	15.3	Triple Integrals
18	M 3/23	11.3	Polar Coordinates
		12.7	Cylindrical and Spherical Coordinates
19	W 3/25	15.4	Integration in Polar Coordinates
		15.6	Change of Variables
20	M 3/30		**SECOND MIDTERM EXAM**
21	W 4/1	16.1	Vector Fields
22	W 4/8	16.2	Line Integrals
23	M 4/13	16.3	Conservative Vector Fields
24	W 4/15	16.4	Parametrized Surfaces and Surface Integrals
25	M 4/20	16.5	Surface Integrals of Vector Fields
26	W 4/22	17.1	Green's Theorem
27	M 12/27	17.2	Stokes' Theorem
28	W 12/29	17.3	Divergence Theorem