MATH 223 (Spring 2013) **CALCULUS III – Multivariable Calculus**

Instructor: Professor Erin Bodine
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Office Hours: MWF 1-3 pm, and by appointment
If not in office check the MSC
Course website: This course has a Moodle website.

Section 223-01 meets MWRF 10:00 – 10:50 in Kennedy 104

Course Description: Calculus I & II focus on developing the calculus of functions of one variable, $y = f(x)$ (here the one variable is x). In this course, we develop the calculus of functions of multiple variables, for example $f(x, y)$ (here the function f depends on two variables x and y). As we go through this course we will look at several ways to conceptualize and mathematically study functions are multiple variables. Once we have developed the mathematical theory and notation of functions of multiple variables, we will develop calculus methods for studying limits, derivatives, and integrals of these functions.

Prerequisites: Calculus II

Course Materials:

- *Text*: Multivariable Calculus by James Stewart (ISBN: 978-0538498678). However, if you have the three semester version of the textbook coving Calculus I, II, and III (ISBN: 978-0538497909) you do not need to purchase the multivariable portion.
- *Student Solution Manual:* There is a student solution manual containing worked out solutions to odd problems available. This is a valuable tool for checking your work and seeking helpful hints when working through homework exercises. I highly recommend you purchase the student solution manual.
- *Supplemental materials*: You are responsible for all handouts given in class and materials posted on the course website.
- *Mathematica*: From time to time, we will utilize the software package Mathematica for graphing and some analytic computation. This software is installed on all lab computers in the library and on the computers in the Math Library in Ohlendorf. You will be required to use Mathematica on various homework questions and on some components of exams.

Time Commitment: In addition to the time spent in class (4 hours a week), ***you should expect to spend between 9 – 12 hours outside of class engaged in homework and study***. Please be aware of the level of time commitment for this course when planning extracurricular activities.

Course Grading:

Component	% of Grade
Practice Homework Problems	10 %
Graded Homework Problems	30 %
Exams (2 midterms & 1 final, 20% each)	60 %

Midterms: Two midterm exams will be given. Each exam will consist of two components: (1) a take home exam which will require the use of Mathematica, and (2) a written exam. The written exams will be given in the evening with a wide window of time (4 hours). You may take the exam for as little or as much of that time as needed. However, the exams will not be designed to take the full length of time.

Midterm 1 on Tuesday, February 19 @ 5:00 – 9:00 pm (Kennedy 104)
Midterm 2 on Tuesday, April 9 @ 5:00 – 9:00 pm (Kennedy 104)

A make-up exam will only be given if both of the following two conditions are satisfied:

1. You contact the instructor prior to the test being given (at least one week in the case of absence due to the attendance of an official school function).
2. You provide the proper documentation.

Final Exam: The final exam will cover all material covered in this course, but will focus on the material covered since the previous second midterm. Unless otherwise notified, the exam will be closed book and closed notes. See below for schedule based on your section.

Final Exam on Wednesday, May 1 @ 1:00 am – 4:00 pm (Kennedy 104)

"Learning is experience. Everything else is just information." – Albert Einstein

Homework: There will be one homework exercise set for each section of the text we cover. A homework exercise set will consist of two parts: practice exercises and graded exercises. The practice exercises will be odd numbered problems in the text. Solutions to these problems should be written up as seen on the last page, where each problem is checked for correctness. If the problem is correct some indication needs to be given. If the problem is not correct, find and indicate where you went wrong in working the problem. You do not need to rework the problem. These problems will be given a grade based on completion: 2 points per problem (1 point for working the problem, and 1 point for checking the problem).

The graded exercises will be 3 even numbered problems. At least one of these will be a challenging problem designed to stretch your mind and understanding of mathematics & calculus.

Each graded problem will be graded on a 10 points scale since that is the typical amount of points given to an exam problem. Use the graded homework as an opportunity to gauge your understanding. Write up the solution as if it were on an exam. For full credit, write neatly and show all your work.

Each homework set will be collect two class days after a section is completed. If you are absent the day a homework set is collected, you are still responsible for making sure your homework is turned in to your instructor. No late homework will be accepted.

"I hear and I forget. I see and I remember. I do and I understand." – Confucius

Homework Collaboration Policy: Working together with other people is a great way to learn mathematics. I encourage you to work together on the homework, if you find that it helps you to learn. However, homework for this course is also graded, as part of your final course grade. Each student must write up his or her own homework solutions. By handing in homework solutions to be graded, you are promising that you took part in solving the problems, and that you are not just copying someone else's work. Handing in homework to be graded when you did not participate in solving the problems is a violation of the Honor Code.

Homework Projects: Various homework projects will be assigned over the course of the semester. Each project is designed to be an in-depth exploration of a specific topic or application. Most of these projects will make use of Mathematica. Solutions, explanations of solutions, and graph generated in completing the project will be typed and presented in a scholarly fashion. The projects are to be done in groups of 2 – 3 individuals. Each homework project will be worth 5 graded homework assignments.

For up to an additional 5% extra credit (on each project), you may type up the solutions using the typesetting programming language LaTeX. If you have never used LaTeX before, check out some video tutorials at https://sites.google.com/site/profbodine/tutorials.

Final letter grades are determined as follows:

A	93 – 100 %	C	73 – 76.9 %
A -	90 – 92.9 %	C -	70 – 72.9 %
B +	87 – 89.9 %	D +	67 – 69.9 %
B	83 – 86.9 %	D	63 – 66.9 %
B -	80 – 82.9 %	D -	60 – 62.9 %
C +	77 – 79.9 %	F	0 – 59.9 %

Disability Services:
If you need course adaptations or accommodations due to a documented disability, please contact the Office of Disability Services at Burrow Student Center, Fourth Floor, 901-843-3885. Hours: M-F, 8:30 am – 5:00 pm.
See http://www.rhodes.edu/disabilityservices/default.asp for details.

Classroom Etiquette:
Please be considerate of the instructor and your classmates around you. Come to class on time and stay the entire period. Turn off cell phones or any beeping/ringing devices during class (this means no sending text messages during class).

The Honor Statement:
You are expected to conduct yourself within the guidelines of the College's Honor Code. If you have any questions about what is or is not allowed, please ask.

The note that this syllabus is a guide and not a contract, and thus is subject to change at the discretion of the instructor.

Name Prof B Section Example Date Today

#1 Find the value of x if $4 = e^{3x+1}$.

$$4 = e^{3x+1}$$

$$\ln 4 = \ln\left(e^{3x+1}\right) = 3x+1$$

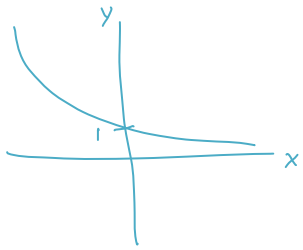
$$\ln 4 - 1 = 3x$$

$$x = \frac{\ln 4 - 1}{3}$$

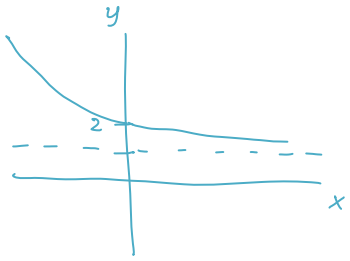
Answer and method are correct

#3 Draw the graph of $y = e^x + 1$.

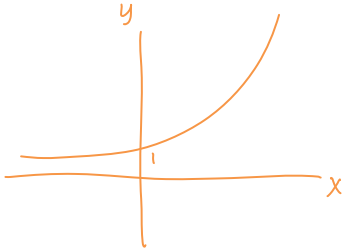
If have $y = e^x$, then



So $y = e^x + 1$ is



← Whoops! Started with $y = e^{-x}$. Need $y = e^x$



#7 Solve for x when $x^2 - x + 7 = 1$

$$x^2 - x + 7 = 1$$

$$x^2 - x + 6 = 0$$

$$(x+3)(x-2) = 0$$

$$x = -3, 2$$

← Messed up signs

Should be $(x-3)(x+2) = 0$