Westfield State University

Department of Mathematics

Calculus I
Math 105
Fall 2013

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Office Hours: Tuesday 10-11AM, Wednesday 12-1, or stop by, or email me.

Welcome!
Welcome to Calculus I! Topics will include: Functions and Rate of Change, Limits and Continuity, the Derivative and its Properties, Applications of Differentiation, Introduction to Anti-Differentiation, the Definite Integrals, and the Fundamental Theorem of Calculus. Students will develop a conceptual understanding of the course material in an inquiry-based classroom, which requires a lot of independent work, group work and projects. There will be no lecture. The resource textbook for this course is "Calculus: Single and Multivariable" by Hughes Hallet, 6th edition.

Mathematics can be fun and challenging at the same time. Westfield State defines a credit hour as "One hour of classroom or direct faculty instruction and a minimum of two additional hours of student work each week for approximately fifteen weeks for one semester." Since this class is 4-credit hours, that means you are expected to spend at least 8 hours per week working on calculus outside of class. This includes time spent meeting with me outside of class during my office hours, or by appointment, whenever you have questions.

Attendance
Exploration, collaboration, and communication in class are essential for this class. Therefore, attendance is mandatory and active participation contributes to your grade. No make-ups will be given for missed quizzes or exams, except in the event of a true, documented emergency where the instructor is notified in advance--if possible. In such a circumstance, it is the student's responsibility to contact the instructor to make alternate arrangements.

Homework
There will be homework on a regular basis. If you are absent, you are expected to find out about the assignment and complete it prior to the due date. For full credit, you must show all your work, express yourself clearly and do the work neatly. Please staple your assignments and use paper with smooth edges. Late work will not be accepted.

Notebook
You will write all your work during class and outside of class in a notebook (not a binder). This will allow you (and me) to see how you progress in your thinking and how much effort you put into your work. I might collect the notebook sometime or just look at

it during class. This is not meant to contain "perfect work" but instead all you attempts, thinking and mistakes. Work that you hand in has to be written up separately.

Portfolio
At several points during the semester you will submit the solutions to **all** problems we are working on during class. This can either be in the form of a "good notebook" (different from the notebook you use during class, or a binder. At the end of the semester you will submit the work of the *whole semester* in your final portfolio.

Class Participation, Presentations
We will work on a lot of problems in class, in groups, and on the blackboards. You are expected to contribute, ask, discuss, and communicate meaningfully and present your group's material to the rest of the class.

Derivative Test
In order to pass the course you have to pass the derivative test. On this test you can show that you have the computational skills and memorized rules necessary to compute derivatives.

Technology
You can use any graphing calculator for this course. I also suggest the wolfram alpha app for smart phones (if you have one), they have general app and a special one for calculus - both are great. The department has laptops we can use during class to access mathematica, a very powerful CAS by wolfram.

Academic Honesty
Anyone detected cheating in an exam, the final examination, or the collected exercises, whether aiding or being aided, will receive a zero for that exam or exercise. I encourage students to seek assistance on homework assignments whenever there is a need: in my office, at the tutoring center, or with fellow students. However, one should not simply copy somebody else's work. What you write on your paper should always reflect your understanding of the material. If you were helped in a substantial way, note your helper's name next to the assignment. (Ideas for this syllabus, for instance, are owed to my colleagues Volker Ecke and Phil Hotchkiss)

Grading
The midterm will be 10% and the final will be 10%. 20% will be homework and 20% will be the final portfolio. The other 40% will account for meaningful class participation, presentations and queries. In order to pass the class you have to pass the derivative test. I will use the following grading scale:

%	95-100	90-94	87-89	84-86	80-83	77-79	74-76	70-73	67-69	60-66	0-59
	A	A-	B+	B	B-	C+	C	C-	D+	D	F

Best wishes for a successful semester!

Learning Outcomes

It is important that students gain a strong conceptual understanding of calculus and its role, as well as the ability to use the algorithms of calculus to solve problems. Upon successful completion of this course students will be able to:

1. Describe basic properties of functions: concave, monotone, linear etc.
2. Understand, explain, and apply the concept of a function in a variety of representations.
3. Understand, explain, and apply the concept of inverse functions in a variety of representations.
4. Understand the properties of power functions and logarithm functions.
5. Understand, explain, and apply the concepts of limits and continuity in a variety of representations.
6. Understand, explain, and apply the concepts of derivative and rates of change (both average and instantaneous) in a variety of representations.
7. Understand, explain, and apply the relationship between average rate of change and instantaneous rate of change.
8. Estimate derivatives numerically, graphically and symbolically.
9. Differentiate a variety of functions (given as formulas).
10. Apply an understanding of rate of change concepts to answer questions about the behavior (long-term behavior, change, optimization,..) of changing quantities.
11. Use appropriate tools for computing derivatives such as product rule, chain rule, quotient rule, and technology (e.g. graphing calculator, and mathematica).
12. Understand, explain, and apply the relationship between data and theoretical models as a means of examining/analyzing real-world phenomena.