Math 117 - Syllabus

Spring Quarter 2007

TEXT: *Single Variable Calculus: Concepts and Context*, by James Stewart (Edition 3E: 2005). Published by Thomson Brooks/Cole. ISBN: 0-534-41022-7. Website: http://www.stewartcalculus.com/media/3_home.php

COURSE OBJECTIVES: To provide students with basic concepts and skills associated with calculus, along with applications of the topic.

LECTURER: Dr. William Husen. Office: MA 418. Phone: 292-7670. Email: mailto:husen@math.ohio-state.edu
Office hours: MWF 1:30-2:15 pm.

RECITATION INSTRUCTOR:Peng Zhao. Office: MW 609. Phone: 292-1922.
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CALCULATORS: A graphics calculator is a required component in this course. Most instructors will be familiar with the Texas instruments TI-83, TI-83Plus, or TI-84. NOTE: The TI-89, TI-92, and any calculator that uses a Computer Algebra System are not allowed in this course.

EXAMINATIONS: Attendance at the midterms and the final are required. Because the midterm will be given during class time and the final will be given at the University-assigned time, make-up exams will only be considered to be given under extreme circumstances that are to be documented in writing **Such conflicts must be brought to the attention of the lecturer (via email or message left at department phone: 292-4975) at the earliest feasible time.**

COURSE GRADES: The grade you receive in Math 117 will be based on your midterm score (one exam worth 100 points), recitation score (worth 170 points), and final examination score (worth 150 points). Thus there are 420 possible points to earn. Extra credit work will not be assigned under any circumstances. You may use the following letter grade scale to evaluate your performance on the examinations:

GRADING SCALE (Percent):

A	A-	B+	B	B-	C+	C	C-	D+	D
90	87	83	80	77	73	70	67	63	60

RECITATION GRADE: 170 points are determined by performance in recitation (20 points for attendance and 150 points for homework). Attendance will be taken and an absence will be excused only with a reasonable (preferably written) excuse. Homework assignments and their due dates will be announced in lecture. Late assignments will not be accepted. Your work will be assessed according to your reasoning and process of solution, not just the final answer. Therefore, show all your work!

Students have the responsibility to master the mathematical ideas presented in the lectures, recitation classes, and assigned homework. Students are encouraged to examine related problems from the text, such as non-assigned problems and review problems found at the end of chapters.

EXAMINATION SCHEDULE: There will be ONE MIDTERM EXAM and ONE FINAL EXAM given during the quarter. The date for the midterm is tentative as of the beginning off the quarter. Any alteration of the dates will be announced in lecture.

MIDTERM EXAM (2.1 through 4.2) Monday, April 23, 12:30 pm – 1:18 pm in the Lecture Hall (SO 4)
FINAL EXAM: (comprehensive) Monday June 4, 11:30 am - 1:18 pm in Lecture Hall (SO 4)

A. GEC Information. This Mathematics course can be used, depending on your degree program, to satisfy the Quantitative and Logical Skills category of the General Education Requirement (GEC). The goals and learning objectives for this category are:

Goals: Courses in quantitative and logical skills develop logical reasoning, including the ability to identify valid arguments, use mathematical models and draw conclusions based on quantitative data.

Learning objectives: Students comprehend mathematical concepts and methods adequate to construct valid arguments and understand inductive and deductive reasoning, scientific inference and general problem solving.

B. Disability Statement. Students with disabilities that have been certified by the Office for Disability Services will be appropriately accommodated, and should inform the instructor as soon as possible of their needs. The Office for Disability Services is located in 150 Pomerene Hall, 1760 Neil Avenue; telephone 292-3307, TDD 292-0901; http://www.ods.ohio-state.edu/.

C. Academic Misconduct Statement. It is the responsibility of the Committee on Academic Misconduct to investigate or establish procedures for the investigation of all reported cases of student academic misconduct. The term "academic misconduct" includes all forms of student academic misconduct wherever committed; illustrated by, but not limited to, cases of plagiarism and dishonest practices in connection with examinations. Instructors shall report all instances of alleged academic misconduct to the committee. For additional information, see the Code of Student Conduct (http://studentaffairs.osu.edu/resource_csc.asp).

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Problem Responsibilities

Note: You will be asked to hand in a subset of these problems (and possibly problems from other sources) by your lecturer. Be sure to show all your work so that your reasoning can be adequately assessed.

Section	Problems
1.1 (Optional review)	1-37, 51-57
1.2 (Optional review)	3-5, 10-18
1.4 (Optional review)	1-8, 17-18
2.1: The Tangent and Velocity Problems	1-7
2.2: The Limit of a Function	3-5, 13-20
2.3: Calculating Limits using the Limit Laws	8-18
2.6: Tangents, Velocities, and Other Rates of Change	3-9, 11-22, 24-26
2.7: Derivatives	2-11, 13, 14, 19-21, 25-34
2.8: The Derivative as a Function	1-23, 26-30, 37-44, 50
2.9: What does f' say about f?	1-28
3.1: Derivatives of Polynomial and Exponential Functions	1-51
3.2: The Product and Quotient Rules	1-29, 31-32, 37-38, 41-42
3.3: Rates of Change in the Natural and Social Sciences	1-9, 11ab, 12-13, 14ab, 16, 18, 19ab, 27-29
3.4: Derivatives of the Trigonometric Functions	1-12, 17-20, 31-33
3.5: The Chain Rule	1-32, 35-37, 39, 41-42, 62-63, 66
3.6: Derivatives of Inverse Trig Functions	29-35
3.7: Derivatives of Logarithmic Functions	2-20, 23-25
3.8: Linear Approximations and Differentials	5-18, 23-30
4.2: Maximum and Minimum Values	3-10, 23-44, 56-57
4.3: Derivatives and the Shapes of Curves	5-14, 19-26, 29-31, 33-34, 39-40
4.4: Graphing with Calculus and Calculators	1-8
4.6: Optimization Problems	1-12, 15-28, 30-34, 36, 38, 40-44
4.9: Antiderivatives	1-29, 39-42, 44, 47-51
5.1: Areas and Distances	1-6, 11-16
5.2: The Definite Integral	1-12, 17-20, 31-43
5.3: Evaluating Definite Integrals	1-28, 37-42, 45-60, 64
5.4: The Fundamental Theorem of Calculus	1-4, 19-21
5.5: Integration by Substitution	1-54, 57-58
5.8: Integration using Tables	1-22
5.9: Approximate Integration	5-16, 26-30
6.1: More about Areas	1-16, 21-25, 28, 39, 40
6.2: Volumes (by slicing, solids of revolution)	1-3, 5-12, 14, 17-18, 21-24, 25-39, 44-46
6.3: Arc Length	3, 7, 8, 11-12, 15acd, 21-23
6.4: Average Value of a Function	1-4, 5-8 (a only), 12-14
6.5: Applications in Physics and Engineering	(Center of Mass: 32-34, 35-38, 40; Hydrostatic Force: 23-30)

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Notes and Advice for Students

Welcome to Math 117: A Survey of Calculus! In this course, you will be experiencing the basic concepts of calculus with an eye toward using these concepts to model physical phenomena. There are two major "kinds" of calculus: "differential" and "integral". Each was developed to address a particular general problem, each of which turns out to have many applications. This course will address differential calculus in a little more than the first half of the quarter and integral calculus in the second half. In each half, the general problem will be discussed, certain needed skills will be practiced, and (finally) phenomena that the general problem models will be examined. We will also discover that differential and integral calculus are related in a special way!

Because we are limited to a ten week course, most of the phenomena we talk about will be those that deal with functions of one variable ("y= f(x)"). That is, we will be mostly dealing with two-dimensional concepts and applications (with a few three-dimensional exceptions that utilize functions of one variable). Most of these concepts, however, generalize to the three-dimensional case; that is, the world you will be working in! Thus, we may occasionally discuss these generalizations, although they will not be required material in the course (The later chapters of the text cover this material). There will be ways of modeling phenomena that the ten week constraint does *not* allow us to deal with: in particular, modeling with "parametric equations" and "vector calculus". The same basic concepts and skills we will talk about are used in these paradigms and you may see them occasionally mentioned in the text. Unfortunately, time does not permit us to investigate them.

Please note that the algebraic skills we learn and practice in the course will not be as in depth as other calculus courses you may have previously experienced. This will be particularly true in integral calculus. The reason for this is so more time can be devoted to the concepts of calculus and how these concepts model "real-world" applications.

In order to get the most out of this course, it is vital that you keep up with the material! This means especially that you: (1) Keep up with the homework assignments and (2) When you need help, you get it as soon as possible! There are a lot of problems assigned as homework because you will not learn calculus (or anything else) unless you immerse yourself in it. To further motivate you to do homework (and also reward you for the effort put forth), there will be about ten homework collections (roughly once per week with the problems and due dates announced in lecture).

I do not mind if, and in fact encourage that, you work together on homework assignments. But please remember to submit your own work and not work copied from another person. Also, it is vital that you show the work you did to obtain the answer. We want to see what you are thinking as you attack a problem. If we deem that *we* cannot get the answer without a certain amount of work, we will assume that you need to do work, too! Thus, answers without supporting work will not be given credit on homework (or exams), even if the answer is correct. NOTE: Certain problems can be solved graphically or numerically on a graphing calculator. That is fine, but in many cases, we will ask for supporting algebraic work as well!

In recitation sections, please make sure you TRY a problem before you ask for a solution. This also goes for the homework assignments: please try a problem as best you can before putting a question mark next to it. If you find yourself putting many question marks down, this is most likely an indication that you need to see one of us for personal help ASAP!!

Finally, because we want to present mathematics as a problem-solving process instead of a collection of facts to be memorized, you will be allowed to bring an 8.5 inch by 11 inch sheet of notes to the midterm exam (both sides). You may bring two such sheets to the final exam.

Best of luck this quarter!!