

**Mathematics 110B**  
**Fall, 2005**

**Instructor:** Dr. Jianmin Ma, jma3@learnlink.emory.edu

**Meeting:** Section 1: MWF 8:30 - 9:20AM, Section 2: 9:35—10:25AM

**Office:** Seney 115, (770) 784-8398, MW 1 - 2PM, TH 3-4PM or by appointment

**Textbook:** Larson, Hosteller & Edwards, Calculus of a Single Variable: Early Transcendental Functions, 3<sup>rd</sup> Ed.

**Course Content:** A two-semester course, Mathematics 110A, B provides students with an integrative approach to calculus that includes the necessary precalculus topics. Course content includes limits; continuity; the derivative; differentiation of algebraic, trigonometric, and the natural logarithmic and exponential functions; applications of derivatives; anti-derivatives; the definite integral; integration by substitution; and applications of the definite integral. Algebraic and transcendental functions are included. Math 110A does not count for a GER mathematics course. Math 110B does count for a GER mathematics course.

**Content for Math 110A**

Review topics include algebra, functions, trigonometric functions, logarithms and exponents. Calculus topics include limits, continuity, and definition of derivative, differentiation, and extrema, Intermediate Value Theorem, Mean Value Theorem, graphing polynomial and rational functions, optimization problems.

**Content for Math 110B**

Review topics includes of inverse trigonometric functions, differentiation, and graphing. New topics include implicit differentiation, logarithmic differentiation, related rates, graphing vertical tangents, sums and sigma notation, induction, antiderivatives, Fundamental Theorem of Calculus, definite integral, area, volume, separable differential equations, substitution method of integration.

**Goals:** By the completion of the sequence Math110A and 110B, the student should have a basic conceptual understanding of the following:

- ✓ Limits and their relationship to the graph of a function;
- ✓ The derivative and its relationship to the graph of a function and to the concept of “rate of change”
- ✓ The definite integral and its relationship to area and volume.

The student should be able to calculate derivatives and to evaluate limits and integrals (both definite and indefinite). The sequential course for Math 110B is Math 112, Calculus II.

**Class Attendance:** The student is responsible for the course material discussed in class; therefore the student is expected to attend all classes. An inordinate number of absences will be handled in accordance with the College’s policies. In addition, after three absences (excused or unexcused), any unexcused absence will result in a deduction of 5 points from your grade total. Entering class late by ten or more minutes is considered an absence.

**Homework:** Homework will be assigned on a regular basis but will not be collected. However, doing homework is key to understand the course material.

**Gateway Test:** In order to pass this course, the student must pass an examination on differentiation. All 100 points will be given for a perfect paper. If the student has only ONE mistake, the student may choose to get a score of 80 points and not retest. More than ONE mistake is **not** considered a passing grade. The Gateway test dates are **September 15 and 29, October 13 and 27**. The last chance is offered on the Reading day, **December 14**.

**Major Tests:** Three major tests will be given. Students are expected to take tests at the scheduled times. Conflicts, problems and emergencies will be handled on an individual basis. For reasons deemed legitimate by your professor, arrangements may be made for a student to take a test prior to the testing time. Any student who needs special accommodations must provide documentation **seven** days in advance of the needed accommodation so that appropriate arrangements may be made.

**September 22, October 20, November 22**

**Problem Sets:** Two problem sets worth 25 pts. Each will be taken home and worked individually or in small groups of 2-3 people. Detailed information will be given at the time of distribution.

**Graphing Portfolio:** Students are to use software (GRAPHMATICA) to prepare a portfolio of computer-generated graphs. The portfolio is to contain at least 10 distinctly different displays of graphs. Each function is to be clearly identified by the formula. Use only algebraic, trigonometric (including inverse trigonometric), logarithmic and exponential functions or combinations of them. The student must have four or five graphical displays where the important features of the graphs are clearly labeled (maximum, minimum, inflection points, etc). The Curve Sketching Checklist (provided during the graphing section of this course) should be used to determine what graphing aspects should be labeled. These are the technical graphs. In addition to the required or technical graphs, the student should compose functions to produce pictures illustrating a theme or a story for a second set of graphs, the thematic graphs. Each portfolio should include a variety of functions (algebraic and transcendental). Evaluation of the portfolio will be based on the selection of graphs, the documentation associated with the graphs, the completeness of the technical graphs, the creativity of the thematic graphs, and the oral presentation of the portfolio. Accuracy, clarity, organization, and originality are important in your portfolio. Oral presentations will be given on the due date. Students should not wait until the week before the due date to do this project. Use your time wisely throughout the semester. Examples of previous portfolios can be reviewed in your professor's office during office hours.

**Quizzes:** Some are in class and others are take-home. *Warning:* you must follow the instructions carefully. Failing to obey them is a violation of honor code.

**Grading:** The student's final course grade will be determined according the table. Grades of A-, B+, B-, C+, C- may be assigned near the cut-off percentage.

Gateway Exam @ 100 pts	100
Two Problem Sets @ 25 pts	50
Quizzes	100
Major tests (3 @ 100 points)	300
Graphing Portfolio	100
Final Exam (Comprehensive)	200
Attendance and participation	30
	Total: 880
A: 91% and above, B: 81-89%, C: 68-79%, D: 58%-67%, F: < 58%	

**Load:** The student will need to spend at least 10 good hours of study each week, not counting time spent taking quizzes, reviewing for tests, and preparing the graphing portfolio.

**Calculators:** Calculators will not be allowed on tests.

**Scheduled Help Outside Class:** The Supplementary Instructors (SI leaders) will schedule outside of class study sessions for students. In addition, student tutors are available to help with homework problems. A schedule of tutoring hours will be provided early in the semester.

**Blackboard:** Announcements from your SI leaders and from your instructors will be posted. Students may ask questions and make requests of a general nature. There will be also discussion forum. Make sure to check into blackboard on a daily basis. The website is [classes.emory.edu](http://classes.emory.edu)

**Written Style:** Neatness is one way of showing courtesy toward your instructor and pride in your work. Thoughts in mathematics are expressed in sentences, such as " $1 + 1 = 2$ ". There is a subject " $1 + 1$ ", a verb "=", and a predicate "2". The student should strive to be neat and to use mathematical symbols appropriately.

**THE HONOR CODE OF OXFORD COLLEGE APPLIES TO ALL WORK SUBMITTED FOR CREDIT IN THIS COURSE. BY YOUR SIGNATURE ON SUCH WORK YOU PLEDGE THAT WORK WAS DONE IN ACCORDANCE WITH THE RULES STIPULATED ON THE WORK OR IN THIS SYLLABUS.**

## Calculus Survival Guide

1. **How much to study:** Calculus is a hard subject. It is likely that it will be your most challenging course this semester. You should be spending **10 to 15** hours a week studying calculus. If you need to make adjustments in your academic or work schedules, do so now. If you cannot make this level of time commitment this semester you will likely be better off taking calculus at another time.
2. **How to study:** Calculus texts are odd books. They are not meant to be read like a novel, or even like a history or biology text. Your calculus should be read in a series of passes. On the first pass through a section, which should be done **before** the lecturer covers it, the student should skim through it lightly, reading definitions and theorems, and trying to **work** through some of the examples. But, and this is the key, you won't fully understand much of what you've read until you start working on the exercises. In fact, you should spend most, perhaps **80%**, of your study time working problems. As you get stuck, you go back, rereading the section, studying the examples and derivations, on a "need-to-know" basis.
3. **Homework:** Work lots and lots of problems, not just the ones assigned as homework. If you are done with the current section, go back and work review problems. Furthermore, you are not done with a problem just because you got the right answer. You are only done when you understand **why** the methods you used had to have worked. If all you are doing is blindly applying formulas and mimicking examples, get extra help. The problems should make *sense* to you.
4. **Studying for tests:** If you were an athlete preparing for track meet, and you slacked off during the weeks before the meet, doing just what you needed so the coach wouldn't get on your case, and then stayed up running the whole night before you meet, you'd lose. Yet this is just how many students prepare for exams. The right way to study for a test, is to do your work at a steady pace throughout the semester. The point is, that while there are a few facts and formulas you'll need to remember for a test, the real way to do well is to think well. That is, you want your brain to be in top shape. You cannot achieve that by cramming. It is now known that as you learn the brain slowly rewires itself. As you study, you *gradually* get smarter. That is the whole point of college!
5. **Come to class:** Many college students treat class attendance as optional. This may be fine for some classes. However, for calculus you can get way behind very fast. You should come to class every period unless you are seriously ill.