

**Mathematics 110A**  
**Fall, 2006**

<b>Instructors:</b>	Dr. Jianmin Ma	Dr. Michael Rogers.
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Hours:	Tu Th F 2:00-3:00 And by appt.	Avail. by appt.: MWF 9:30-11:00, 3:00-5:00 Tu 9:30-12:00 Th 9:30-12:00, 2:00-5:00 Drop-ins welcome, too!

**Textbook:** James Stewart, *Essential Calculus: Early Transcendentals*.

**Course Content:** Mathematics 110A is the first part of a two-semester course, Mathematics 110A/B, which provides students with an integrative approach to Calculus I that includes the necessary precalculus topics.

**Content of Mathematics 110A:** Review of algebra, functions, trigonometric functions, logarithms and exponents. Calculus topics include limits, continuity, derivative, differentiation, extrema, Intermediate Value Theorem, Mean Value Theorem, graphing polynomial and rational functions, optimization problems.

**Content of Mathematics 110B:** Review of inverse trigonometric functions and differentiation, and graphing. New topics include implicit differentiation, logarithmic differentiation, related rates, graphing vertical tangents, logarithmic and exponential graphs, sums and sigma notation, induction, antiderivatives, Fundamental Theorem of Calculus, definite integral, area, volume, separable differential equations, substitution method of integration.

**Course Goals:** After completion of the sequence Mathematics 110A/B, the student should be able to do the following: to find the limit, derivative, antiderivative, and definite derivative of a function; to understand the basic theoretical underpinnings of these processes; to understand the relationships between these processes and rates of change; to understand the relationships between these processes and the graph of a function; and to apply these processes in solving problems on rates, extrema, area, volume, and approximation. An overall goal is to provide the student with a solid foundation for Mathematics 112.

**Class Attendance:** The student is responsible for work covered in class. Furthermore you are expected to have done the reading for each class. In addition to the regular class meetings, there will be optional SI sessions and help sessions. There will also be four tests scheduled on Thursday mornings. (See below).

**Homework:** Assignments from the textbook and handouts are for the benefit of the student and will not be collected except as noted under “Review of Notes/HW” below. The purpose of calculation is insight (Gauss). It is important for the success of the student that the assignments be completed as they are assigned. Collaboration is encouraged. However each student should be sure that he or she can **solve problems unaided by notes, the textbook, or other people**. Use good style on homework. Daily practice develops valuable mental habits. In general the student will need to study at least six good hours per week exclusive of the time spent on quizzes, review for tests, and the graphing portfolio.

**Learning Skills Review:** On occasion, students may be required to show their notes and homework to the instructor for critical review. They will not be graded per se, but the process is worth 25 points in the overall grading scheme. When there is evidence of a lack of effort or a failure to improve habits, full credit will not be earned.

**Gateway Exam:** In order to pass this course the student must pass an examination on basic algebra and trigonometry. The goal for the student to master fundamental skills needed for the student to be successful at learning calculus. The student will be given three opportunities to pass the exam.

**Problem Sets:** Frequently, a set of problems will be given to be written out for the next class. Students may be called upon in class to write solutions on the board.

**Tests and the Final Exam:** Calculators will not be allowed on tests. See the calendar which follows this syllabus for the schedule of tests. The student is expected to take tests at the scheduled times. Any conflicts or problems will be handled on an individual basis. For excuses deemed legitimate arrangements will be made to take a test **prior to** the testing time.

A cumulative final exam will be given at the time scheduled by the Registrar. (You may wish to fill in the appropriate time for yourself.)

**Grading:** Evaluation will be based on the following written work:

Tests (4 @ 100 pts)	400 points
Problem Sets	50 points
Learning Skills Review	25 points
Gateway Exam	50 points
Final	200 points
Total	725 points

The plus/minus system will be used with the following rough guide to letter grades:

A	650 points and up
B	580--650 points
C	505--580 points
D	435--505 points

**Written Style:** Thoughts are expressed by sentences: just so in mathematics. Pay attention to your textbook: it is written in sentences. **Your written work must be in complete sentences.** Note “ $1 + 1 = 2$ ” is a complete sentence (it has a subject “ $1+1$ ”, verb “ $=$ ” and predicate “ $2$ ”). Use mathematical symbols wherever appropriate; do not use a lot of words. Your work needs to be neat and orderly to be intelligible. It is a common practice to rewrite solutions once they are found. See Priestley, “Clean Writing in Mathematics,” pp.~413--420 in *Calculus: An Historical Approach*, which is on reserve.

**SI/Help Sessions/Tutoring:** The SI program is a program of supplemental instruction. The supplemental instructor (SI) is a student who has taken the course before, has a good understanding of the material (but probably not as complete as the instructor), and knows how to succeed in the course. The SI leads organized study sessions. They are not tutoring sessions and are not for going over homework. The sessions will help to make the student's efforts more productive.

Help sessions will be scheduled as there is demand for them. Attendance is optional.

Student tutors will be available and a schedule will be announced.

**Honor Code:** The Honor Code of Oxford College applies to all work submitted for credit in this course. To receive credit for work submitted you must place your name on it. By placing your name on such work, you pledge that the work has been done in accordance with the given instructions and that you have witnessed no Honor Code violations in the conduct of the assignment.

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Wednesday, August 30 Algebra Review  
Friday, September 1  
e-reserve: Handout A Algebra Review

Wednesday, September 6	Review of Graphing
e-Reserve:	Handout B Graphs of Functions
Friday, September 8	Algebraic Functions, Piecewise Functions
Textbook:	p. 9: 29- 44 odd
	p. 22: 15, 16, 17
Monday, September 11	Limits
Wednesday, September 13	Limits (cont.)
Friday, September 15	Limits Involving infinity
e-Reserve:	Limits
Textbook:	p. 33: 3-11 odd, 23
	p. 43: 1, 2, 3, 5, 7, 11- 25 odd, 35-38, 53
	p. 66: 1- 7 odd, 13-23 odd, 27-35 odd, 39
Monday, September 18	Continuity
e-Reserve:	Continuity
Wednesday, September 20	Review for Test 1
e-Reserve:	Review for Test 1

Friday, September 22	Intermediate Value Theorem Properties of Continuous Functions
e-Reserve:	Properties of Continuous Functions Intermediate Value Theorem
Textbook:	p. 54: 3- 11 odd 13 -17 all, 19, 27, 29
Monday, September 25	Definition of Derivative
Wednesday, September 27	Derivatives as Functions
e-Reserve:	Definition of Derivative
Friday, September 29	Trigonometric Functions
e-Reserve:	Trig Handout Notes on Transcendental Functions – sections A, B, C, D
Textbook:	p. 80, 1-17 odd, 25- 31 odd
Textbook:	p. 91, 1- 13 odd, 17- 23 odd, 27, 29, 33, 35, 39, 40
Monday, October 2	Trigonometric Functions (cont.)
Wednesday, October 4	Trigonometric Functions (cont.)

Thursday, October 5 **Gateway Test** at 8:30 a.m.

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Friday, October 6

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*Monday, October 9 is Mid-semester Break*

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Wednesday, October 11 Trigonometric Functions (cont.)

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Thursday, October 12 **Gateway Test** at 8:30 a.m.

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Friday, October 13 Rules on differentiability  
e-Reserve: Differentiation

Monday, October 16 Differentiation rules (cont.)

Wednesday, October 18 Review for Test 2  
e-Reserve: Review for Test 2

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Thursday, October 19 **Test 2** at 8:00 a.m.

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Friday, October 20 Derivative of Trigonometric functions  
e-Reserve: Differentiation – Find  $f'(x)$   
Textbook: p. 102: 1- 37 odd, 41, 43, 47, 51  
p. 111: 1- 45 odd, 53

Monday, October 23 Logarithmic functions  
e-Reserve: Notes on Transcendental Functions, sections F and G

Wednesday, October 25 Chain Rule

Friday, October 27 Exponential Functions

Monday, October 30 Continuity and Differentiability  
e-Reserve: Differentiation  
e-Reserve: Continuity and Differentiability  
Textbook: p. 119: 7-39 odd, 43 - 51 odd

Wednesday, November 1 Log and Exp derivatives  
e-Reserve: Differentiation- Find  $f'(x)$  part 2  
Textbook: p. 166, 1- 43odd, 63, 64

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Thursday, November 2 **Gateway Test** at 8:30 a.m.

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Friday, November 3 Extrema

Monday, November 6  
e-Reserve: Optimization Problems  
Optimization – Examples for Class  
Textbook: p. 203: 1, 2, 7- 13 odd, 22, 23-35 odd, 37-47 odd  
Textbook: p. 232: 3, 5, 7, 9, 13, 17, 23, 43, 44

Wednesday, November 8 Review for Test 3  
e-Reserve: Review for Test 3

