Math 110AX - Calculus I with PreCalculus [Extended Study]
Oxford College of Emory University – Fall 2008
MWF 11:45AM to 12:35PM & Th 11:30 to 12:45 – Seney 208

Instructor: Paul Oser

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Office Hours: Math Center (in Pierce Hall) 3-6PM; "Open door" policy at other times, and by appointment.

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

Course Description: Math 110AX is the first part of a two-semester sequence that integrates precalculus into Calculus I with early transcendental functions. Either Math 110AX or its companion course Math 110A can be taken as a prerequisite to Math 110B, the terminal course in this sequence. Math 110AX meets more frequently than Math 110A, spending the extra time to strengthen students' mathematical backgrounds.

Content for Math 110AX (and Math 110A)
Review of algebra; functions; trigonometric, logarithmic, and exponential functions. Calculus topics include limits, continuity, the definition of the derivative, differentiation, extrema, the Intermediate Value Theorem, the Mean Value Theorem, graphing polynomial and rational functions, optimization problems.

Content for Math 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, the Fundamental Theorem of Calculus, definite integral, area, volume, separable differentiable equations, substitution

Course Goals: Upon successful completion of Math 110AX and Math 110B, students will:

1. Understand conceptually limits and their relationship to the graph of a function.
2. Understand conceptually the derivative and its relationship to the graph of a function and to the concept of "rate of change".
3. Understand conceptually the definite integral and its relationship to area and volume.
4. Be able to calculate derivatives, evaluate limits, and compute integrals (both definite and indefinite).
5. Be well-prepared for Math 112.

Grading: Students' grades are determined by performance on homework, quizzes/projects, tests, and a *comprehensive* final exam. All tests will be administered on Thursday mornings throughout the semester.

Homework	50 points
Quizzes/Projects	150 points
5 Tests	500 points
Final	200 points
Total	900 points

Maximum grade cuts are as follows: 90% - A, 80% - B, 70% - C, 60% - D. Plus/minus grades may be assigned for percentages near the maximum grade cuts. **Students must pass the final in order to pass the course.**

Homework: Timely completion of the daily homework assignments is crucial to success in this course in addition to serving as an excellent preparation for the quizzes. Some homework may be assigned and collected for a grade during the semester.

Quizzes/Projects: An undetermined number of quizzes will be given throughout the semester. Quizzes need not be announced ahead of time. The bottom 10% of your quiz grades will be dropped. The average of all of the remaining quizzes (and any projects assigned) will be used to determine how many of the 150 points for quizzes/projects are earned towards the overall grade. For example, if one had an average of 90% on your quizzes and projects, then one would receive 135 points toward one's final grade. There is no provision for making up a quiz. You will receive a zero on any missed quiz. Grades on projects are treated identically to those on quizzes, except that project grades may not be dropped.

Tests: Five tests will be given on Thursday mornings and the tentative dates for the exams are listed in the course calendar, although these times and dates are subject to change. Students are expected to be present for all scheduled tests. Any conflicts should be brought to the instructor's attention as soon as possible. If a legitimate reason exists for missing a test – as determined by the instructor – then the test must be taken prior to the regularly scheduled date. In the unusual circumstance where taking the test early is not possible, students should be aware that any make-up tests given will likely be designed to be more difficult to offset the additional time given for study. Students must provide written documentation in advance of any special accommodations required for testing. This includes additional time or other needs.

Class Attendance: Students are responsible for all material covered in class and any changes to the syllabus that may be announced. Any conflicts between the course schedule and religious holy days are to be negotiated in advance with one's instructor.

Calculators: Students will not be allowed to use calculators on any quizzes or exams.

"Good Style": All necessary work must be correctly shown in a clear and organized fashion for full credit. Organization and clarity of thought are essential to mathematical thinking. Therefore, points will be deducted for a lack of organization, illegible or sloppy work, and the inappropriate use of mathematical symbols, even if answers found are correct. Students will be provided examples of what is considered "acceptably clear and organized work". The goal is for students to be able to solve

problems in "good style", unaided by books, notes, tutors, or calculators – and to understand the reasoning behind the solution method.

Resources

Tutoring and Review Sessions: Paul Oser, the Math Center Director, is available for free, individual tutoring in the Math Center in Pierce Hall from 3-6 PM Mondays through Thursdays. Student tutors will also be available in the evenings and on Sundays. The complete schedule will be forthcoming. Students are encouraged to do your homework in this area, where help is available as needed. Some of the student tutors, working in close conjunction with the coordinator for this course, will also hold review sessions in the evenings before the tests. These are to one's benefit to attend.

The Math Center Online: One can find tutorial videos, notes, and practice exercises – specifically created for Math 110AX at http://mathcenter.oxford.emory.edu. This website will be an _essential_ resource for students in this class.

Learnlink: There will be a Math 110AX class conference on Learnlink. Announcements from any instructor or tutor in the course will be posted there. Students are encouraged to ask questions and make requests of a general nature on this conference. Individual concerns should be sent directly to one's instructor.

HotMath.com: Step-by-step hints and answers to most of the homework exercises in Stewart's text can be found at http://hotmath.com/help/bookindexes/stewartet07/index.html. Access to these solutions requires students to login with the school password: _"oxford90"_.

Course Calendar (Subject to Change)

Date	Topic	Notes
Aug 27	Exponents & Order of Operations	
Aug 28	Diagnostic Exam	
Aug 29	Radical Expressions & Rational Exponents	
Sept 1	**No Class**	**Labor Day**
Sept 3	Polynomial Arithmetic & Factoring	**Drop/Add Ends**
Sept 4	Solving Linear Equations & Quadratics by Factoring	
Sept 5	Completing the Square, Quadratic Formula, Quadratic Forms	
Sept 8	Solving Polynomials by Factoring & Equations with Radicals	
Sept 10	Functions: Evaluation, Interval Notation, Domain & Range	
Sept 11	Inverse Functions & Combining Functions, Composition	
Sept 12	Graphing Linear Functions & Absolute Value Functions	
Sept 15	Transformations of Functions	
Sept 17	Distance, Midpoints, Circles & Semi-Circles	
Sept 18	Parabolas (Horizontal & Vertical)	**Test 1**
Sept 19	Rational Functions, Limits, "Holes" & Cancelling Factors	
Sept 22	Properties of Limits	
Sept 24	Piecewise Functions & One-Sided Limits	
Sept 25	Infinite Limits & Vertical Asymptotes	
Sept 26	Products & Quotients of Rational Functions	
Sept 29	Sums & Differences of Rational Functions	
Oct 1	Limits Involving Radicals, Conjugates & Absolute Value	
Oct 2	Continuity & Continuous Functions	
Oct 3	Unit Circle & Trigonometric Function Definitions	
Oct 6	Triangle Trigonometry, Angles & Rotations	
Oct 8	Trigonometric Identities	
Oct 9	Solving Trigonometric Equations	
Oct 10	Graphing Trigonometric Functions	**Test 2**
Oct 13	**No Class**	**Mid-semester Break**
Oct 15	Graphing Trigonometric Functions	
Oct 16	Limits/Continuity of Trigonometric Functions, Squeeze Theorem	
Oct 17	Intermediate Value Theorem	**Last Day to Receive W**
Oct 20	Slope & Equations of Lines	
Oct 22	Definition of Derivative, Slope of Tangent Line, Intervals of Increase/Decrease	
Oct 23	Using Definition to find Derivatives	
Oct 24	Tangent & Normal Lines to Graph of a Function	
Oct 27	Exponential Functions & Their Graphs, Limits at Infinity	
Oct 29	Logarithms & Their Graphs	
Oct 30	Properties of Logarithms	**Test 3**
Oct 31	Solving Logarithmic Equations	
Nov 3	Solving Logarithmic Equations	
Nov 5	Differentiation of Exponential, Logarithmic, Sine and Cosine Functions	
Nov 6	Sum/Differences, Constant Multiple, Power Rule	
Nov 7	Product Rule	
Nov 10	Quotient Rule	
Nov 12	Chain Rule	
Nov 13	Combining Differentiation Rules	**Test 4**
Nov 14	Continuity/Differentiability of Functions	
Nov 17	Mean Value Theorem	
Nov 19	Extrema on an Interval	
Nov 20	Optimization	
Nov 21	Optimization	
Nov 24	Graphing Polynomials, Second Derivatives & Concavity	
Nov 26	**No Class**	**Thanksgiving**
Dec 1	Graphing Polynomials, Second Derivatives & Concavity	
Dec 3	Catch-up & Review	

Dec 4	Graphing Rational Functions	Test 2
Dec 5	Graphing Rational Functions	
Dec 8	Final Review	Last Day of Class

Math 297R – Selected Topics in Topology

Oxford College of Emory University – Fall 2008

Mondays and Fridays 9:00 – 9:50, Pierce 122A

Instructor: Paul Oser **Phone:** 4-4655

Office: Pierce Hall, 122A **Email:** poser3@emory.edu

Office Hours: Math Center (in Pierce Hall) 3-6PM; "Open door" policy at other times, and by appointment.

Text: Michael Henle's *A Combinatorial Introduction to Topology* (with additional readings and exercises taken from George L. Cain's *Introdution to General Topology*).

Course Description: Topics will include: Continuous transformations in the plane; metric and pseudometric spaces; compactness and connectedness; platonic solids; Euler's theorem; Sperner's lemma and the Brouwer Fixed Point theorem; winding numbers, critical points and the Poincare Index Theorem; the classification theorem for surfaces; boundary operators; maximality and Zorn's lemma; topological spaces, subspaces, bases for topologies; and other related topics – as time allows.

Course Goals: Upon successful completion of Math 297R – Selected Topics in Topology, students will:

1. Understand the difference between point set topology and algebraic topology.
2. Understand some of the topological connections between analysis, geometry, and algebra
3. Be able to create mathematical documents with LaTeX.
4. Have a familiarity with the terms, major results, and methods of proof employed in the study of topology.

Grading: Course grades are determined by performance on problem sets, tests, and a final project.

Problem Sets (at least 10)	500 points (scaled)
3 Tests @ 100 pts each	300 points
Final Project	200 points
Total	1000 points

Maximum grade cuts are as follows: 90% - A, 80% - B, 70% - C, 60% - D. Plus/minus grades may be assigned for percentages near the maximum grade cuts.

Course Meetings: Regular attendance and communication with the instructor are expected. Any conflicts between the course schedule and religious holy days are to be negotiated in advance with one's instructor.

"Good Style": Organization and clarity of thought are essential to mathematical thinking. As such, all work must be correctly shown in a clear and organized fashion for full credit.