

**Math 110A**  
**Oxford College of Emory University**  
**Fall 2010**

**Instructors:** Dr. Ricardo Conceição & Dr. Michael Rogers.  
**Office:** Pierce Hall 121 & Pierce Hall 122D  
**Email:** ricardo.conceicao@emory.edu & Rogers@LearnLink.Emory.Edu  
**Phone:** 4-4657 & 4-8419  
**Office Hours:** To be announced

**Course Description:** Mathematics 110A provides students with an integrative approach to Calculus I that includes the necessary precalculus topics.

- **Content:** Review of algebra; functions; trigonometric, inverse trigonometric, logarithmic, and exponential functions. Calculus topics include limits, continuity, the definition of the derivative, differentiation, extrema, the Intermediate Value Theorem, antiderivatives, optimization problems.

**Textbook:** James Stewart, *Single Variable Calculus, 6th Edition*. Try to read the book before coming to class: believe me, this is a very useful habit.

**Course Goals:** Upon successful completion of Math 110A students will:

1. Be able to perform complex algebraic manipulations.
2. Be able to graph and compute with algebraic and transcendental functions.
3. Understand conceptually limits and their relationship to the graph of a function.
4. Understand conceptually the derivative and its relationship to the concept of “rate of change”.
5. Be able to calculate derivatives and evaluate limits.
6. Be well-prepared for Math 111.

**Classes:** The student is responsible for what is covered in class. In addition to the regular class meetings, there will also be several tests scheduled on Tuesday or Thursday mornings. (See below).

**Homework:** A homework is assigned almost every day of class at the end of class. These exercises usually will not be collected but are for the benefit of the student. Students may ask questions, and quizzes based on the homework may be given. The instructor may ask to see a student’s homework.

**Quizzes:** (100 points.) All quizzes may be announced and are usually in-class. The student must be present in class to take each quiz. Up to one quarter of the quizzes will be dropped. Each quiz will count the same amount, the average per cent being used to calculate the number of points. For example, a 94% quiz average at the end of the course will result in 94 points out of the 100. Normally an excused absence during which a student misses a quiz may not be made up; it will be dropped.

**Gateway Exams:** (100 points.) In order to pass this course the student must pass two examinations, one algebra and graphs and one on trigonometry. See the calendar for the schedule. The student will be allowed three opportunities to pass it. Each test (of each kind) will be different but very similar to the original test.

	<b>Algebra</b>	<b>Trigonometry</b>
<b>8:00 am</b>	<b>Tuesday, September 14</b>	<b>Tuesday, October 19</b>
<b>8:00 am</b>	<b>Thursday, September 30</b>	<b>Tuesday, October 26</b>
<b>8:00 am</b>	<b>Tuesday, November 9</b>	<b>Tuesday, November 30</b>

**Projects:** (100 points.) A few group projects will be assigned during the semester. The groups will consist of two or three people.

**Tests:** (400 points.) In general, calculators will not be allowed on tests. Three tests will be given on the following days:

- In class, Wednesday, October 6 - Test 1, Part A (80 points)
- 8:00 am, Thursday, October 7 - Test 1, Part B (120 points)
- 8:00 am, Tuesday, November 2 - Test 2 (100 points)
- 8:00 am, Tuesday, November 23 - Test 3 (100 points)

**Final Exam:** (200 points.) A cumulative final exam will be given at the time scheduled by the Registrar.

**Excuses:** Excuses deemed legitimate by the instructor will be handled according to the individual circumstances and college policies.

The student is expected to take all tests and exams at the scheduled times. For legitimate excuses arrangements will be made to take a test prior to the testing time. There will be no make-up tests given after the testing time.

**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. Your work also needs to be neat and orderly to be intelligible. See the “Calculus Style Guide” on Blackboard.

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

Gateway Exams	100 points
Tests (4 @ 400 pts)	400 points
Quizzes	100 points
Projects	100 points
Final	200 points
Total	900 points

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

A	B	C	D	F
810 points and up	720 - 809 points	630 - 719 points	540 - 629 points	below 539

**Tips for Success:** Calculus is hard, but it can be made easier by intelligent and efficient study habits. Gauss said the purpose of calculation is insight. Insight is an understanding into why things work the way they do. This should be the goal of working out problems. Know **why** each step is correct and **why** each step was the right step to take. This is more than knowing **that** each step is correct.

Although the homework exercises are not graded, it is important for the success of the student that they be completed as soon after covering the material as possible. Calculators may be used when appropriate, but the student should keep in mind that they are not permitted on the tests. While collaboration is encouraged, each student should be sure that he or she ultimately can **solve problems unaided by notes, the textbook, a calculator, or other people.**

Practice good style on homework. A clean style helps to clean up messy thinking.

In general the student will need to study at least six good hours per week exclusive of the time spent on case studies and review for tests.

Tests are performances, similar to those by athletes, musicians, and dancers. Prepare for them in similar ways. Begin practicing for them weeks in advance.

The topics we will cover are very useful and fundamental in the sciences, business and engineering, among other fields, and I want you all to succeed. However, success in the course will require your diligence and hard work. Be sure to keep up with the assignments and to attend class. Talk to me as soon as you are having problems - don't wait until the week of a test. In addition to learning quantitative skills, it is important that you develop learning skills and study habits that will help you in calculus, in other courses, and in life beyond Oxford College.

**Help Sessions/Tutoring:** Help sessions will be scheduled as there is demand for them. Attendance is optional.

The schedule for tutoring in the Math Center will be announced when available.

**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.

You may always ask the instructor any question about an assignment. He will answer at his discretion.

Good luck and I hope this will be an enjoyable experience for all of you!

### Proposed Calendar:

Date	Topic	Section
Wed, Aug 25 <sup>th</sup>	Introduction: Examples of functions and problems in Calculus	APC <sup>1</sup>
Fri, Aug 27 <sup>th</sup>	Introduction to limits: Velocity problem and sunset illustration of infinite limits	APC
Mon, Aug 30 <sup>th</sup>	Binomial Theorem	BH <sup>2</sup>
Wed, Sept 1 <sup>st</sup>	Quadratic, polynomial and rational functions	§1.1
Fri, Sept 3 <sup>rd</sup>	Piecewise defined function: Distance example and graphs	§1.1
Mon, Sept 6 <sup>th</sup>	<i>LABOR DAY</i>	
Wed, Sept 8 <sup>th</sup>	Combining functions; transformation of graphs	§1.3
Fri, Sept 10 <sup>th</sup>	Trigonometric Functions: definition and basic graphs	NTF <sup>3</sup>
Mon, Sept 13 <sup>th</sup>	Graphs of transformed trig. functions	NTF
Tue, Sept 14 <sup>th</sup>	<b>Gateway Exam (Algebra - First opportunity)</b>	
Wed, Sept 15 <sup>th</sup>	Trigonometric Functions: graph of $\tan x$ and reciprocal trig. functions	NTF
Fri, Sept 17 <sup>th</sup>	Limits (finite and infinite)	§2.2
Mon, Sept 20 <sup>th</sup>	Combining functions and limits	§2.3
Wed, Sept 22 <sup>nd</sup>	Continuity and review of limits	§2.5
Fri, Sept 24 <sup>th</sup>	Intermediate value theorem and continuity	§2.5
Mon, Sept 27 <sup>th</sup>	Derivative	§3.1
Wed, Sept 29 <sup>th</sup>	Derivative	§3.2
Thu, Sept 30 <sup>th</sup>	<b>Gateway Exam (Algebra - Second opportunity)</b>	
Fri, Oct 1 <sup>st</sup>	Derivative rules	§3.3
Mon, Oct 4 <sup>th</sup>	REVIEW	
Wed, Oct 6 <sup>th</sup>	<b>Test 1, Part A</b>	
Thu, Oct 7 <sup>th</sup>	<b>Test 1, Part B</b>	
Fri, Oct 8 <sup>th</sup>	Trigonometric Functions: identities	NTF
Mon, Oct 11 <sup>th</sup>	<i>FALL BREAK</i>	
Wed, Oct 13 <sup>th</sup>	Trigonometric Functions: intro. to inverse functions and problems	NTF
Fri, Oct 15 <sup>th</sup>	Limits and derivatives of trig. functions	3.4
Mon, Oct 18 <sup>th</sup>	Chain Rule	§3.5
Tue, Oct 19 <sup>th</sup>	<b>Gateway Exam (Trigonometry - First opportunity)</b>	
Wed, Oct 20 <sup>th</sup>	Extreme values of functions	§4.1
Fri, Oct 22 <sup>nd</sup>	Inverse Functions	§7.1

<sup>1</sup>See section “A preview of Calculus” in the textbook.

<sup>2</sup>See “Binomial Handout” on Blackboard.

<sup>3</sup>See “Notes on Transcendental functions” on Blackboard.

Date	Topic	Section
Mon, Oct 25 <sup>th</sup>	Inverse Trig. functions	NTF, §7.6
Tue, Oct 26 <sup>th</sup>	<b>Gateway Exam (Trigonometry - Second opportunity)</b>	
Wed, Oct 27 <sup>th</sup>	Derivative of inverse trig. functions	§7.6
Fri, Oct 29 <sup>th</sup>	Exponential and logarithmic equations	NTF
Mon, Nov 1 <sup>st</sup>	REVIEW	
Tue, Nov 2 <sup>nd</sup>	<b>Test 2</b>	
Wed, Nov 3 <sup>rd</sup>	Exponential and logarithmic functions	NTF
Fri, Nov 5 <sup>th</sup>	Derivatives of logarithmic and exponential functions	§7.2, 7.4
Mon, Nov 8 <sup>th</sup>	Antiderivatives	§4.9
Tue, Nov 9 <sup>th</sup>	<b>Gateway Exam (Algebra - LAST opportunity)</b>	
Wed, Nov 10 <sup>th</sup>	Antiderivatives (Cont.)	§4.9
Fri, Nov 12 <sup>th</sup>	(Simple) Substitution rule	Part of §5.5
Mon, Nov 15 <sup>th</sup>	Differentials	Part of §5.5
Wed, Nov 17 <sup>th</sup>	Differential equations	DE <sup>4</sup>
Fri, Nov 19 <sup>th</sup>	Exponential growth and Decay	§7.5
Mon, Nov 22 <sup>nd</sup>	REVIEW	
Tue, Nov 23 <sup>rd</sup>	<b>Test 3</b>	
Wed, Nov 24 <sup>th</sup>	<i>THANKSGIVING</i>	
Fri, Nov 26 <sup>th</sup>	<i>THANKSGIVING</i>	
Mon, Nov 29 <sup>th</sup>	Optimization problems	§4.7
Tue, Nov 30 <sup>th</sup>	<b>Gateway Exam (Trigonometry - LAST opportunity)</b>	
Wed, Dec 1 <sup>st</sup>	Optimization problems (cont.)	§4.7
Fri, Dec 3 <sup>rd</sup>	Review limits	
Mon, Dec 6 <sup>th</sup>	Review Differentiation	
Dec 8 - 15	<i>Reading day &amp; Finals</i>	

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<sup>4</sup>See “Separable Differential Equations” on Blackboard.