

MATH 110  
SPRING 2016

**Instructor:** Dr. Jonathan Hulgan

**Office:** Pierce 122B

**Email:** jonathan.hulgan@emory.edu

**Phone:** 4-4507

**Office Hours:** MW 3:30-5:00; additional hours posted weekly.

**Course Content:** Mathematics 110 provides students with an integrative approach to Calculus I that includes the necessary precalculus topics: 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 and optimization problems.

**Textbook:** *Single Variable Calculus: Early Transcendentals, 7th Edition* by Stewart. (Both the 8th and 6th editions are likely fine as well, but problem numbers will be off in places.)

**Course Goals:** Upon successful completion of Math 110 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 material, examples, and announcements discussed in class; therefore, the student is expected to attend all classes. Generally, students who attend class on a regular basis achieve better grades than those who elect to be absent occasionally. Students accumulating an inordinate number of absences will be referred to the assistant dean of academic services. In addition to the regular class meetings, tests are scheduled for certain Friday afternoons.

**Homework:** Homework is assigned almost every day of class. The student should expect to spend at least 2 productive hours of study for each class session, or about 6 to 8 hours per week. Productive study in mathematics often means working appropriately challenging problems: these should seem neither easy nor impossible. The students is encouraged to ask questions of the instructor about any problems that present a fruitless struggle.

**Quizzes:** Twelve in-class quizzes are scheduled throughout the semester according to the course calendar below. The student must be present in class to take each quiz; no make-up quizzes will be offered for any reason. The student’s 10 best quizzes will be used in the final grade calculation.

**Gateway Exam:** In order to pass this course the student must pass an examination in algebra, graphs and transcendental (trigonometric, logarithmic, and exponential) functions. The student will be allowed three opportunities to pass it on the following Friday afternoons: **March 18, April 1,** and

**April 8.** Each test will be different but very similar to the original test. Once a passing score is earned, the student may choose to take any subsequent exams to try to earn a higher grade.

**Tests:** Tests will be given on Friday afternoons on **February 5, February 26, March 25, and April 15.** The student is expected to take tests at the scheduled times. Conflicts, problems and emergencies will be handled on an individual basis and should be brought to the attention of the instructor as soon as possible. For reasons deemed legitimate by your professor, arrangements may be made for the student to take a test prior to the testing time; such arrangements must be made several days in advance.

Students requesting special accommodations must present their letter of accommodation provided by the college; the student must make arrangements for these accommodations several days in advance of the scheduled assessment.

**Final Exam:** A cumulative final exam will be administered according to the final exam schedule: Section 12A at 9am on Tuesday, May 3; Section 01A at 9am on Wednesday, May 4. The final exam must be taken at the scheduled time.

**Grading:** The student's final course grade will be determined as follows:

Tests ( $4 \times 100$ pts)	400 points
Gateway Exam	50 points
Quizzes ( $10 \times 10$ pts)	100 points
Final Exam	200 points
<hr/>	
TOTAL	750 points

In general, letter grades will be determined as follows, based on points each student earns: A: at least 675 points; B: 600-674 points; C: 525-599 points; D: 450-524 points; F: fewer than 450 points. Grades of A-, B+, B-, C+, C-, D+ may be assigned for sums of points near these cut-off totals.

**Written Style:** Mathematicians value the efficient communication of logical arguments and statements. 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.

**Support Services:** Students should utilize the following resources:

- **Blackboard:** Announcements and important documents will be posted on the course's Blackboard site. The student is responsible for regularly checking the site for new announcements and resources.
- **Office Hours:** Office hours will be posted on Blackboard. These times vary due to meetings and other obligations, but most afternoons should have some availability.
- **Supplemental Instruction:** The supplemental instruction (SI) leader will be announced. The SI will schedule weekly sessions to review course content and help students discover how best to study calculus. The SI is a student who has taken the course (or a similar course) before and knows how to be a successful student in it.
- **Math Center:** The Math Center is located in Pierce Hall. Student tutors are generally available from 3pm to 6pm, Monday through Thursday.

- **Study Groups:** When used appropriately, study groups can be a useful tool in learning mathematics. To be effective, time spent in a study group must be complementary to time spent studying individually: group study sessions should push its members to solve difficult problems without help.

**Closing Advice:** Learning calculus can be difficult but can be made easier by intelligent and efficient study habits. Keep in mind the following quote by the American computer scientist and mathematician Richard Hamming: “The purpose of computing is insight, not numbers.” 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 that they be completed as soon after covering the material as possible. Calculators may be used to assist with tedious calculations, but keep in mind that they are not permitted on tests or quizzes. While collaboration is encouraged, be sure that you 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 you will need to study at least six good hours per week exclusive of the time spent to review for tests.

Tests are performances, similar to those by athletes, musicians, and dancers; prepare for them in similar ways by practicing for weeks in advance. The topics we will cover are very useful and fundamental in the sciences, business, and other fields. I want you to succeed in your academic, intellectual, and career pursuits. Such success will require your diligence and hard work; this is no less true for success in this course. 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.

—Dr. Hulkan

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

# Math 110, Spring 2016

## Course Calendar

MONDAY	WEDNESDAY	FRIDAY
Jan 11th	Jan 13th <b>1</b> Introduction to Calculus	Jan 15th <b>2</b> Review of Algebra Text: Handout A
Jan 18th NO CLASS (Martin Luther King Jr. Holiday)  <i>Drop/Add Ends on Jan 19th</i>	Jan 20th <b>3</b> Quadratic, Polynomial, and Rational Functions Text: Handout B; Stewart §1.2	Jan 22nd <b>4</b> Piecewise Functions Text: Stewart §1.1 <b>Quiz 1</b>
Jan 25th <b>5</b> Combining Functions Text: Stewart §1.3	Jan 27th <b>6</b> Trigonometric Functions Text: NTF A <b>Quiz 2</b>	Jan 29th <b>7</b> Trigonometric Identities Text: NTF B
Feb 1st <b>8</b> Trigonometric Graphs Text: NTF C <b>Quiz 3</b>	Feb 3rd <b>9</b> Trigonometric Equations Text: NTF D	Feb 5th <b>10</b> Review <b>Afternoon: Test 1</b>
Feb 8th <b>11</b> Inverse Trigonometric Functions Text: NTF E	Feb 10th <b>12</b> Binomial Theorem Text: Additional Handout	Feb 12th <b>13</b> Limit of a Function Text: Stewart §2.2 <b>Quiz 4</b>
Feb 15th <b>14</b> Calculating Limits Text: Stewart §2.3	Feb 17th <b>15</b> Infinite Limits Text: Stewart §2.2 <b>Quiz 5</b>	Feb 19th <b>16</b> Limits at Infinity Text: Stewart §2.6
Feb 22nd <b>17</b> Continuity Text: Stewart §2.5 <b>Quiz 6</b>	Feb 24th <b>18</b> Continuity Text: Stewart §2.5	Feb 26th <b>19</b> Review <b>Afternoon: Test 2</b>
Feb 29th <b>20</b> Exponential and Logarithmic Functions Text: NTF F	Mar 2nd <b>21</b> Exponential and Logarithmic Equations Text: NTF G	Mar 4th <b>22</b> Introduction to Derivatives Text: Stewart §2.7 <b>Quiz 7</b>  <i>Last Day to Withdraw</i>

MONDAY	WEDNESDAY	FRIDAY
Mar 7th NO CLASS (Spring Break)	Mar 9th NO CLASS (Spring Break)	Mar 11th NO CLASS (Spring Break)
Mar 14th <b>23</b> Definition of the Derivative Text: Stewart §2.7	Mar 16th <b>24</b> Derivatives of Polynomial and Exponential Functions Text: Stewart §3.1 <b>Quiz 8</b>	Mar 18th <b>25</b> Product and Quotient Rules Text: Stewart §3.2 <b>Afternoon: Gateway Exam First Attempt</b>
Mar 21st <b>26</b> Derivatives of Trigonometric Functions Text: Stewart §3.3 <b>Quiz 9</b>	Mar 23rd <b>27</b> Summation Notation Text: Additional Handout	Mar 25th <b>28</b> Review <b>Afternoon: Test 3</b>
Mar 28th <b>29</b> Chain Rule Text: Stewart §3.4	Mar 30th <b>30</b> Derivative of Logarithmic Functions Text: Stewart §3.6 <b>Quiz 10</b>	Apr 1st <b>31</b> Working with Derivatives Text: Additional Handout <b>Afternoon: Gateway Exam Second Attempt</b> <i>Freshman Withdrawal Deadline</i>
Apr 4th <b>32</b> Maximum and Minimum Values Text: Stewart §4.1 <b>Quiz 11</b>	Apr 6th <b>33</b> Increasing, Decreasing, and Concavity Text: Stewart §4.3	Apr 8th <b>34</b> Optimization Text: Stewart §4.7 <b>Afternoon: Gateway Exam Third Attempt</b>
Apr 11th <b>35</b> Antiderivatives Text: Stewart §4.9 <b>Quiz 12</b>	Apr 13th <b>36</b> Antiderivatives Text: Stewart §5.5	Apr 15th <b>37</b> Review <b>Afternoon: Test 4</b>
Apr 18th <b>38</b> Antiderivatives Recap Text: Stewart §5.5	Apr 20th <b>39</b> Preview of Definite Integrals Text: Stewart §5.2	Apr 22nd <b>40</b> Review and Course Evaluations
Apr 25th <b>41</b> Final Review  <i>Last Day of Classes</i>	Apr 27th	Apr 29th FINAL EXAMS: 12A May 3 at 9am 01A May 4 at 9am