

**Math 111**  
**Oxford College of Emory University**  
**Spring 2013**

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**Course Content:** Mathematics 111 is the first semester of single-variable calculus. The main topics are the limits, differentiation, and integration of functions and the applications of these process; they include the analysis of algebraic and elementary transcendental functions. A calendar of topics is attached to this syllabus.

**Textbook:** James Stewart, *Single Variable Calculus: Early transcendentals, 7th Edition*.

**Course Goals:** By the completion of this course, the student should be able to:

1. Evaluate limits and interpret the results in relation to the graph of a function.
2. Define the derivative and relate this definition to the graph of a function and to the concept of “rate of change.”
3. Give proofs of some of the basic theorems, those that require only elementary algebra, geometry, and induction.
4. Differentiate algebraic, trigonometric, logarithmic and exponential functions.
5. Apply the derivative to the graphs of functions, to optimization situations and to related rates problems.
6. Define the definite integral and its relationship to area and volume.
7. Evaluate definite and indefinite integrals using algebraic techniques and the method of substitution.
8. Write mathematics clearly and cogently.

In general, each student should be able to calculate derivatives, to evaluate limits and to evaluate integrals (both definite and indefinite). Students should be able to apply appropriately their calculations and evaluations. In addition, students should understand the concepts of limit, continuity, derivative, anti-derivative, and have a beginning understanding of proof. The primary purpose of this course is to provide a solid foundation for success in Mathematics 112.

**Classes:** The student is expected to attend all classes since the student is responsible for work covered and any announcements made in class. An inordinate amount of absences will be handled in accordance with school policies. In addition to the regular class meetings, there will also be several tests scheduled on Tuesday or Thursday mornings.

**Homework:** Homework is assigned almost every day 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.

Students will need to spend **at least 3 productive hours of study for each class session, or about 9 to 10 hours per week**. Students should not get behind or wait until the night before a test to study. Sleep is important prior to tests.

**Quizzes:** In-class quizzes will be given and most of them will be unannounced. The student must be present in class to take each quiz. There will be 12 quizzes of which the highest 10 will be counted.

**Gateway Exams:** In order to pass this course the student must pass an examination on derivatives. Each re-test will be different but very similar to the original test. The student will be allowed three opportunities to pass it.

The Gateway Exams will be given on the following days:

- 8:00 am Thursday, February 28
- 8:00 am Thursday, March 21
- 8:00 am Thursday, April 11

**Pre-calculus skill test:** A diagnostic test on pre-calculus skills will be given at **8 a.m. on Tuesday, January 22**. It will cover basic algebraic skills (factoring, simplifying expressions, solving equations); transformations of functions (shifts, stretching and reflecting); functions: linear, quadratic, polynomial, rational, square root, algebraic, absolute value, transcendental (trigonometric, inverse trigonometric, exponential, logarithmic), piecewise-defined functions; and graphs of functions.

**Tests:** Three major tests will be given. All of the tests will be comprehensive. Each student is expected to take tests at the scheduled times. Any conflicts or problems will be handled on an individual basis. If the excuse is considered legitimate by your instructor, arrangements will be made to take a test on the afternoon **prior to** the testing time. Emergencies will be handled on an individual basis. Documented special accommodations for test-taking must be cleared several days prior to the test date so that appropriate arrangements can be made.

The tests will be given on the following days:

- 8:00 am, Tuesday, January 22 - Precalculus Skill Test
- 8:00 am, Thursday, February 14 - Test 1
- 8:00 am, Tuesday, March 26 - Test 2
- 8:00 am, Thursday, April 18 - Test 3

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

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

Quizzes (10 @ 20 pts)	200 points
Gateway Exams	50 points
Pre-calculus Skill Test	50 points
Tests (3 @ 100 pts)	300 points
Final	200 points
Total	800 points

In general, letter grades will be determined as follows:

A: 91% and above;    B: 81 – 90%;    C: 71 – 80%;    D: 61 – 70%;    F: less than 60%

Grades of  $A-$ ,  $B+$ ,  $B-$ ,  $C+$ ,  $C-$ ,  $D+$  may be assigned for percentages near the above cut-offs.

**Calculators will NOT be allowed on quizzes or tests.**

**Blackboard Website:** There is a course website **Math.OX111 Calculus I - Spring 2013** on the Blackboard: <http://classes.emory.edu> Homework assignment, extra handouts, announcements, scheduled SI sessions, questions related to problems, and other material can be posted at any time. Students are responsible for checking the site every day and obtaining related information.

**Supplemental Instruction/Help Sessions/Tutoring/Study groups:** The supplemental instruction (SI) leaders will schedule study sessions to review calculus concepts, to help students discover how best to study calculus. The SI is a student who has taken the course (or a similar course) before, has a good understanding of the material, and knows how to be a successful student. Check the Blackboard for scheduled sessions.

**Email** is an official means of communication at Emory. Students are expected to so organize their life that they receive and read Emory email daily. Frequently the instructor needs to tell the class or an individual student something via email.

Contact Mr. Paul Oser, Director of the **Mathematics Center** for tutoring hours, most likely Mondays through Thursdays, 3–6 pm.

Study groups, organized by students are highly recommended.

**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.

**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 9 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.

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

**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.**

## Tentative Calendar:

Monday	Tuesday	Wednesday	Thursday	Friday
Jan 14th	Jan 15th	Jan 16th <u>1</u> <u>§Precalculus</u> Review <sup>1</sup>	Jan 17th	Jan 18th <u>2</u> <u>§Handouts</u> Mathematical Induction
Jan 21st <i>No class MLK holiday</i>	Jan 22nd <small>Last day for changing courses.</small> 8:00 a.m. Precalculus Skill Test	Jan 23rd <u>3</u> <u>§Handouts</u> Mathematical Induction	Jan 24th	Jan 25th <u>4</u> <u>§2.1</u> Preview of Calculus
Jan 28th <u>5</u> <u>§2.2</u> The limit of a function	Jan 29th	Jan 30th <u>6</u> <u>§2.3</u> Calculating limits	Jan 31st	Feb 1st <u>7</u> <u>§2.6</u> Limits at infinity
Feb 4th <u>8</u> Review Limits	Feb 5th	Feb 6th <u>9</u> <u>§2.5</u> Continuity	Feb 7th	Feb 8th <u>10</u> <u>§2.5</u> Intermediate Value Theorem
Feb 11th <u>11</u> <u>§2.7, 2.8</u> Definition of Derivative	Feb 12th	Feb 13th <u>12</u> REVIEW	Feb 14th 8:00 a.m. Test 1	Feb 15th <u>13</u> <u>§3.1, 3.2</u> Differentiation Rules
Feb 18th <u>14</u> <u>§3.3</u> Differentiation Rules	Feb 19th	Feb 20th <u>15</u> <u>§3.4</u> Differentiation Rules	Feb 21st	Feb 22nd <u>16</u> <u>§3.5</u> Implicit Differentiation
Feb 25th <u>17</u> <u>§3.6</u> Derivative of logarithmic functions	Feb 26th	Feb 27th <u>18</u> Continuity and Differentiability	Feb 28th 8:00 a.m. Gateway Exam First opportunity	Mar 1st <u>19</u> <u>§3.9</u> Related Rates
Mar 4th <u>20</u> <u>§3.9</u> Related Rates	Mar 5th	Mar 6th <u>21</u> <u>§3.10</u> Differentials and Approximations	Mar 7th	Mar 8th <u>22</u> <small>Last day to drop.</small> <u>§4.1</u> Maximum and minimum values

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<sup>1</sup>Precalculus Skill Test on January 22nd.

Monday	Tuesday	Wednesday	Thursday	Friday
Mar 11th <i>Spring Break</i>	Mar 12th	Mar 13th <i>Spring Break</i>	Mar 14th	Mar 15th <i>Spring Break</i>
Mar 18th <u>23</u> <u>§4.2</u> Mean Value Theorem	Mar 19th	Mar 20th <u>24</u> <u>§4.3</u> Monotonicity and Concavity	Mar 21st 8:00 a.m. Gateway Exam Second opportunity	Mar 22nd <u>25</u> <u>§4.5</u> Graphing I
Mar 25th <u>26</u> REVIEW	Mar 26th 8:00 a.m. Test 2	Mar 27th <u>27</u> <u>§4.5</u> Graphing II	Mar 28th	Mar 29th <u>28</u> <u>§4.7</u> Optimization problems
Apr 1st <u>29</u> <u>§4.9, 5.4</u> Antiderivatives and Indefinite Integral	Apr 2nd	Apr 3rd <u>30</u> <u>§5.1</u> Summation and Area	Apr 4th	Apr 5th <u>31</u> Last day for freshman drop. <u>§5.2</u> Definite Integral
Apr 8th <u>32</u> <u>§5.3</u> Fundamental Theorem of Calculus	Apr 9th	Apr 10th <u>33</u> <u>§5.5</u> Substitution	Apr 11th 8:00 a.m. Gateway Exam Last opportunity	Apr 12th <u>34</u> <u>§5.5</u> Substitution
Apr 15th <u>35</u> <u>§6.1</u> Area Between Curves	Apr 16th	Apr 17th <u>36</u> REVIEW	Apr 18th 8:00 a.m. Test 3	Apr 19th <u>37</u> <u>§6.2</u> Volume - Disc/washer method
Apr 22nd <u>38</u> <u>§6.3</u> Volume - Shell method	Apr 23rd	Apr 24th <u>39</u> <u>§6.5</u> Average Value of a Function	Apr 25th	Apr 26th <u>40</u> <u>§9.3</u> Differential Equations
Apr 29th <i>Last day of classes</i>	Apr 30th <i>Reading Day</i>	May 1st <u>41</u>	May 2nd	May 3rd <u>42</u>