Math 111 Calculus I
Fall 2019

Instructors: Dr. Jonathan Hulgan Dr. Nicolas Petit
Email: jonathan.hulgan@emory.edu nicolas.petit@emory.edu
Office: Pierce 122 Pierce 126
Phone: 770-784-4509 770-784-8516
Office Hours: TuTh 2:30–5:00 PM M 2:00–5:00 PM, W 9:00–10:00 AM, Th 3:00–6:00 PM

Text Material: James Stewart, Single Variable Calculus: Early Transcendentals, 8th Edition; additional resources will be posted on Canvas.

Course Content: Mathematics 111 is the first semester of introductory calculus. Course content includes: limits; continuity; the derivative; differentiation of algebraic, trigonometric, and the natural logarithmic and exponential functions; applications of derivatives; anti-derivatives; the definite integral; simple integration by substitution; and applications of the definite integral. A calendar of topics is provided at the end of this syllabus.

Course Goals: Upon successful completion of Math 111 students will:

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 rate 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.

Prerequisites: Mathematics 111 is a beginning course: no prior exposure to calculus is needed! However, an advanced understanding of pre-calculus concepts (including algebra, logarithms and exponents, and trigonometry) and skill in applying them is necessary to perform well in the course.

Course Success: Mathematical ability is a skill—just like riding a bicycle or playing an instrument. As with any other skill, one’s mathematical ability can be developed and improved through mindful and intentional practice. Students who thoughtfully engage with course material on a regular basis are more likely to demonstrate a high level of performance on tests. A collection of suggested problems will be provided at most class meetings; each assignment should be completed before the next class. A homework assignment is not considered “complete” until the student is able to produce a
full solution for each problem without any sort of assistance. The amount of time required to com-
plete a homework assignment can vary from student to student, but mastering each assignment is the
most important aspect of preparation for this course; it is worth investing the time necessary to do it!

Grading: Course grades will be determined as follows:

<table>
<thead>
<tr>
<th>Component</th>
<th>Points</th>
</tr>
</thead>
<tbody>
<tr>
<td>Class Participation</td>
<td>50</td>
</tr>
<tr>
<td>Online Practice</td>
<td>100</td>
</tr>
<tr>
<td>Problem Sets</td>
<td>200</td>
</tr>
<tr>
<td>Gateway Exam</td>
<td>50</td>
</tr>
<tr>
<td>Tests (4 x 100 pts)</td>
<td>400</td>
</tr>
<tr>
<td>Final Exam</td>
<td>200</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td><strong>1000</strong></td>
</tr>
</tbody>
</table>

Letter grades will be determined based on the total points each student earns: A: at least 900 points; B: 800–899 points; C: 700–799 points; D: 600–699 points; F: fewer than 600 points. Plus and minus grades may be assigned for sums of points near cut-off values.

Class Participation: Coming to class and engaging with the day’s material can make the difference be-
tween succeeding and failing in this class. To motivate you to be an active member of the class,
you’ll be assigned a participation grade. Any student that regularly comes to class, is attentive,
participates and generally contributes to a positive classroom atmosphere will get the full amount
of points. Conversely, being unjustifiably absent or late for class, being inattentive (e.g. by looking
at your cellphone) or not engaging in group work are all things that will lower your participation grade.

Online Practice: In this class, we will use the online homework platform WeBWorK. A short set of prob-
lems will be assigned daily, and must be completed within the allotted time (typically, the deadline will
be the day after the next lecture). After an assignment closes you won’t be able to make any changes,
so make sure to complete them ahead of the deadline. Note that every person gets the same type of
problem, but with slightly different values; so you are welcome to work together on the homework, but
every person will have a slightly different answer (that is constructed in the same way). Be also aware
that you will typically have a finite amount of chances to submit the answer to every problem; so make
sure to preview your answer before you submit it, to make sure it looks the way you want. You can
find our WeBWorK website at https://courses1.webwork.maa.org/webwork2/Emory-Math111.

Problem Sets: Most weeks, a small collection of problems will be assigned for a grade. These assignments
serve as an incentive for students to keep current with the course material, as well as a means to
provide formative feedback on solution technique and style in preparation for each test. The lowest
problem sets will be dropped for each student; the average of the remaining scores will be used to
determine each student’s overall problem set grade.

Gateway Exam: In order to pass this course, the student must pass an examination on applying deriva-
tive rules. All 50 points will be given for a perfect paper while having only one mistake will earn 35
points; papers with more than one mistake will receive no grade. Students will have three opportu-
nities to pass the gateway exam and must take each scheduled exam until one is passed. Students
may re-test for a better score with no penalty.

Tests: Four tests will be given throughout the semester on the Tuesday and Thursday mornings indicated
on the course calendar at the end of this syllabus. Students are expected to take tests at the sched-
uled times. Conflicts, problems and emergencies will be handled on an individual basis; arrangements
for legitimate conflicts must be made far in advance to take a test prior to the scheduled testing time.
Final Exam: The final exam is comprehensive and will be given according to the exam schedule. Students, including students with related accommodations from the Office of Accessibility Services (OAS), must follow the posted exam schedule. Students must secure the approval of the associate dean of academic affairs to take a final exam earlier or later than scheduled. Permission will also be granted for students scheduled to take three exams on a single calendar day (not three exams within a general twenty-four-hour period). Students must document their situation with the associate dean for academic affairs no later than April 1 in spring semester and December 1 in fall semester. Students in this situation may be granted permission to take one of their exams at an alternate date and time within the official exam period. Students may not select which exam is rescheduled.

Honor Code: Oxford College is a community of scholars. As scholars, we are interested in pursuing truth and becoming more adept at our individual contribution to this pursuit. As a community, we have certain expectations of—and responsibilities to—each other in our scholarly endeavors. The Honor Code is the document detailing expected behaviors as members of this community, as well as the means by which these expectations are upheld; a copy of this document is available at http://oxford.emory.edu/catalog/regulations/honor-code.html.

Generally, if permission is not given in writing to use a certain resource—including collaboration with other people—then any use of that resource in the completion of an assignment constitutes a violation of the Honor Code. While completing in-class assignments, all personal papers and cell phones must be put away for the duration of the assessment. Students who have taken an exam or test must not discuss the content or nature of the assessment until all students have completed the assignment. Any graded out-of-class assignments should be completed using only the resources explicitly permitted in that assignment’s written instructions. The guidelines listed here are not intended to be exhaustive; if you are uncertain about any aspect of how an assignment is to be completed, ask first!

Written Style: Thoughts are expressed through sentences, even in mathematics. Mathematical arguments will often use symbols to efficiently convey complex ideas, but these notions are still communicated through sentences. Note “1+1 = 2” is a complete sentence: it has the subject “1+1”, verb “=” , and predicate “2”. It is important to clearly communicate solutions using appropriate mathematical symbols and complete sentences; pertinent work needs to be neat and orderly to be intelligible. Taking time to be neat while working problems often eliminates careless mistakes and allows the writer (and ultimately, the audience) to focus on the main concept at hand.

Absences: It is the student’s responsibility to notify the instructor as soon as possible in the event of an absence from an assessment. If an excused absence from a test is known in advance—such as those due to official school functions or religious holidays—arrangements can be made to take the test ahead of time. Missing a test due to an emergency will be handled on a case-by-case basis; such absences must be documented (e.g. a doctor’s note in case of illness) in order to be excused.

Religious Holidays: Instructors are encouraged, not required, to accommodate students’ academic needs related to religious holidays. Please make every effort to negotiate your religious holiday needs within the first two weeks of the semester; waiting longer may compromise your instructor’s ability to extend satisfactory arrangements. If you need guidance negotiating your needs related to a religious holiday, the College Chaplain, Rev. Lyn Pace, ppace@emory.edu, Candler Hall 202, is willing and available to help. Please be aware that Rev. Pace is not tasked with excusing students from classes or writing excuses for students to take to their professors. Emory’s official list of religious holidays may be found at http://www.religiouslife.emory.edu/faith_traditions/holidays.html.
Accessibility: If you have a documented disability and have anticipated barriers related to the format or requirements of this course, or presume having a disability (e.g. mental health, attention, learning, vision, hearing, physical or systemic), and are in need of accommodations for this semester, we encourage you to contact the Office of Accessibility Services (OAS) to learn more about the registration process and steps for requesting accommodations at oas.oxford@emory.edu. If you are a student that is currently registered with OAS and have not requested or received a copy of your accommodation notification letter, please notify OAS immediately.

Students who have accommodations in place are encouraged to coordinate with their professor during the first week of the semester, to communicate specific needs for the course as it relates to approved accommodations. Accommodations may not be implemented until the instructor is provided an accommodation letter and discusses the accommodation plan for this course face to face with the OAS student. Accommodations may not be implemented retroactively. All discussions with OAS and faculty concerning the nature of your disability remain confidential. For additional information regarding OAS, please visit the website: http://accessibility.emory.edu.

Inclusivity: Oxford College of Emory University’s ideals of inclusivity compel us to foster an environment where people of diverse backgrounds, identities, abilities, and ideologies are affirmed, respected, and seen as a source of strength—where we strive to learn together, and ultimately thrive communally. When these ideals are not upheld, we encourage discussion to better understand and spur action towards improvement. In my teaching, I always aim to challenge your thinking, but never to challenge your identity. If there is anything I can do to help you feel more comfortable and engaged (pronoun usage, calling on you more often, calling on you less frequently, etc.), please let me know.

Support Services: Students should utilize the following resources:

- **Office Hours:** Changes to office hours will be posted on Canvas. These times vary due to meetings and other obligations, but most days should have some availability.

- **Canvas:** Announcements and important documents will be posted on the course’s Canvas site. The student is responsible for regularly checking the site for new announcements and resources, including homework assignments and handouts.

- **Supplemental Instruction:** Supplemental instructors are sophomores who have previously taken the course and know how to be a successful student in it. Each SI will offer a weekly session to review course content and provide advice on how to prepare for the course. Attendance is optional, but students often find these sessions very helpful.

- **Math Center:** Student tutors are generally available in the Math Center in Pierce Hall Monday through Thursday afternoons. Additional online resources from the Math Center are available at http://mathcenter.oxford.emory.edu.

- **Study Groups:** When used appropriately, study groups can be a useful tool in learning mathematics. Study groups should complement and enrich individual study of course material; with particular regard to homework assignments, it is suggested that study groups discuss completed (or attempted) assignments rather than work through homework problems for the first time.

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 assignment and in this syllabus.
<table>
<thead>
<tr>
<th>MONDAY</th>
<th>TUESDAY</th>
<th>WEDNESDAY</th>
<th>THURSDAY</th>
<th>FRIDAY</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>Introduction to calculus</td>
<td>Precalculus review</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Sep 2nd</td>
<td>Sep 3rd</td>
<td>Sep 4th</td>
<td>Sep 5th</td>
<td>Sep 6th</td>
</tr>
<tr>
<td>NO CLASS</td>
<td></td>
<td>Mathematical induction</td>
<td>Tangent line,</td>
<td></td>
</tr>
<tr>
<td>(Labor Day</td>
<td></td>
<td></td>
<td>velocity, and other rates</td>
<td></td>
</tr>
<tr>
<td>Holiday)</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Sep 9th</td>
<td>Sep 10th</td>
<td>Sep 11th</td>
<td>Sep 12th</td>
<td>Sep 13th</td>
</tr>
<tr>
<td>Limits</td>
<td></td>
<td>Squeeze theorem</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Sep 16th</td>
<td>Sep 17th</td>
<td>Sep 18th</td>
<td>Sep 19th</td>
<td>Sep 20th</td>
</tr>
<tr>
<td>Comparison of</td>
<td></td>
<td>Continuity</td>
<td></td>
<td></td>
</tr>
<tr>
<td>functions</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Sep 23rd</td>
<td>Sep 24th</td>
<td>Sep 25th</td>
<td>Sep 26th</td>
<td>Sep 27th</td>
</tr>
<tr>
<td>The derivative</td>
<td></td>
<td>Test 1 wrap-up</td>
<td>Test 1 (8:00AM)</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Sep 30th</td>
<td>Oct 1st</td>
<td>Oct 2nd</td>
<td>Oct 3rd</td>
<td>Oct 4th</td>
</tr>
<tr>
<td>Basic</td>
<td></td>
<td>Trigonometric derivatives</td>
<td></td>
<td></td>
</tr>
<tr>
<td>derivative</td>
<td></td>
<td></td>
<td></td>
<td>Chain rule</td>
</tr>
<tr>
<td>rules</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Implicit</td>
<td></td>
<td>Additional derivative</td>
<td>Gateway 1 (8:00AM)</td>
<td></td>
</tr>
<tr>
<td>differentiation</td>
<td></td>
<td>rules</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Oct 14th</td>
<td>Oct 15th</td>
<td>Oct 16th</td>
<td>Oct 17th</td>
<td>Oct 18th</td>
</tr>
<tr>
<td>No CLASS</td>
<td></td>
<td>Differentials and</td>
<td></td>
<td></td>
</tr>
<tr>
<td>(Fall Break)</td>
<td></td>
<td>approximation</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Monday</td>
<td>Tuesday</td>
<td>Wednesday</td>
<td>Thursday</td>
<td>Friday</td>
</tr>
<tr>
<td>--------------</td>
<td>------------------------</td>
<td>-------------------</td>
<td>---------------------</td>
<td>-------------------------</td>
</tr>
<tr>
<td>Test 2 wrap-up</td>
<td>Test 2 (8:00AM)</td>
<td>Mean value theorem</td>
<td></td>
<td>Monotonicity and concavity</td>
</tr>
<tr>
<td>Oct 28th</td>
<td>Oct 29th</td>
<td>Oct 30th</td>
<td>Oct 31st</td>
<td>Gateway 2 (8:00AM)</td>
</tr>
<tr>
<td>Graphing I</td>
<td></td>
<td>Graphing II</td>
<td></td>
<td>Optimization problems</td>
</tr>
<tr>
<td>Nov 4th</td>
<td>Nov 5th</td>
<td>Nov 6th</td>
<td>Nov 7th</td>
<td>Nov 8th</td>
</tr>
<tr>
<td>Antiderivatives and substitution</td>
<td></td>
<td>Differential equations</td>
<td></td>
<td>Summation and area</td>
</tr>
<tr>
<td>Nov 11th</td>
<td>Nov 12th</td>
<td>Nov 13th</td>
<td>Nov 14th</td>
<td>Nov 15th</td>
</tr>
<tr>
<td>Test 3 wrap-up</td>
<td>Test 3 (8:00AM)</td>
<td>Integration</td>
<td></td>
<td>Average value</td>
</tr>
<tr>
<td>Nov 18th</td>
<td>Nov 19th</td>
<td>Nov 20th</td>
<td>Nov 21st</td>
<td>Nov 22nd</td>
</tr>
<tr>
<td>Fundamental theorems of calculus</td>
<td></td>
<td>Substitution</td>
<td>Gateway 3 (8:00AM)</td>
<td>Net change</td>
</tr>
<tr>
<td>Nov 25th</td>
<td>Nov 26th</td>
<td>Nov 27th</td>
<td>Nov 28th</td>
<td>Nov 29th</td>
</tr>
<tr>
<td>Area I</td>
<td></td>
<td>No Class</td>
<td></td>
<td>No Class</td>
</tr>
<tr>
<td></td>
<td></td>
<td>(Thanksgiving</td>
<td></td>
<td>(Thanksgiving</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Recess)</td>
<td></td>
<td>Recess)</td>
</tr>
<tr>
<td>Dec 2nd</td>
<td>Dec 3rd</td>
<td>Dec 4th</td>
<td>Dec 5th</td>
<td>Dec 6th</td>
</tr>
<tr>
<td>Area II</td>
<td></td>
<td>Test 4 wrap-up</td>
<td>Test 4 (8:00AM)</td>
<td>Final review</td>
</tr>
<tr>
<td>Dec 9th</td>
<td>Dec 10th</td>
<td>Dec 11th</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Course wrap-up</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Dec 12th</td>
<td>Final Exams</td>
<td>08: 12/17 at 9AM</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>09: 12/17 at 2PM</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>10: 12/16 at 2PM</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Dec 13th</td>
<td>Final Exams</td>
<td>11: 12/13 at 2PM</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>01: 12/12 at 9AM</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>