Math 111 Course Syllabus
Fall 2016 - Sections 09A & 10A (Oser)

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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.

Mathematics 111 is a beginning course: no prior exposure to calculus is needed! However, a firm background in pre-calculus concepts (including algebra, logarithms and exponents, and trigonometry) is necessary to perform well in the course. A list of specific topics by day 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; Mathematics 111 and 112 provide the student with a year of college calculus.

Text Material: Handouts and Notes are located at the Blackboard online course site. James Stewart's *Single Variable Calculus: Early Transcendentals, 7th Edition* is suggested as a reference.

Class Attendance: The student is responsible for the course material 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.

Electronics: No electronics of any sort will be permitted during assessments. During lectures, students are encouraged to use devices responsibly: large-screen devices (e.g. laptops and tablets) may be used to access electronic copies of the text and lecture notes; small-screen devices (e.g. cell phones) should be used sparingly, if at all. Research seems to indicate that taking notes with pencil and paper is more effective than recording them electronically; if you feel the need to have an electronic copy of your notes, it is suggested to initially record them the old-fashioned way in class and type/write them on your device of choice after class. Calculators will not be used in this course.

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

Major Tests (3 × 120 pts)	360 points
Quizzes (6 out of 9 @ 25 pts each)	150 points
Short Answer Questions (unannounced)	60 points
Graphing Portfolio	130 points
Gateway Exam	50 points
Final Exam	250 points
TOTAL	1000 points

In general, letter grades will be determined as follows, based on 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. Grades of A-, B+, B-, C+, C-, D+ may be assigned for sums of points near these cut-off totals.

Homework: Homework assignments included in the handouts are for the student's benefit and will not be collected; however, these are considered a mandatory component of the course! It is important that each student thoughtfully complete most of the problems assigned. The student will need to spend **at least 8 good hours** of study each week, not counting time spent reviewing for tests. Merely looking over a solution is no replacement for actually working it through for yourself; worse yet, trying to memorize a solution is almost always a waste of time and effort.

Students should keep current with the course material. Cramming for calculus tests often results in poor grades and forgotten material; this course builds on previous work and so it is vital to regularly practice both new and old material. Students should get at least 6 hours of good rest prior to taking a calculus test; otherwise, the law of diminishing returns kicks in and students will lose more than they retain. Marathon studying does not work in calculus! Students who have had some calculus previously sometimes fail to study appropriately.

Gateway Exam: In order to pass this course, the student must pass a timed examination on derivatives. All 50 points will be given for a perfect paper on the Gateway Exam. There will be three opportunities for the student to earn all 50 points with a perfect paper. If the student has only one mistake, the student may choose to keep a score of 35 points. More than one mistake will receive a score of zero. Students making at least 35 on Gateway Exam 1 will receive a bonus of 20 points. Students must take each scheduled gateway exam until one is passed. Students may re-test for a better score with no penalty. Passing the Gateway Exam is a requirement for passing this course (Goal 4).

Previous Gateway Exams are available on Blackboard. The Gateway Exam will be given during class on September 19 and October 3; a third exam will be given outside of class later in October. Any student not passing one of the scheduled Gateway Exams and who attempted all three exams may petition the instructor to take a fourth Gateway Exam during the last week of classes.

Quizzes: All quizzes are announced on the syllabus. A student must be present in class to take the quiz. There is no provision for making up quizzes since many will be dropped. The Student Honor Code applies to the taking of these quizzes. In particular, the content of these quizzes should not be discussed until after they are graded and returned to you.

Each quiz will be graded on a basis of 25 points although some quizzes may contain bonus points. A minimum of nine quizzes will be given; the best two from each set of three quizzes will be used as part of the grade determination for this course. Quiz problems will be similar to problems from the notes and handouts, including the homework assignments.

Short Answer Questions: These will be unannounced, occur at the beginning of some classes, and consist of single problems or short discussions of concepts. The average score on all of these questions taken over the course of the semester will be scaled to 60 points for the purposes of grade calculations.

Graphing Portfolio: Computing derivatives of functions and determining what they tell us about the original function are key components of this course. Each student will use software to create images using functions similar to those encountered in class. Two or three of these images will be technical in nature, exhibiting data produced by derivatives, while the remaining images will be thematic, artistic in style and linked by a common theme. Detailed instructions for this assignment will be provided in class and on Blackboard.

Major Tests: Tests will be given on Friday afternoons on September 23, October 21, and December 2. The final exam will be given according to the exam schedule and will be comprehensive.

Students are expected to take tests at the scheduled times. Conflicts, problems and emergencies will be handled on an individual basis. For reasons deemed legitimate by your professor, arrangements may be made for a student to take a test prior to the testing time. Arrangements must be made several days in advance.

Any student requiring 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.

Responsibilities of the Student: As far as this course, each student needs to attend class regularly, to actively participate in the learning process both during class and outside of class, and to use the available support services in order to reach the expected competence level required in this course. Each student has the following responsibilities:

1. Come prepared and on time to every class.
2. Complete all work on time with proper thought.
3. Consider that adequate understanding of a concept may not always occur by the end of the lecture. Use your outside help (office hours, SI sessions, online course material).
4. Treat the instructor and peers with respect.
5. Ask questions. Asking questions is a sign of maturity, not ignorance, as long as the student thinks clearly before asking.
6. Understand that the instructor is not trying to "nit pick" when grading and remember that grading is the responsibility of the instructor. Accuracy is important in this class!

Responsibilities of the Instructor: As far as this course, the instructor is a facilitator of student learn-

ing and as such, should provide materials and the environment to enable students to learn what is expected. The instructor has the following responsibilities:

1. Come prepared to every class.

2. Design each class so students can accomplish the cognitive objectives listed in the syllabus.

3. Provide advice for studying and study materials as appropriate.

4. Establish and foster a mutually respectful classroom environment.

5. Return tests and quizzes in a timely manner so that students will know their grade.

6. Grading, as far as possible, is to be consistent and impersonal even though students might not agree with the decisions concerning partial credit.

Support Services: Students should utilize the following 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.

- **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, including homework assignments and handouts. These handouts provide problems and explanations for the material being studied.

- **Supplemental Instruction:** Supplemental instructors are sophomores who have taken the course before and know how to be a successful student in it. Each SI will schedule a weekly session to review course content and help students discover how best to study calculus. Each student is encouraged to attend regularly. Even though these sessions are optional, students who regularly attend SI sessions generally do better in the courses for which there are SI leaders.

- **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.

Special Accommodations: Access, Disability Services and Resources (ADSR) works with students who have disabilities to provide reasonable accommodations. In order to receive consideration for reasonable accommodations, students must contact ADSR and complete the registration process. Faculty may not provide disability accommodations until an accommodation letter has been processed; accommodations are not retroactive. Students registered with ADSR who receive a letter outlining specific academic accommodations are strongly encouraged to coordinate a meeting time with their professor to discuss a protocol to implement the accommodations as needed throughout the semester. This meeting should occur as early in the semester as possible. Contact Access, Disability Services and Resources for more information at (770) 784-4690 or adsroxford@emory.edu. Additional information is available at the ADSR website at http://equityandinclusion.emory.edu/access/students/index.html.

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. Taking time to be neat while working mathematical problems has been shown to eliminate many careless mistakes and to allow the student to focus on conceptual misunderstandings.

Organizational Guidelines:

- As soon as you get your syllabi from your courses, put important dates on a single calendar, clearly labeled.

- Stay current in each of your courses by setting aside 8 to 10 hours per week per course to study and really grapple with the material. You may need more time in some subjects. Spread your per-subject time out over the week. Marathon studying, especially in mathematics, does not work well! So, make a schedule and keep to it! Be flexible enough to make changes in your schedule but don't schedule marathon studying.

- Plan ahead so that you get enough sleep before a test so you will be able to think clearly and logically.

- Take advantage of the available outside help for each of your courses. Schedule at least one SI session per week for Math 111.

- Plan ahead for all your papers and projects so that studying for tests is not compromised. Create and schedule mini-goals to attain the major goal of completion on time.

- Have needed supplies for each course. Make sure you get copies of the handouts from Blackboard prior to the class for which they are needed.

- Follow each syllabus carefully. For Math 111, your homework is provided in the notes and handouts for each class meeting. Reading the handout before coming to class will help your understanding.

Closing Advice:

- **How much to study:** Calculus, to some, is a hard subject. It may be your most challenging course this semester. You should spend around 10 hours a week studying calculus, even if you have seen it before. Don't assume you know the material! Extra time is needed to complete quizzes and the projects. If you cannot make this level of time commitment this semester you will likely be better off taking calculus at another time.

- **How to study:** Students often find calculus texts hard to read. They are not to be read like a novel, or a history or even a biology text. Your text is a reference book. After class, read your notes and/or handouts obtained from the online course and the textbook, as needed. Don't expect to understand fully much of what you've read until you start working on the exercises. In fact, you should spend most of your study time working problems, thinking about those problems, and discussing problems. When you get stuck, go back and re-read your notes, handouts, and/or the textbook, studying the examples and derivations long enough to find how to proceed.

- **Homework:** Work lots and lots of problems. When you finish the current section, you should go back and work review problems. Furthermore, you have not completed the homework just because you have the right answers, you must understand **why** your methods worked. If all you are doing is blindly applying formulas and mimicking examples, get extra help: the problems

should make logical sense to you. You must get to the point where you are able to work problems correctly, from start to finish, without having to flip back to the answer or to previous work. Taking time to reflect on your work helps to build confidence, speed, and retention.

- **Studying for tests:** Imagine an athlete who slacked off during the weeks before a big track meet, doing just enough so that their coach wouldn't get on their case; if they then stayed up running the whole night before the meet, they would get crushed by the competition! Many students prepare for tests by cramming: they procrastinate and then believe that they can stuff in what they need for success by staying up all night attempting to study. Your brain will not to be in top shape by marathon studying; the right way to study is to do your work at a steady pace throughout the semester. There are a few facts and formulas you'll need to remember for a test; make note cards for those facts and formulas and touch base with them often. In order to think well, you need to rest sufficiently and exercise adequately. Remember that aerobic exercise circulates blood to the body, including the brain.

- **Come to class and use outside help:** Many college students treat class attendance as optional. This may be fine for some classes; however, for calculus you can get way behind very fast. You should come to every class meeting unless you are seriously ill. Schedule at least one SI session per week. Stop by and see your instructor during office hours to ask pertinent questions. Take charge of your learning!

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.

TOPICS BY DAY
Math 111, Fall 2016

- Handouts, homework, and class notes are on the Blackboard online course.

- Refer to Blackboard for homework assignments.

- Come to class ready to work problems, not merely to copy or observe the instructor.

- Read the syllabus carefully; you are responsible for the content.

Monday	Wednesday	Friday
Aug 22nd	Aug 24th **1** Introduction to Calculus **Diagnostic Exam**	Aug 26th **2** Limits
Aug 29th **3** Continuity	Aug 31st **4** Limits and Continuity; Intermediate Value Theorem	Sep 2nd **5** Definition of Derivative; Tangent Lines **Quiz 1**
Sep 5th No Class (Labor Day Holiday) *Drop/Add Ends on Sep 6*	Sep 7th **6** Basic Rules of Differentiation	Sep 9th **7** Chain Rule **Quiz 2**
Sep 12th **8** Logarithmic Differentiation; Higher Order Derivatives	Sep 14th **9** Continuity and Differentiability	Sep 16th **10** Implicit Differentiation **Quiz 3**
Sep 19th **11** Review of Differentiation **Gateway Exam 1**	Sep 21st **12** Test 1 Wrap-Up	Sep 23rd **13** Test 1 Review (In Class) **Test 1 (Afternoon)**
Sep 26th **14** Related Rates	Sep 28th **15** Related Rates; Mean Value Theorem	Sep 30th **16** Extrema on an Interval; Graphing Polynomials **Quiz 4**
Oct 3rd **17** Graphing Polynomials **Gateway Exam 2**	Oct 5th **18** Infinite Limits; Limits at Infinity	Oct 7th **19** Graphing Rational Functions; **Quiz 5**

Monday	Wednesday	Friday
Oct 10th No Class (Fall Break)	Oct 12th **20** Graphs with Vertical Tangents; Other Graphs *Last Day to Withdraw*	Oct 14th **21** Review Graphing **Quiz 6**
Oct 17th **22** Test 2 Wrap-Up	Oct 19th **23** Test 2 Review	Oct 21st *Georgia Math Conference* **Test 2 (Afternoon)**
Oct 24th **24** Optimization	Oct 26th **25** Antiderivatives	Oct 28th **26** Sums and Sigma Notation; Mathematical Induction **Quiz 7**
Oct 31st **27** Mathematical Induction	Nov 2nd **28** Definite Integral and Area; Fundamental Theorem of Calculus	Nov 4th **29** Integration by Substitution
Nov 7th **30** Mean Value Theorem for Integrals **Quiz 8**	Nov 9th **31** Introduction to Differential Equations; Separation of Variables	Nov 11th **32** Area Between Curves *Last Day for Freshman Withdrawal*
Nov 14th **33** Volumes of Revolution– Disk Method	Nov 16th **34** Volumes of Revolution– Shell Method	Nov 18th **35** Volumes of Revolution– Both Methods **Quiz 9**
Nov 21st **36** Graphing Portfolio Exhibition **Graphing Portfolios Due**	Nov 23rd No Class (Thanksgiving Recess)	Nov 25th No Class (Thanksgiving Recess)
Nov 28th **37** Area and Volume Recap	Nov 30th **38** Test 3 Wrap-Up	Dec 2nd **39** Test 3 Review (In Class) **Test 3 (Afternoon)**
Dec 5th **40** Final Exam Review *Last Day of Classes*	Dec 7th	Dec 9th 09A Exam Dec. 12 at 9:00 A.M. 10A Exam Dec. 13 at 9:00 A.M. 12A Exam Dec. 13 at 7:00 P.M.