Math 112 Calculus II

Spring 2018

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Office Hours: To be announced on Canvas.

Text Material: James Stewart, *Single Variable Calculus: Early Transcendentals, 7th Edition*; additional resources will be posted on Canvas.

Course Content: Mathematics 112 is the second semester of introductory calculus. Course content includes: analysis of exponential and logarithmic functions; methods of integration; indeterminate forms; improper integrals; polar coordinates; infinite sequences and series; power series; and differential equations. A calendar of topics is provided at the end of this syllabus.

Course Goals: Building upon Calculus I, students should know and/or demonstrate:

1. A basic understanding of derivative, of anti-derivative, and of limit.
2. Use the rules of differentiation as they apply to algebraic and transcendental functions.
3. Evaluate a variety of limits and appropriately interpret findings.
4. Sketch graphs of transcendental functions by building on concepts from Calculus I.
5. All variations for the u-substitution method of integration, definite and indefinite integrals.

Additional goals for Calculus II, students should know and demonstrate:

6. New methods of integration (parts, trigonometric substitution, partial fractions) for typical indefinite, definite, and improper integrals.
7. Be able to graph and to find area using simple polar coordinate expressions.
8. Determine convergence of appropriate infinite series by giving logical arguments.
9. A basic understanding of power series and be able to determine the domain of appropriate power series.
10. Be able to derive a power series expression for specified transcendental expressions using a geometric series or Taylor's Theorem.
11. Be able to solve simple first-order differential equations (separable, exact, linear).

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, test, or quiz must not discuss the content or nature of the assessment until all students have completed the assignment.

Any graded out-of-class assignments—including reflection problems and some quizzes—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!

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 perform better on assessments than those who elect to be absent occasionally. Students accumulating an inordinate number of absences will be referred to the associate dean of academic affairs. In addition to the regular class meetings, tests are scheduled for certain Tuesday and Thursday mornings.

Homework: Students who thoughtfully engage with course material on a regular basis are more likely to demonstrate a high level of performance on tests and quizzes. 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 complete 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! Any resource may be used in the completion of daily homework assignments.

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. There is no provision for making up missed quizzes since many will be dropped.

Grading: Course grades will be determined as follows:

Quizzes	200 points
Reflection Problems	150 points
Tests (4 × 100 pts)	400 points
Final Exam	250 points
TOTAL	1000 points

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.

Quizzes: To further incentivize keeping current with the course material, we will have quizzes regularly throughout the semester. Students who have completed recent homework assignments will be well-prepared for the problems appearing on each quiz. Approximately one-fifth of each student's lowest quizzes will be dropped. The average of the remaining quiz scores will be used to determine each student's overall quiz grade.

Reflection Problems: A large portion of high school mathematics courses are devoted to computation; being able to apply correct calculative procedures is important, but it is not "the point" of mathematics. Being able to develop a systematic approach to solving novel complex problems and then clearly and completely explaining their solutions are also important components of developing one's mathematical ability. Throughout the semester, four challenging problems will be assigned. These problems will vary in style and content, but will require using the skills and knowledge acquired from studying calculus—perhaps in a way different from problems seen in class or the homework. Each problem will have three components: an initial individual attempt at solving the problem, a final solution developed and revised within a team, and a brief written reflection on your thought process while working on the problem. More specific guidelines will be provided on Canvas.

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 scheduled times. Conflicts, problems and emergencies will be handled on an individual basis. For legitimate excuses, arrangements may 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 must obtain the permission of the Senior Associate Dean of academic affairs to take a final exam earlier or later than scheduled. Permission is normally granted for documented family emergencies, documented medical reasons, or for participation in educational programs. 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 with three exams on one calendar day must document their situation with the Senior Associate Dean no later than 5:00 p.m. on Reading Day. Students in this situation will be granted permission to work with one of their instructors to arrange to take one of their exams at an alternate date and time within the official exam week. Leaving early for rides or flights, vacations, relatives' or friends' weddings or graduations, jobs, or having two exams on one day, and other situations, are not considered valid reasons to request an earlier or later exam.

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: The Office of Accessibility Services (OAS) works with students who have disabilities to provide reasonable accommodations. In order to receive consideration for reasonable accommodations, please contact the OAS and complete the registration process. Faculty may not legally provide you with accommodations until an accommodation letter has been processed and discussed with them; accommodations do not start until this point and are not retroactive. Students registered with OAS who receive a letter outlining specific academic accommodations are thus strongly encouraged to immediately coordinate a meeting with their professors to discuss a protocol to implement accommodations that will (or may) be needed over the course of the semester. This meeting should occur as early in the term as possible. Contact Megan Bohinc in OAS for more information at (770)784-4690 or `oas_oxford@emory.edu`.

Inclusivity: Oxford College of Emory University's ideals of inclusivity require that we 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. If we at all fail to support these ideals, then we encourage discussion towards improvement, and we hope that this statement affirms your right to seek those discussions via dialogue with faculty, staff, your peers, and the use of the "Speak Up!" system when needed.

Support Services: Students should utilize the following resources:

- **Office Hours:** Office hours will be posted on Canvas. These times vary due to meetings and other obligations, but most afternoons 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://www.oxfordmathcenter.com`.
- **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.

A student's submission of any work to be evaluated for course credit constitutes a declaration that he or she has neither given nor received unauthorized information on the work, nor has condoned the giving or receiving of unauthorized information by others.

Each student at Oxford College of Emory University agrees to abide by the honor pledge and takes upon himself or herself the responsibility of upholding the Honor Code. Each student is urged to inquire of the Honor Council about any doubtful case at any time throughout the year.

Read the full Honor Code at `http://oxford.emory.edu/catalog/regulations/honor-code.html`

TOPICS BY DAY
Math 112, Spring 2018

Monday	Tuesday	Wednesday	Thursday	Friday
Jan 15th	Jan 16th	Jan 17th **1** Review of limits	Jan 18th	Jan 19th **2** L'Hospital's rule
Jan 22nd **3** Graphing exponential and logarithmic functions	Jan 23rd	Jan 24th **4** Graphing exponential and logarithmic functions	Jan 25th	Jan 26th **5** Review of integration
Jan 29th **6** Integration by parts	Jan 30th	Jan 31st **7** Trigonometric integrals	Feb 1st	Feb 2nd **8** Trigonometric substitution
Feb 5th **9** Partial fractions	Feb 6th	Feb 7th **10** Partial fractions	Feb 8th	Feb 9th **11** Review of integration techniques
Feb 12th **12** Test 1 wrap-up	Feb 13th Test 1	Feb 14th **13** Improper integrals	Feb 15th	Feb 16th **14** Arc length and surface area
Feb 19th **15** Polar coordinates	Feb 20th	Feb 21st **16** Polar coordinates	Feb 22nd	Feb 23rd **17** Differential equations
Feb 26th **18** Differential equations	Feb 27th	Feb 28th **19** Infinite sequences	Mar 1st	Mar 2nd **20** Infinite series
Mar 5th **21** Infinite series	Mar 6th	Mar 7th **22** Test 2 wrap-up	Mar 8th Test 2	Mar 9th **23** nth term test and p-series

Monday	Tuesday	Wednesday	Thursday	Friday
Mar 12th No Class (Spring Break)	Mar 13th	Mar 14th No Class (Spring Break)	Mar 15th	Mar 16th No Class (Spring Break)
Mar 19th **24** Integral test	Mar 20th	Mar 21st **25** Comparison tests	Mar 22nd	Mar 23rd **26** Comparison tests
Mar 26th **27** Alternating series	Mar 27th	Mar 28th **28** Ratio and root tests	Mar 29th	Mar 30th **29** Review of infinite series
Apr 2nd **30** Review of infinite series	Apr 3rd	Apr 4th **31** Power series (on Test 4)	Apr 5th	Apr 6th **32** Power series (on Test 4)
Apr 9th **33** Test 3 wrap-up	Apr 10th Test 3	Apr 11th **34** More power series	Apr 12th	Apr 13th **35** More power series
Apr 16th **36** Taylor and Maclaurin series	Apr 17th	Apr 18th **37** Taylor and Maclaurin series	Apr 19th	Apr 20th **38** Review of power series
Apr 23rd **39** Test 4 wrap-up	Apr 24th Test 4	Apr 25th **40** Parametric equations	Apr 26th	Apr 27th **41** Parametric equations
Apr 30th **42** Final review (Last Day of Class)	May 1st	May 2nd	May 3rd	May 4th **Final Exams** 09A: 5/9 at 9am 10A: 5/2 at 9am 12A: 5/3 at 2pm 01A: 5/3 at 9am