

MATH 112 CALCULUS II

SPRING 2019

Instructors:	Jonathan Hulgán	Christina Lee
Email:	jonathan.hulgan@emory.edu	christina.h.lee@emory.edu
Office:	Pierce 122	Pierce 120
Phone:	4-4509	4-4563
Office Hours:	TTh 2–5pm	TBD

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).

Prerequisites: Mathematics 112 is a continuation of Math 111. Students should have a demonstrable mastery of topics and skills from Calculus I to perform well in the course.

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; during tests and exams, students must remain in the classroom until they have completed 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 problem sets—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 four or more 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, as indicated on the calendar included with this syllabus.

Homework: Students who thoughtfully engage with course material on a regular basis are more likely to demonstrate a high level of performance on assessments. 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 (within 24 hours or sooner) 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. In the event that a make-up test is necessary, note that the test will generally be more difficult to account for the extra time the student has to prepare.

Grading: Course grades will be determined as follows:

Problem Sets	100 points
Reflection Problems	100 points
Tests (4×100 pts)	400 points
Final Exam	200 points
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TOTAL	800 points

Letter grades will be determined based on the total points each student earns: A: at least 720 points; B: 640–719 points; C: 560–639 points; D: 480–559 points; F: fewer than 480 points. Plus and minus grades may be assigned for sums of points near cut-off values.

Problem Sets: Most weeks, a small collection of problems will be assigned for a grade. These will generally be completed outside of class, but occasionally students may be asked to complete them in class (much like a quiz). 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. At least two of 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.

Reflection Problems: Many mathematics courses heavily emphasize 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, two 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; 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 must obtain permission from the Associate Dean of Academic Affairs to take an exam earlier or later than scheduled. Permission may be granted for medical reasons or for participation in educational programs. Any Student who has three exams on the same calendar day (not within a general twenty-four hour period) must document their situation with the Associate Dean for Academic Affairs 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 exam at an alternate date (within exam week). You may NOT receive permission to alter your exam schedule for the following reasons: Taking an earlier flight/ride, vacation schedule, weddings (other than your own), graduation or job schedule.

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 sometime with your professor, during the first week of the semester,

to communicate your specific needs for the course as it relates to your approved accommodations. Accommodations are not implemented until the instructor is provided an accommodation letter and discusses the accommodation plan for this course face to face with the OAS student. 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 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 2019

MONDAY	TUESDAY	WEDNESDAY	THURSDAY	FRIDAY
Jan 14th	Jan 15th	Jan 16th 1 Calculus I basics	Jan 17th	Jan 18th 2 L'Hospital's rule
Jan 21st NO CLASS (MLK Holiday)	Jan 22nd	Jan 23rd 3 L'Hospital's rule	Jan 24th	Jan 25th 4 Graphing exponential and logarithmic functions
Jan 28th 5 Graphing exponential and logarithmic functions	Jan 29th	Jan 30th 6 Review of integration	Jan 31st	Feb 1st 7 Integration by parts
Feb 4th 8 Trigonometric integrals	Feb 5th	Feb 6th 9 Trigonometric substitution	Feb 7th	Feb 8th 10 Partial fractions
Feb 11th 11 Partial fractions	Feb 12th	Feb 13th 12 Test 1 wrap-up	Feb 14th TEST 1 (7:45AM)	Feb 15th 13 Improper integrals
Feb 18th 14 Improper integrals	Feb 19th	Feb 20th 15 Arc length and surface area	Feb 21st	Feb 22nd 16 Polar coordinates
Feb 25th 17 Polar coordinates	Feb 26th	Feb 27th 18 Polar coordinates	Feb 28th	Mar 1st 19 Infinite sequences
Mar 4th 20 Infinite series	Mar 5th	Mar 6th 21 Test 2 wrap-up	Mar 7th TEST 2 (7:45AM)	Mar 8th 22 More infinite series

MONDAY	TUESDAY	WEDNESDAY	THURSDAY	FRIDAY
Mar 11th No CLASS (Spring Break)	Mar 12th	Mar 13th No CLASS (Spring Break)	Mar 14th	Mar 15th No CLASS (Spring Break)
Mar 18th 23 n th term test and p -series	Mar 19th	Mar 20th 24 Integral test	Mar 21st	Mar 22nd 25 Integral test
Mar 25th 26 Comparison tests	Mar 26th	Mar 27th 27 Comparison tests	Mar 28th	Mar 29th 28 Alternating series
Apr 1st 29 Ratio and root tests	Apr 2nd	Apr 3rd 30 Review of infinite series	Apr 4th	Apr 5th 31 Power series
Apr 8th 32 Test 3 wrap-up	Apr 9th TEST 3 (7:45AM)	Apr 10th 33 More power series	Apr 11th	Apr 12th 34 More power series
Apr 15th 35 Taylor and Maclaurin series	Apr 16th	Apr 17th 36 Taylor and Maclaurin series	Apr 18th	Apr 19th 37 Review of power series
Apr 22nd 38 Test 4 wrap-up	Apr 23rd TEST 4 (7:45AM)	Apr 24th 39 Differential equations	Apr 25th	Apr 26th 40 Differential equations
Apr 29th 41 Final review (Last Day of Class)	Apr 30th	May 1st	May 2nd	May 3rd Final Exams 8AM: 5/8 at 2PM 9AM: 5/8 at 9AM 1PM: 5/2 at 2PM