

Lecture	12	Tu Thu 8:30AM - 9:45 PM	Goessmann 152	Paul Gunnells
Discussion 1	12AA	Mon 4:00 - 4:50 PM	LGRT TBA	Hyunjun Kim
Discussion 2	12AB	Mon 12:20 - 1:10 PM	LGRT TBA	Hyunjun Kim

Math 132 Section 12 webpage: <https://gunnells.github.io/calc/calc.html>

Instructor

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Course Prerequisite: MATH 131 or equivalent

Course Textbook: *Calculus: Early Transcendentals*, 9th Edition, James Stewart. Enhanced WebAssign (Webassign access code + e-book) is required for this course. Your homework will be done through Enhanced WebAssign based on the textbook. The e-book and WebAssign access code together are built within your Canvas course. A physical copy of the textbook is not required.

Course Description: The definite integral, techniques of integration, and applications to physics, chemistry, and engineering. Sequences, series, and power series. Taylor and MacLaurin series.

Student Learning Objectives: By the end of this course, students will be able to:

- Apply integration techniques to evaluate definite and indefinite integrals.
- Use integration in applications such as computing areas, volumes, and arc lengths.
- Represent functions as power series, and find Taylor and Maclaurin series.
- Analyze curves and solve problems using parametric equations and polar coordinates.

Course Requirements and Grade Weights: There will be two midterm exams and one final exam.

- **Midterm Exam 1: Thursday, October 15, 7:00-9:00 PM**, location TBA.
 Make-up Exam 1: Friday, October 16, 5:00 - 7:00 PM, location TBA
 Exam 1 covers Sections 5.3-5.5, 6.1 & 6.2, 7.1-7.5, and it will count for **25%** of the final grade.
- **Midterm Exam 2: Wednesday, November 18, 7:00-9:00 PM**, location TBA.
 Make-up Exam 2: Thursday, November 19, 7:00 - 9:00 PM, location TBA.
 Exam 2 covers Sections 7.8, 11.1-11.7, and it will count for **25%** of the final grade.
- **Final Exam: Friday, December 18, 8:00-10:00 AM**, location in SPIRE. The final exam will be cumulative, with focus on material covered after Exam 2, and it will count for **30%** of the final grade.
- **Homework: 15%**
- **Quizzes: 5%**

Grading Scale

A	A–	B+	B	B–	C+	C	C–	D+	D	F
90	87	83	79	75	71	67	63	59	55	< 55

The final numerical scores will be truncated down to the nearest integer. For example, a final score of 89.99 will be truncated to 89 and is an A–. There is **no rounding** of grades in this course.

Attendance Policy: You are expected to attend all classes regularly and are responsible for any material, announcements, or assignments you miss. Class attendance will not be taken, but students should notify the instructor if illness or other extenuating circumstances prevent attendance. Absences for university-approved conflicts or excusable reasons do not excuse students from meeting course requirements.

Technology Requirements: This course uses Canvas as the LMS. Log in with your `NetID@umass.edu` and password. Midterms and the final exam will be graded through Gradescope. No course entry code is needed; you will be automatically enrolled near the time of the first midterm. We will scan your exams, so no scanning action is required on your part.

WebAssign Homework: The homework assignments will be given weekly and cover material from the previous week. Students have up to 5 submission attempts per question, except for true/false or convergent/divergent questions, which allow only one attempt. The homework due dates are posted in the WebAssign calendar, typically on Wednesdays and Sundays by 11:59 PM, except during exam weeks. Homework must be completed through the WebAssign system, which requires purchasing an access code. You can buy the access code and register via the link on your Canvas course. After registering, you can access all homework assignments in WebAssign. If Canvas is unavailable, you can still do your homework directly on the WebAssign website. No Class Key is needed to enroll in your WebAssign course.

Late Homework Policy: If you miss the homework deadline, you may still complete the assignment for up to 7 days after the due date by requesting an automatic extension through WebAssign. A **30% late penalty will be applied only to the portion of the assignment submitted within 7 days after the homework due date**. Late homework generally will not be accepted or extended without a penalty. In addition, **the lowest two homework scores will be dropped**. If you join the course late, it is your responsibility to catch up on all assignments. The schedule is arranged so that the first assignment is due one day after the last day to add or drop the course, allowing late-enrolled students time to complete it.

Quizzes: Weekly quizzes will be given during discussion sections, except in the first week and during midterm weeks. All quizzes are closed-book. Make-up quizzes are generally not offered, exceptions may be considered only with documented extenuating circumstances. To accommodate absences including illness or emergencies, **the two lowest quiz scores will be dropped**. Calculators are not permitted on quizzes.

Help and Resources: The best way to get help is to attend your instructor's or TA's office hours. The Calculus Tutoring Center (LGRT 140) is available for Math 132 students and will open on Monday, September 14.

The Learning Resource Center (LRC) offers a variety of free academic support programs, including one-on-one peer tutoring, study skills tutoring, Supplemental Instruction (SI), and exam review sessions. SI sessions will begin the week of February 9.

Exam Policy: All exams are closed-book. Calculators, textbooks, notes, formula sheets, cell phones, smart-watches, and all other electronic devices are strictly prohibited. Any electronic device visible during the exam will lead to an assumption of cheating. Please bring your student ID to each exam.

Make-Up Exam Policy: Students are expected to take exams at the scheduled times. In excusable situations, including but not limited to the ones listed below, the instructors are obligated to offer make-up exams. Students are responsible to inform the instructors as early as possible and to provide supporting documents when necessary.

1. Students absent due to **extenuating circumstances:** including jury duty, military obligations, scheduled activities for other classes, the death of a family member, or verifiable health-related incapacity.
2. Students absent due to **religious reasons.** Inform the instructor **at the beginning of the semester.**
3. Students absent due to **athletic events, field trips, and performances.**
4. Students absent due to **health reasons.** Note that if a student gets sick while taking an exam, the student is responsible for notifying the proctors immediately and the student will be taken to University Health Services. No make-up exam will be offered if the proctors were not notified.
5. **Exam conflicts.** It is the University's policy that students can not be expected to take **two exams at the same time or three exams in one day.** For conflicting exams, students should submit an exam conflict form through their SPIRE account for review and approval by the Registrar's Office. The Evening Exam Conflict and Final Exam Conflict forms are located in the Class & Finals Schedule section of the Manage Classes tile in SPIRE. The Registrar's Office will review students' exam schedule and notify students and instructors when a make-up exam is warranted based on the policy as outlined in the academic regulations. Students are required to submit the request at least **2 weeks before the scheduled exams.**
6. **Other circumstances:** students are expected to inform the instructors as early as possible should issues arise beyond those discussed above. The students' instructor and course chair will evaluate the situation and inform the student of their decision. If the situation is not the fault of the student, then the instructors and course chairs are obligated to offer a make-up exam.

Note: There are no exam retakes in this course for any reason. If an emergency arises and you are unable to take an exam, contact your instructor within 24 hours of the scheduled exam to request a make-up exam. Supporting documentation is generally required. Once an exam has been taken, it cannot be retaken or made up.

In scheduling a make-up exam, the instructors and course chairs should inform the students at least **three business days** before the scheduled time of the time and location of the exam. The instructors and course chairs may use the department and CNS proctoring services for make-up exams when appropriate.

Accommodation Statement: The University of Massachusetts Amherst is committed to providing an equal educational opportunity for all students. If you have a documented physical, psychological, or learning disability on file with Disability Services (DS), you may be eligible for reasonable academic accommodations to help you succeed in this course. If you have a documented disability that requires an accommodation, please notify me within the first two weeks of the semester so that we may make appropriate arrangements. For further information, please visit Disability Services (<https://www.umass.edu/disability/>).

Testing Accommodations for Exams. Students approved for testing accommodations will take their **midterm exams** on the same day as the scheduled midterm exam, but beginning at **6:00 PM** instead of 7:00 PM. The final exam will also be held on the same day as the scheduled **final exam**, starting at **8:00 AM**. You do **not** need to schedule your midterm or final exams with the Disability Services Exam Proctoring Center (EPC) or through Clockwork. No exams will be given at the Disability Services Proctoring Center. The Math 132 course chair or your instructor will email you your exam location at least three days before each exam.

Title IX Statement: In accordance with Title IX of the Education Amendments of 1972 that prohibits gender-based discrimination in educational settings that receive federal funds, the University of Massachusetts Amherst is committed to providing a safe learning environment for all students, free from all forms of discrimination, including sexual assault, sexual harassment, domestic violence, dating violence, stalking, and retaliation. This includes interactions in person or online through digital platforms and social media. Title IX also protects against discrimination on the basis of pregnancy, childbirth, false pregnancy, miscarriage, abortion, or related conditions, including recovery. There are resources here on campus to support you. A summary of the available Title IX resources (confidential and non-confidential) can be found at the following link: <https://www.umass.edu/titleix/resources>. You do not need to make a formal report to access them. If you need immediate support, you are not alone. Free and confidential support is available 24 hours a day / 7 days a week / 365 days a year at the SASA Hotline 413-545-0800.

Academic Honesty Statement: Since the integrity of the academic enterprise of any institution of higher education requires honesty in scholarship and research, academic honesty is required of all students at the University of Massachusetts Amherst. Academic dishonesty is prohibited in all programs of the University. Academic dishonesty includes but is not limited to: cheating, fabrication, plagiarism, and facilitating dishonesty. Appropriate sanctions may be imposed on any student who has committed an act of academic dishonesty. Instructors should take reasonable steps to address academic misconduct. Any person who has reason to believe that a student has committed academic dishonesty should bring such information to the attention of the appropriate course instructor as soon as possible. Instances of academic dishonesty not related to a specific course should be brought to the attention of the appropriate department Head or Chair. Since students are expected to be familiar with this policy and the commonly accepted standards of academic integrity, ignorance of such standards is not normally sufficient evidence of lack of intent (http://www.umass.edu/dean_students/codeofconduct/acadhonesty).

Academic Alerts: Your success in this course is important. UMass Amherst uses Navigate360, a student success management system, to help identify students who may need additional support to achieve academic success. Throughout the semester you may receive emails from Navigate360 regarding your course grades and academic performance. Please check your UMass email account regularly and, if you receive an alert, read the email carefully and connect with one or more of the campus resources provided. Alerts are meant to help you achieve success in the course; they are not meant to be punitive. UMass has many ways to support students and Navigate360 is a tool that helps us connect you with the services, resources, and people you need.

Drops, Withdrawals, Pass/Fail, Incomplete: Last day to add or drop with no record is **Monday, September 14**. Last day to drop with "W" and select 'P/F' is **Wednesday, November 4**. An Incomplete is possible only if: (1) you had a compelling personal reason, e.g., serious illness; (2) your work has clearly been passing; and (3) there's a good chance you'll complete the course with a passing grade within the allotted time. Thus, failing work is no reason in itself for an Incomplete.

General Education Designation

MATH 132 is a four-credit General Education course that satisfies the R1 (Basic Math Skills) and R2 (Analytic Reasoning) general education requirements for graduation. The General Education Program at the University of Massachusetts Amherst offers students a unique opportunity to develop critical thinking, communication, and learning skills that will benefit them for a lifetime. For more information about the General Education Program, please visit the GenEd webpage.

Learning Outcomes for all General Education courses

The General Education Program has four common objectives that pervade all designations. Math 132 satisfies the following General Education objectives:

- *Content:* Know fundamental questions, ideas, and methods of inquiry/analysis used in mathematics: Students will learn the Fundamental Theorem of Calculus, techniques of integration and its real-life and theoretical applications, along with the concepts of sequences and series.
- *Critical Thinking:* Students demonstrate creative, analytical, quantitative, & critical thinking through inquiry, problem solving, & synthesis: Students will use critically thinking skills to develop and understand cumulative change of a function, and computational skills to find this cumulative change efficiently. Students will demonstrate an understanding of various integration techniques in order to solve many different types of integrals. In determining the convergence of infinite sequences and series, students will develop formal reasoning skills to determine which test of convergence is applicable and what conclusions can be drawn.
- *Communication:* Develop informational and technological literacy: Students will develop their writing skills in articulating their reasoning of testing convergence of series. Additionally, in learning estimations for cumulative change, students will develop methods of error analysis used to quantitatively evaluate the accuracy of their results.
- *Demonstrate capacity to apply disciplinary perspectives and methods of analysis to real world problems (the larger society) or other contexts:* Students will apply the theoretical concepts of calculus to real-world and theoretical problems, such as finding how far an object moves based on the force applied to it and derive the formulas of volume for 3dimensional solids of revolution, such as a sphere. Students will also learn how to use the integral to solve problems concerning areas of enclosed regions, lengths of curves, population predictions, work, among many others. Students will be able to demonstrate an understanding of sequences and series in order to develop various techniques to solve application problems.

Learning Outcomes for the R1 and R2 Designations

Because Math 132 presupposes basic math skills, it carries the designation for the Basic Math Skills requirement (R1). In addition, the course satisfies the following objectives of the Analytic Reasoning requirement (R2):

- *Advance a student's formal or mathematical reasoning skills beyond the level of basic competence:* In learning Calculus in Math 132, students will think critically about the overarching idea of cumulative change by furthering their understanding of integrals. Students will advance their mathematical literacy and analyzing skills by learning to construct new methods of both estimating and computing cumulative change more accurately and efficiently. Additionally, students will develop formal reasoning skills to determine whether sequences and series converge, and in the case where they converge the computational skills to determine the value to which they converge.
- *Increase the student's sophistication as a consumer of numerical information:* Students will connect the ideas of rates of change and cumulative change to various disciplines by analyzing and solving problems in both real life and theoretical applications.
- *Indicate the limits of formal, numerical, quantitative, or analytical reasoning and discuss the potential for the abuse of numerical arguments:* Students will learn methods of both estimating and computing cumulative change. Students will analyze when it is appropriate to use an estimation, as well as the accuracy and efficiency of their estimations.

Math 132 Course Topics - Fall 2026

Chapter 5 - Integrals

- 5.3 The Fundamental Theorem of Calculus
- 5.4 Indefinite integrals and the Net Change Theorem
- 5.5 The Substitution Rule

Chapter 6 - Applications of Integration

- 6.1 Area Between Curves
- 6.2 Volumes

Chapter 7 - Techniques of Integration

- 7.1 Integration by Parts
- 7.2 Trigonometric Integrals
- 7.3 Trigonometric Substitution
- 7.4 Integration of Rational Functions by Partial Fractions
- 7.5 Strategy for Integration (Review)
- 7.8 Improper Integrals

Chapter 11 - Infinite Sequences and Series

- 11.1 Sequences
- 11.2 Series
- 11.3 The Integral Test and Estimates of Sums
- 11.4 The Comparison Tests
- 11.5 Alternating Series and Absolute Convergence — *except* subsection Rearrangements
- 11.6 The Ratio and Root Tests
- 11.7 Strategy for Testing Series (Review)
- 11.8 Power Series
- 11.9 Representation of Functions as Power Series
- 11.10 Taylor and Maclaurin Series — *except* subsection Multiplication and Division of Power Series and Binomial Series Functions of Several Variables

Chapter 10 - Parametric Equations and Polar Coordinates

- 10.1 Curves Defined by Parametric Equations
- 10.2 Calculus with Parametric Curves — *only* subsections Tangents and Arc Length (*not* subsections Area and Surface Area)
- 10.3 Polar Coordinates
- 10.4 Calculus in Polar Coordinates

Math 132 MWF Tentative Course Schedule - Fall 2026

Week	Sections	Topics	Special Dates & Notes
1 9/7 - 9/11	Intro 5.3 5.4 (start)	• The Fundamental Theorem of Calculus • Indefinite integrals and the Net Change Theorem	Labor Day: Mon 9/7 First Day of classes: Tues 9/8
2 9/14 - 9/18	5.4 (end) 5.5 6.1	• Substitution Rule • Area Between Curves	Last day to add/drop classes: Mon 9/14
3 9/21 - 9/25	6.2 7.1	• Volumes • Integration by Parts	
4 9/28 - 10/2	7.2 7.3	• Trigonometric Integrals • Trigonometric Substitution	
5 10/5 - 10/9	7.4 7.8 (start)	• Integration of Rational Functions by Partial Fractions • Improper Integrals	
6 10/12 - 10/16	7.8 (end) 7.5 11.1 (start)	• Strategy for Integration (Review) • Sequences	Holiday-Indigenous People's Day Mon 10/12 Exam 1: Thursday 10/15, 7- 9 PM
7 10/19 - 10/23	11.1 (end) 11.2 11.3 (start)	• Series • Integral Test and Estimates of Sums	
8 10/26 - 10/30	11.3 (end) 11.4 11.5	• Comparison Tests • Alternating Series and Absolute Convergence	
9 11/02 - 11/06	11.6 11.8 (start)	• Ratio and Root Tests • Power Series	Election Day-no classes held: Tues 11/3 Last day to Drop w/ 'W': Wed 11/4
10 11/9 - 11/13	11.7 11.8 (end) 11.9 (start)	• Strategy for Testing Series (Review) • Representation of Functions as Power Series	Holiday-Veterans' Day: Wed 11/11
11 11/16 - 11/20	11.9 (end) 11.10	• Taylor and Maclaurin Series	Exam 2: Wednesday 11/18, 7 - 9 PM
12 11/23 - 11/27	10.1	• Curves Defined by Parametric Equations	Wednesday schedule followed on Tues 11/24 Thanksgiving recess begins after last class on Tues 11/24
13 11/30 - 12/04	10.2 10.3 (start)	• Calculus with Parametric Curves • Polar Coordinates	Classes resume: Mon 11/30
14 12/7 - 12/11	10.3 (end) 10.4	• Calculus in Polar Coordinates	
15 12/14 - 12/18		Exam Review	Last day of classes: Tues 12/15 Reading Days: Wed 12/16, Sat 12/19 Final Exam: Friday, 12/18