

MATH 162

Calculus IIA

Textbook:

Calculus: Early Transcendentals (9th edition) by James Stewart. You may use an older edition, however there will be some differences in page and section numbers.

Prerequisites: MATH 161 or 142.

Course Description and Learning Objectives:

MATH 162 continues the development of calculus started in MATH 161. We start with applications of single-variable such as finding areas, volumes, work, average values, arc length, and surface areas of revolution. We then cover techniques of integration, such as substitution, integration by parts, trigonometric substitution, the method of partial fractions, improper integrals, sequences, series, tests for convergence including comparison tests, integral test, alternating series test, ratio test, root test. Taylor and Maclaurin series. Calculus with parametric curves and polar coordinates. Students will obtain a deep understanding of one-dimensional integral calculus, including how to solve various problems in abstract and applied settings. Students will obtain a deep understanding of parametric and polar curves in the plane, including tangent slopes, finding arc lengths and enclosed areas. Students will obtain a deep understanding of infinite sequences and series, divergence and convergence thereof, including intuition and problem-solving in theoretical and applied settings. Students will obtain a deep understanding of Taylor series formulas, including radii of convergence, and approximating known functions by Taylor polynomials.

Grade: *The percentages below are typical and may change from semester to semester. In all cases, proctored exams must comprise at least 60% of the course grade per department policy.*

Recitation Attendance and Participation – 5%

Webwork Homework – 15%

2 Midterms – 20% each

Comprehensive Final Exam – 40%

The Final Exam will have two parts: Part A will cover the material tested in both Midterms 1 and 2, while Part B will only contain questions related to material appearing after Midterm 2. Part A accounts for 15% of your course grade and Part B accounts for 25% of your course grade. In addition, the Part A score will replace the lowest midterm score if it is indeed higher (but not both). Makeup exams are typically **not** offered, outside of exceptional circumstances approved by the course Professors. If you feel you have an exceptional situation discuss it with your instructor ASAP. Otherwise, if you miss a midterm exam, Part A of the final exam will usually count as your makeup. In all cases, Final Part A can only replace one of midterms 1 or 2.

Incomplete “I” grades are almost never given. The only justification is a documented serious medical problem or a genuine personal/family emergency. Falling behind in this course or problems with workload on other courses are not acceptable reasons.

You will NOT be permitted calculators or other electronic devices (smart phones, smart watches, etc) on any exams. You will NOT be permitted books, notes, or “cheat sheets” on any exams.

Webwork Homework:

WeBWorK problems are completed online and provide instant feedback as to whether you have done a problem correctly or not. You are encouraged to discuss problems with other students, however WeBWorK problems are individualized for each student, so you must do your own assignment. There will be weekly WeBWorK assignments, which may consist of up to 25 problems.

To access webwork click the Webwork link on the MATH 162 blackboard site.

Recitations:

Recitations meet once a week, attendance and participation typically accounts for 5% of your final grade. Recitations start the 3rd week of the semester. There are no makeup recitations, but typically several of your lowest recitation scores will be dropped as determined by the course coordinator each semester.

In recitation you will discuss worksheets related to material covered in lecture. These problems will generally be more difficult than problems on the homework or examples in class. Instead of doing routine calculations, you will be asked to analyze and explain in a small group. The questions will aim to get you to think more deeply about the material you are learning in class. The purpose of recitation is to spend 75 minutes discussing and thinking about the material taught in class. This should help you solidify your own understanding of the material, as well as that of your peers. Explaining a topic to others is one of the best ways to learn the material! Therefore, you will not be graded on correct answers, but instead you'll be graded individually depending on your total engagement and effort in the workshop.

Academic Honesty:

All assignments and activities associated with this course must be performed in accordance with the University of Rochester's Academic Honesty Policy. More information is available at <https://www.rochester.edu/college/honesty>

In this class, homework collaboration is encouraged. Collaboration means discussing the problems together, however, it is important that you fully understand the solutions to homework problems. Similarly, direct copying of answers from A.I. tools is not allowed and considered academic dishonesty.

Also, be aware of the Department of Mathematics policy on unauthorized online resources: Any unauthorized usage whatsoever of online solution sets or AI-generated material is considered an academic honesty violation and will be reported to the Board on Academic Honesty. In particular, any assignment found to contain content copied from such sources is subject to a minimum penalty of zero on the assignment and a full letter grade reduction at the end of the semester (e.g. a B would be reduced to a C). Depending on the circumstances, this may apply even if the unauthorized content was obtained through indirect means (through a friend for instance) and/or the student is seemingly unaware that the content was copied from such sources. If you have any questions about whether resources are acceptable, please check with your instructor.

Help:

If you are having difficulty seek help immediately - do not wait until it is too late to recover from falling behind or failing to understand a concept. There are several avenues for you to get help and ask questions, outside of lecture:

- Attend instructor office hours or schedule an appointment to meet with your instructor. You can attend office hours of any MATH 162 professor, regardless of which section you're registered for.

- Go to math department study hall, for more info see here:

<https://www.sas.rochester.edu/mth/undergraduate/tutoring.html>

- The Learning Center offers a range a resources: The Learning Center study group for MATH 162 is listed here: Learning Center Study Groups. Attend Learning Center drop-in tutoring: Learning Center Tutoring. The Learning Center also offers tutoring, study groups, and study skills counseling. More information can be found here:

<https://www.rochester.edu/college/learningcenter/>

Disability Support:

The University of Rochester respects and welcomes students of all backgrounds and abilities. In the event you encounter any barrier(s) to full participation in this course due to the impact of disability, please contact the Office of Disability Resources. The access coordinators in the Office of Disability Resources can meet with you to discuss the barriers you are experiencing and explain the eligibility process for establishing academic accommodations. You can reach the Office of Disability Resources at: (585) 275-3424; Taylor Hall. Or, visit <https://www.rochester.edu/college/disability/index.html>

Please note that to be granted alternate testing accommodations, you (the student) must fill out forms with Disability Resources at least seven days before each and every exam. These forms are not sent automatically. Instructors are not responsible for requesting alternative testing accommodations at Disability Resources or making accommodations on their own.

College Credit-Hour Policy:

This course follows the College credit hour policy for four-credit courses. This course meets 3 academic hours per week. The course also includes recitations/workshops for 1.5 academic hours per week.

Course Schedule

All sections refer to the Stewart text. Fall holidays shown. Details are subject to change based on holidays and exam dates, but content coverage does not change.

Week	Topics
Week 1	No recitations this week Ch. 5 Review: Definition of the Integral, Fundamental Thm. of Calc., Substitution Rule
Week 2	Labor Day: No classes Monday; No recitations this week 6.1-6.2: Areas Between Curves, Volumes
Week 3	Recitations start this week (Monday) 6.3-6.4: Volumes By Cylindrical Shells, Work
Week 4	7.1-7.2: Integration by Parts, Trig. Integrals
Week 5	7.3-7.4: Trig. Substitution, Partial Fraction Decomposition
Week 6	7.5, 4.4, 7.8 Integration Strategies, L'Hospital's Rule (review), Improper Integrals
Week 7	Fall Break: No classes Mon/Tues; No recitations this week 8.1-8.2: Arc Length, Surface Areas of Revolution
Week 8	10.1-10.2: Calculus with Parametric Curves
Week 9	10.3-10.4: Polar Coordinates, Calculus with Polar Curves
Week 11	11.1-11.2: Sequences, Series
Week 12	11.3-11.4: Integral Test, Comparison Tests
Week 13	11.5-11.7: Alternating Series Test, Ratio and Root Tests, Absolute Convergence, Strategies
Week 14	Thanksgiving Break: No classes Wed-Fri; No recitations this week 11.8-11.9: Power Series, Functions as Power Series
Week 15	11.9-11.10: Funcs. as Power Series (cont.), Taylor and Maclaurin Series, Polynomial Approx. Catchup/Review
Week 16	Fall Classes End Monday; No recitations this week Catchup/Review