

MATH 140 6980 Calculus I (2162) MATH-140

Spring 2016 Section 6980 4 Credits 02/01/2016 to 03/27/2016

Faculty Contact

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Course Description

Prerequisite: MATH 108 or MATH 115. An introduction to calculus. The goal is to demonstrate fluency in the language of calculus; discuss mathematical ideas appropriately; and solve problems by identifying, representing, and modeling functional relationships. Topics include functions, the sketching of graphs of functions, limits, continuity, derivatives and applications of the derivative, definite and indefinite integrals, and calculation of area. Students may receive credit for only one of the following courses: MATH 130, MATH 131, MATH 140, or MATH 220.

Course Introduction

This course introduces the study of calculus, which evolved from the work of the ancient Greeks and the acknowledged codevelopers Isaac Newton and Gottfried Leibniz. We will explore the two major topics of calculus: the derivative and the integral (or antiderivative). The study of these topics requires the extensive use of algebra and analytic geometry.

This course begins with a review of precalculus mathematics, as directly applicable to the study of calculus. Then we will discuss the concept and use of limits. These two topics will usher us into a discussion of the derivative, most easily explained in terms of the rate of change of a function.

We will spend the rest of the course learning the mechanics of taking derivatives and using them in numerous applications. Many of the applications will focus on graphing functions. We will also use derivatives to solve interesting problems associated with finding maximum and minimum values of functions. This course presents examples and exercises from many different disciplines, including engineering, physics, chemistry, biology, and economics.

Note: This course is identified as a prerequisite for another course at UMUC. Successful completion of this course is required to advance to the next course in a sequence. A grade of Withdrawal (W), Failure for non-attendance (FN), Failure (F) or Incomplete (I) will not meet a prerequisite requirement. You may be barred from enrolling in or may be removed from courses for which you do not have the necessary prerequisites. Keep track of your progress in this course. If you are uncertain about your standing, consult with your instructor. You should also work with an academic advisor to be sure you are aware of your options and are meeting all necessary program requirements when planning your schedule.

Course Outcomes

After completing this course, you should be able to

- determine fluency in the language of *Calculus I*, and describe and discuss mathematical ideas, using appropriate terminology
- solve problems by identifying, representing, and modeling functional relationships
- use limits to determine continuity, slope of tangent, and rate of change
- apply rules of differentiation to sketch graphs of functions, and to solve optimization and related rate problems
- apply antidifferentiation and the Fundamental Theorem of Calculus to evaluate integrals

Course Materials

[Click to access your course materials information \(http://webapps.umuc.edu/UgcmBook/BPage.cfm?C=MATH%20140&S=6980&Sem=2162\)](http://webapps.umuc.edu/UgcmBook/BPage.cfm?C=MATH%20140&S=6980&Sem=2162)

Class Guidelines

Preparation

To succeed in an 8-week mathematics course, it is important to complete all assignments on time. Print out a copy of the Course Schedule and keep it in a place where you can consult it daily. Late work will be accepted only in cases of documented emergency.

Turn in your material on time. The syllabus is clear that no material will be accepted late. If you have a thing happening, let me know ahead of time. I can plan; you can plan; we'll both be much happier.

Classroom Management

Don't edit your posts in discussion sessions. After I see your post, it gets marked as read. If you go in and edit it, it doesn't show up as new again. So I never know you posted something new! And it won't get graded.

Log into our online classroom regularly to read news, participate in discussions, and post questions. After posting work in a discussion, check back into the discussion to read comments and make any necessary revisions.

Questions and thoughts of general interest to the class should be posted in the "Ask the Professor" or "Student Lounge" discussions. For questions pertaining to your own work in the course, please send an e-mail with our course name in the subject line.

If you need help or get lost, let me know. I have a lot of resources I can send you that will get you through this. But if you're lost, you gotta tell me where you last knew where you were. If you send me an email that just says "I am lost, help, I don't know what to do," I will have no idea where you are *or how to find you*. It's just like being lost in the real world. So when you do get lost, tell me exactly where you are or, if you can't, what's happening and how you got there. It will make it a lot easier on both of us.

Preferred Contact Method

Don't use the send a message feature in LEO. It goes to spam too frequently. Use your own email service and send a message to jphoward@faculty.umuc.edu. It will buzz my phone. I am unlikely to respond until the end of the day or even the next. But I will probably see it quickly.

Supplemental Materials

None.

✓ Grading Information

The course grade will be determined as follows:

Component	Weighted Percentage
Participation / Attendance	10%
Six quizzes (10% each)	60%
Applied Project	15%
Final Examination	15%
TOTAL	100%

Unit Participation Problems

For online participation credit, each week will have a list of problems. Choose **one** of these problems (which has not already been solved or reserved by a classmate), and post your solution online within the appropriate Weekly Participation Discussion. You are expected to post a solution to **one** problem for **each** week.

Each weekly participation problem is worth 10 points. If you have made an error on your initial attempts, then you will receive feedback and an opportunity to revise your work for full credit if submitted prior to the deadline.

Quizzes, Exam, and Applied Project

The Quizzes, Applied Project, and Final Examination grades are each worth between 0 and 100 percent, unweighted. For each, the grading breakdown will be provided.

Project: Real-World Application in Calculus I (related to Science, Technology, Engineering, and/or Mathematics)

1. Submit **one** real-world application and the complete solution that each requires concepts in Calculus I in order to solve.
2. The real-world application and its solution must be original (your own work) and/or cited if other work was adapted. You may not simply copy or modify an existing application and/or solution.

Note: Textbook word problems are NOT an acceptable applied project.

3. Use APA style to cite any references (websites, books, journals, etc...) that are used to inspire your problems (and/or solutions).
4. These real-world applications should be related to current events and should clearly demonstrate concepts in covered in our Calculus I.
5. Your grade for this project will be based on (a) originality, (b) accuracy of problem and its solution, (c) relevancy to current events, and (d) relevance and clear connection to concepts addressed in our Calculus I course.

If you have any questions, please feel free to contact me via our "Ask the Prof" Discussion or via PAGER.

Academic Policies

Academic Policies and Guidelines

ACADEMIC INTEGRITY

As a member of the University of Maryland University College (UMUC) academic community that honors integrity and respect for others you are expected to maintain a high level of personal integrity in your academic work at all times. Your work should be original and must not be reused in other courses.

CLASSROOM CIVILITY

Students are expected to work together cooperatively, and treat fellow students and faculty with respect, showing professionalism and courtesy in all interactions. Please review the Code of Civility for more guidance on interacting in UMUC classrooms:

<https://www.umuc.edu/students/support/studentlife/conduct/code.cfm>

(<https://www.umuc.edu/students/support/studentlife/conduct/code.cfm>).

POLICIES AND PROCEDURES

UMUC is committed to ensuring that all individuals are treated equally according to Policy 040.30 [Affirmative Action, Equal Opportunity, and Sexual Harassment](https://www.umuc.edu/policies/adminpolicies/admin04030.cfm) (<https://www.umuc.edu/policies/adminpolicies/admin04030.cfm>).

Students with disabilities who need accommodations in a course are encouraged to contact the Office of Accessibility Services (OAS) at accessibilityservices@umuc.edu, or call 800-888-UMUC (8682) or 240-684-2287.

The following academic policies and procedures apply to this course and your studies at UMUC.

150.25	<p>Academic Dishonesty and Plagiarism (https://www.umuc.edu/policies/academicpolicies/aa15025.cfm) – UMUC defines academic dishonesty as the failure to maintain academic integrity. All charges of academic dishonesty will be brought in accordance with this Policy.</p> <p>Note: Your instructor may use Turnitin.com, an educational tool that helps identify and prevent plagiarism from Internet resources, by requiring you to submit assignments electronically. To learn more about the tool and options regarding the storage of your assignment in the Turnitin database go to: https://www.umuc.edu/library/libresources/turnitin.cfm (https://www.umuc.edu/library/libresources/turnitin.cfm).</p>
151.00	<p>Code of Student Conduct (https://www.umuc.edu/policies/studentpolicies/stud15100.cfm)</p>
170.40	<p>The following policies describe the requirements for the award of each degree:</p>
170.41	<p>Degree Completion Requirements for the Graduate School (https://www.umuc.edu/policies/academicpolicies/aa17040.cfm),</p>
170.42	<p>Degree Completion Requirements for a Bachelor's Degree (https://www.umuc.edu/policies/academicpolicies/aa17041.cfm),</p> <p>Degree Completion Requirements for an Associate's Degree (https://www.umuc.edu/policies/academicpolicies/aa17042.cfm)</p>

170.71	Policy on Grade of Incomplete (https://www.umuc.edu/policies/academicpolicies/aa17071.cfm) - The grade of I is exceptional and only considered for students who have completed 60% of their coursework with a grade of B or better for graduate courses or C or better for undergraduate courses and request an I before the end of the term.
170.72	Course Withdrawal Policy (https://www.umuc.edu/policies/academicpolicies/aa17072.cfm) - Students must follow drop and withdrawal procedures and deadlines available at https://www.umuc.edu/ (https://www.umuc.edu/) under Academic Calendar.
130.80	Procedures for Review of Alleged Arbitrary and Capricious Grading (https://www.umuc.edu/policies/academicpolicies/aa13080.cfm) - appeals may be made on final course grades as described herein.
205.06	Calculation Of Grade-Point Average (GPA) for Inclusion on Transcripts and Transcript Requests (https://www.umuc.edu/policies/academicpolicies/aa20506.cfm) - Note: Undergraduate and Graduate Schools have different Grading Policies (i.e. The Graduate School does not award the grade of D). See Course Syllabus for Grading Policies.

GRADING

According to UMUC's grading policy, the following marks are used:

	Undergraduate	Graduate
A	90-100	90-100
B	80-89	80-89
C	70-79	70-79*
D	60-69	N/A**
F	59 or below	69 or below
FN	Failure-Non attendance	Failure-Non attendance
G	Grade Pending	Grade Pending
P	Passing	Passing
S	Satisfactory	Satisfactory
U	Unsatisfactory	Unsatisfactory
I	Incomplete	Incomplete
AU	Audit	Audit
W	Withdrew	Withdrew

* The grade of "B" represents the benchmark for The Graduate School. Students must maintain a Grade Point Average (GPA) of 3.0 or higher. Classes where final grade of C or F places a student on Academic Probation must be repeated.

** The Graduate School does not award the grade of D.

COURSE EVALUATION SURVEY

UMUC values its students' feedback. You will be asked to complete an online evaluation toward the end of the term. The primary purpose of this evaluation process is to assess the effectiveness of classroom instruction in order to provide the best learning experience possible and make continuous improvements to every class. Responses are kept confidential. Please take full advantage of this opportunity to provide your feedback.

LIBRARY SUPPORT

Extensive library resources and services are available online, 24 hours a day, seven days a week at <https://www.umuc.edu/library/index.cfm> (<https://www.umuc.edu/library/index.cfm>) to support you in your studies. The UMUC Library provides research assistance in creating search strategies, selecting relevant databases, and evaluating and citing resources in a variety of formats via its Ask a Librarian service at <https://www.umuc.edu/library/libask/index.cfm> (<https://www.umuc.edu/library/libask/index.cfm>).

LEARNING MANAGEMENT SYSTEM SUPPORT

To successfully navigate the online classroom new students are encouraged to view the Classroom Walkthrough under Help in the upper right menu of the LEO classroom. Those requiring technical assistance can access Help@UMUC Support directly in LEO under the Help menu. Additional technical support is available 24 hours a day, seven days a week via self-help and live chat at <https://www.umuc.edu/help>

(<https://www.umuc.edu/help>) or by phone toll-free at 888-360-UMUC (8682).

SYLLABUS CHANGES

All items on this syllabus are subject to change at the discretion of the Instructor and the Office of Academic Affairs.

Class & Assignment Schedule

Students can access their complete list of assignments and their corresponding due dates within the **Assignments** section of the classroom by navigating to the **Assignments** section of the class from the main navigation bar. Follow the link below, and then click **Assignments**, for a video demonstration on how to utilize this feature.

[Classroom Walkthrough Videos Link \(http://www.umuc.edu/students/leo/videos.cfm\)](http://www.umuc.edu/students/leo/videos.cfm)

Students also have access to a calendar tool on the course homepage within the classroom.

Week	Assignment
0	<p>Week 0: Preview Week</p> <p>(1/25 – 1/31)</p> <p>Please get acquainted with our course and classroom during this preview week prior to the official start date.</p> <p>Readings:</p> <ul style="list-style-type: none">• "News" (Important Weekly news and updates posted on the Home Page)• Content > Syllabus• Content > Course Resources > eReadings (all required course materials are here)• Discussions > Introductions (Introduce yourself and meet your classmates)• Discussions > Ask the Prof (Ask any course related questions here. If you have a more individualized question, feel free to use the PAGER [envelope icon in upper right menu bar, to the left of your name].
1	<p>Week 1: Brief Precalculus Overview</p> <p>(2/1 - 2/7)</p> <p>Readings & Videos:</p> <p>Content > Course Resources > eReadings Sections 0.1 – 0.5</p> <p>Content > Course Resources > Videos Sections 0.1 – 0.5</p> <p>Homework:</p> <ul style="list-style-type: none">• Section 0.1: 1, 3, 5• Section 0.2: 1-11, 15, 17, 19, 25ab, 27• Section 0.3: 3-15 odd, 17-21 odd• Section 0.4: 3, 5, 7, 11-19 odd, 23, 25, 31• Section 0.5: 1-15 odd, 19-25 odd <p>Discussions:</p> <ul style="list-style-type: none">• Discussions > Introductions• Discussions > Week 1 Participation• Supplemental Review Videos: <p>Course Outcomes Aligned for the Week:</p> <ul style="list-style-type: none">• Determine fluency in the language of Calculus I, and describe and discuss mathematical ideas,• Using appropriate terminology• Solve problems by identifying, representing, and modeling functional relationships

<p>2</p>	<p>Week 2: Functions, Graphs, and Limits and Continuity</p> <p>(2/8 - 2/14)</p> <p>Readings & Videos:</p> <ul style="list-style-type: none">• Content > Course Resources > eReadings Sections 1.0 – 1.4• Content > Course Resources > Videos Sections 0.1 – 0.5 <p>Homework:</p> <ul style="list-style-type: none">• Section 1.0: 1–9 odd• Section 1.1: 1-19 odd• Section 1.2: 1-7 odd, 11-19 odd• Section 1.3: 1-5, 7-21 odd• Section 1.4: 1-19 odd <p>Discussion:</p> <ul style="list-style-type: none">• Discussions > Week 2 Participation <p>Assessment:</p> <ul style="list-style-type: none">• Quiz 1 due 2/14 <p>Course Outcomes Aligned for the Week:</p> <ul style="list-style-type: none">• Determine fluency in the language of Calculus I, and describe and discuss mathematical ideas,• Using appropriate terminology• Solve problems by identifying, representing, and modeling functional relationships• Use limits to determine continuity, slope of tangent, and rate of change
<p>3</p>	<p>Week 3: The Derivative (Part 1)</p> <p>(2/15 - 2/21)</p> <p>Readings & Videos:</p> <ul style="list-style-type: none">• Content > Course Resources > eReadings Sections 2.0 – 2.3• Content > Course Resources > Videos Sections 2.0 – 2.3 <p>Homework:</p> <ul style="list-style-type: none">• Section 2.0: odd problems• Section 2.1: 1-37 odd• Section 2.2: 1-3, 5, 7-15, 19-27, 30-37, 39, 47-53 odd• Section 2.3: 1-11 odd, 15-31 odd, 33-35, 39-43 odd <p>Discussion:</p> <ul style="list-style-type: none">• Discussions > Week 3 Participation <p>Assessment:</p> <ul style="list-style-type: none">• Quiz 2 due 2/21 <p>Course Outcomes Aligned for the Week:</p> <ul style="list-style-type: none">• Determine fluency in the language of Calculus I, and describe and discuss mathematical ideas,• Using appropriate terminology• Apply rules of differentiation to sketch graphs of functions, and to solve optimization and related rate problems

4	<p>Week 4: The Derivative (Part 2)</p> <p>(2/22 - 2/28)</p> <p>Readings & Videos:</p> <ul style="list-style-type: none"> • Content > Course Resources > eReadings Sections 2.4, 2.5, 2.6, 2.9 • Content > Course Resources > Videos Sections 2.4, 2.5, 2.6, 2.9 • Optional: eReadings & Videos for Sections 2.7* & 2.8*, based on your instructor) <p>Homework:</p> <ul style="list-style-type: none"> • Section 2.4: 1-4, 11-23 odd, 27-45 odd, 49-69 odd, 71-83 odd • Section 2.5: 1-29 odd, 33-41 odd, 43-49 odd • Section 2.6: 1-21 odd • Section 2.7*: 1-11 odd, 15 (optional) • Section 2.8*: 1, 3, 6, 9, 11, 13, 17, 19 (optional) • Section 2.9: 1-11 odd, 15-31 odd, 33-35, 39-43 odd <p>Discussion:</p> <ul style="list-style-type: none"> • Discussions > Week 4 Participation <p>Assessment:</p> <ul style="list-style-type: none"> • Quiz 3 due 2/28 <p>Course Outcomes Aligned for the Week:</p> <ul style="list-style-type: none"> • Determine fluency in the language of Calculus I, and describe and discuss mathematical ideas, • Using appropriate terminology • Solve problems by identifying, representing, and modeling functional relationships • Apply rules of differentiation to sketch graphs of functions, and to solve optimization and related rate problems <p>* Note: Sections 2.7 and 2.8 are optional at Instructor's discretion.</p>
5	<p>Week 5: Derivatives and Graphs (Part 1)</p> <p>(2/29 - 3/6)</p> <p>Readings & Videos:</p> <ul style="list-style-type: none"> • Content > Course Resources > eReadings Sections 3.1 – 3.4 • Content > Course Resources > Videos Sections 3.1 – 3.4 <p>Homework:</p> <ul style="list-style-type: none"> • Section 3.1: 1-15 odd, 17-35 odd, 41, 43 • Section 3.2: 1, 3, 7, 9, 13-17 odd, 21, 23, 27-29, 31, 33 • Section 3.3: 1, 3, 7-29 odd • Section 3.4: 1, 3, 5-11 odd, 13, 15 <p>Discussion:</p> <ul style="list-style-type: none"> • Discussions > Week 5 Participation <p>Assessment:</p> <ul style="list-style-type: none"> • Quiz 4 due 3/6 <p>Course Outcomes Aligned for the Week:</p> <ul style="list-style-type: none"> • Determine fluency in the language of Calculus I, and describe and discuss mathematical ideas, • Using appropriate terminology • Apply rules of differentiation to sketch graphs of functions, and to solve optimization and related rate problems

<p>6</p>	<p>Week 6: Derivatives and Graphs (Part 2)</p> <p>(3/7 - 3/13)</p> <p>Readings & Videos:</p> <ul style="list-style-type: none">• Content > Course Resources > eReadings Sections 3.5 – 3.7• Content > Course Resources > Videos Sections 3.5 – 3.7 <p>Homework:</p> <ul style="list-style-type: none">• Section 3.5: 1-11 odd, 15-23 odd, 29, 31• Section 3.6: 1-59 odd• Section 3.7: 1-29 odd <p>Discussion:</p> <ul style="list-style-type: none">• Discussions > Week 6 Participation <p>Assessment:</p> <ul style="list-style-type: none">• Quiz 5 due 3/13 <p>Course Outcomes Aligned for the Week:</p> <ul style="list-style-type: none">• Determine fluency in the language of Calculus I, and describe and discuss mathematical ideas,• Using appropriate terminology• Apply rules of differentiation to sketch graphs of functions, and to solve optimization and related rate problems
<p>7</p>	<p>Week 7: Introducing Integration</p> <p>(3/14 - 3/20)</p> <p>Readings & Videos:</p> <ul style="list-style-type: none">• Content > Course Resources > eReadings Sections 4.0 – 4.4• Content > Course Resources > Videos Sections 4.0 – 4.4 <p>Homework:</p> <ul style="list-style-type: none">• Section 4.0: 1–7, 9, 11, 13, 14• Section 4.1: 1–19 odd, 25, 29, 33, 37, 41, 45, 49• Section 4.2: 1–23 odd• Section 4.3: 1–51 odd• Section 4.4: 1–25 odd <p>Discussion:</p> <ul style="list-style-type: none">• Discussions > Week 7 Participation <p>Assessment:</p> <ul style="list-style-type: none">• Quiz 6 due 3/20• Applied Project due 3/20 <p>Course Outcomes Aligned for the Week:</p> <ul style="list-style-type: none">• Determine fluency in the language of Calculus I, and describe and discuss mathematical ideas,• Using appropriate terminology• Solve problems by identifying, representing, and modeling functional relationships• Apply antidifferentiation and the Fundamental Theorem of Calculus to evaluate integrals

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Week 8: The Fundamental Theorem of Calculus

(3/21 - 3/27)

Readings & Videos:

- Content > Course Resources > eReadings Sections 4.5 – 4.7
- Content > Course Resources > Videos Sections 4.5 – 4.7

Homework:

- Section 4.5: 1–7, 9, 11, 13, 14
- Section 4.6: 1–19 odd, 25, 29, 33, 37, 41, 45, 49
- Section 4.7: 1–23 odd

Discussion:

- Discussions > Week 8 Participation

Assessments:

- Final Exam due 3/27

Course Outcomes Aligned for the Week:

- Determine fluency in the language of Calculus I, and describe and discuss mathematical ideas,
- Using appropriate terminology
- Apply antidifferentiation and the Fundamental Theorem of Calculus to evaluate integrals