

MTH 151- 8101 - Calculus for Applied Science and Engineering I

University of Massachusetts Dartmouth

Course Time

Tuesdays – Wednesdays - Thursdays	9:00am -1:00pm	Room 240 CCB (Charlton College of Business)
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Instructor

Name	Adriano Marzullo
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Office Phone	508-999-8323

Office Hours

After class (1:00 pm – 2:00 pm)

Course Description

Lecture / 4 hours per week. An intensive study of differential calculus and its applications, and an introduction to integrals. Topics include: limits, continuity, indeterminate forms, differentiation and integration of algebraic and transcendental functions, implicit and logarithmic differentiation, integration by substitution, the applications of calculus in science and engineering, and the use of technological tools (such as graphing calculator and computer algebra systems). This is the first semester of the standard calculus sequence designed for Physics and Engineering majors in the integrated engineering curriculum. With your advisor's consent, this course may be repeated as MTH 151. This course fulfills the general education core requirements for Physics and Engineering majors who matriculated prior to Fall 2012 and has been approved by University Studies Curriculum for students matriculating in Fall 2012 or later.

Cluster 1D Learning Outcomes

1. Recognize when to apply mathematical concepts and methods to specific problems.
2. Manipulate mathematical expressions to solve for particular variables.

3. Draw conclusions from quantitative information and communicate these conclusions verbally and graphically.
4. Implement mathematical models to obtain accurate or approximate solutions using appropriate tools.
5. Apply mathematical techniques to social and scientific problems.

Course Objectives

After completing this course, you will be able to:

1. Determine the limit of a function, including one-sided limits, infinite limits (vertical asymptotes), and limits at infinity (horizontal asymptotes) using appropriate graphical and analytical techniques, including l'Hospital's rule.
2. Determine the continuity of functions in terms of limits, and classify types of discontinuities
3. Define the derivative as the instantaneous rate of change of a function at point a . Calculate derivatives using the limit of the difference quotient as x approaches a . Use derivatives to calculate the equation of a tangent to a curve at a point. Estimate and interpret instantaneous and average rates of change using graphs, tables, and functions.
4. Compute derivatives of algebraic, trigonometric, exponential, logarithmic and inverse functions using the definition of a derivative and basic differentiation rules.
5. Sketch curves of functions using differentiation: find intervals of increase and decrease, determine local and global maximum and minimum values over an interval, and determine concavity. Combine this information with the domain of a function, intercepts, symmetry and asymptotes to complete the graph of a curve.
6. Use derivatives to solve graphing and modeling problems. Typical problems will be taken from a list that includes, among others, slope of a tangent line, rates of change in economics and science, critical numbers, extreme values, intervals of increasing and decreasing functions, concavity, inflection points, sketching graphs of a function, optimization, linear approximation, and the Mean Value Theorem.
7. Find the anti-derivative of a function. Find the function given the first or second anti-derivative. and solve applied problems using anti-derivatives. Determine a function given graphs of anti-derivatives, or vice-versa.
8. Evaluate indefinite integrals (anti-derivatives) using basic integration formulas and the Substitution Rule.
9. Calculate definite integrals using the Fundamental Theorem of Calculus and the Substitution Rule.
10. Approximate or set up integrals to compute area, accumulated change, displacement and other related problems from tables, graphs and verbal statements.
11. Apply analytical and problem-solving skills through class activities and use of the graphing calculator.
12. Communicate your work both orally and through the use of mathematical language.

Course Materials

Text: Stewart, J. Calculus—Early Transcendentals, 8th ed. Boston, MA: Cengage Learning, 2016

Except for the book, there is no additional material for this class. Since all the assignments will be administered through WebAssign, it is important for the students to buy the textbook with the WebAssign Access Code included. Here are the students' choices:

Cengage Unlimited 1 semester subscription - ISBN: 9780357700006

Cengage Unlimited 1 year's subscription - ISBN: 9780357700013

Cengage Unlimited 2 years' subscription - ISBN: 9780357700020

Course Communication

Expectations for Electronic Communication

Please use email ***ONLY*** when the subject is of a personal and confidential matter. If the question you ask is of a nature that even one other person in the course could benefit from the answer, post the question in the appropriate discussion board forum.

I check my email daily Monday through Sunday during normal business hours only. You can expect a reply from me via email within 24 hours during the week.

I will also check the discussion forums daily during the week. I will post often during the first weeks of the course and then drop off in Activity while expecting participants to fill any void. Rest assured, however, I ***will*** be participating in what I hope will be lively discussions and will ***always*** reply to any discussion comment directed specifically at me.

Time Considerations

Students should be prepared to spend a minimum of 3 hours a week on reading and on course assignments. While you may feel that I'm displaying a lot of information to you on a weekly basis remember that in a traditional "live" course you would be coming to class for 3 hours and then spending an additional 3-6 hours (at least) outside of class on assignments and reading. In our online course environment, my expectation is that you will be spending those 3 "class hours" on your own, working on the concepts that you would usually get in a live lecture. Please be sure to budget your time accordingly!

Substantive participation in online discussions should:

- Ask insightful questions
- Answer other people's questions
- Make comments that are relevant to the course content and objectives

Methods of Instruction

We will have one midterm exam and a cumulative final examination. I will also give five quizzes, in class. It is your responsibility to take the test or quiz at the scheduled time, if known, or to make alternative arrangements in advance. A test or quiz can only be made up if you have a legitimate reason (e.g. medical emergency). If you are to miss a quiz or test, it is your responsibility to contact me. Missing class without excuse when a test or quiz is given results in a zero for the assessment.

I will drop your lowest two homework assignments. I will also drop your lowest quiz. I will not drop any test scores. I do not give extra credit. Don't ask. If you want more points, study harder. If you have questions about the grading policy at any time, please contact me.

MyCourses/WebAssign

MyCourses will contain the current course syllabus, class notes, lesson videos and other course information. Homework and online quizzes will be on WebAssign. There will be a link established to WebAssign on MyCourses. You will be expected to be able to access both MyCourses and WebAssign and use them for these purposes

WebAssign Homework

Your homework will be on-line, and we will use WebAssign for those. WebAssign will be available for you by Sunday June 9, 2019.

Sign up for WebAssign in advance of the first class. You will have a homework assignment the first night of class.

STUDENTS WILL ACCESS TO WEBASSIGN THROUGH myCourses just by clicking the "Link to the Online Homework (WebAssign)".

You will need to use an Access Code to pay for WebAssign. The access code will be included on a card if you purchase your textbook in a hard copy bundle. Do not throw away your WebAssign Access Code card. If you are not purchasing hard copy text, you may obtain an access code online at Webassign.com, or at the bookstore.

Classroom Policy

Attendance and timely arrival at all classes is expected. Classroom participation is expected. You are expected to arrive to class fully prepared and on time, and remain on task throughout each period.

If you miss a class you will be responsible for taking the initiative in making up all work. If you miss more than 3 classes, you are subject to a reduction in your grade, withdrawal from the course or failure.

All cell phones must be turned off in class and put away. You may use computers and tablets for note taking and reference purposes during class. Please do not abuse the privilege. If I see you on any non-related web site, (email, Facebook, IM, etc.) you will be dismissed from class for the day and the entire class may lose the privilege

Final Grade Breakdown

Midterm Exam	30%
Quizzes	20%
Homework	15%
Project(s)	5%
Cumulative Final Exam	30%
TOTAL	100%

Grading will be done on a percentage of total points basis as follows:

98-100%	A+
93-97%	A
90-92%	A-
87-89%	B+
83-86%	B
80-82%	B-

77-79%	C+
73-76%	C
70-72%	C-
67-69%	D+
63-66%	D
60-62%	D-
59% or less	F

Incomplete Policy

According to the university catalog, an incomplete may be given only in exceptional circumstances at the instructor's discretion. The student must be passing at the time of the request or be sufficiently close to passing. If the work is not completed within one year of the recording of the incomplete grade, the grade will become an F(I). The incomplete policy for this course is that at least 70% of the course must be already completed and an exceptional circumstance (i.e. medical issue) must exist. If you feel you require an incomplete for an exceptional reason, you need to email me and state your reasons for the incomplete in writing. We will then decide on a course of action.

Course Conduct

UMass Dartmouth policies regarding equal opportunity, discrimination, harassment, and sexual violence apply to all learning environments wherever they are located and from wherever they are taught. This applies to all UE face-to-face, off-campus, blended, and online courses. Please see the [Office of Diversity, Equity & Inclusion policies page](#) for more information.

Student Academic Integrity Policy

All UMass Dartmouth students are expected to maintain high standards of academic integrity and scholarly practice. The University does not tolerate academic dishonesty of any variety, whether as a result of a failure to understand required an academic and scholarly procedure or as an act of intentional dishonesty.

A student found responsible for academic dishonesty is subject to severe disciplinary action which may include dismissal from the University. The procedure for responding to incidents of academic dishonesty may be found in Section III of this document. You may also refer to the Student Handbook for information about the judicial process.

A high standard of academic integrity promotes the pursuit of truth and learning and respect for the intellectual accomplishments of others. These are values that are fundamental to the mission of this University. Such values are undermined by academic dishonesty.

Academic freedom is a fundamental right in any institution of higher learning. Honesty and integrity are necessary preconditions of this freedom. Academic integrity requires that all academic work be wholly the product of an identified individual or individuals. Joint efforts are legitimate only when the assistance of others is explicitly acknowledged and deemed appropriate by the instructor of the course. Ethical conduct is the obligation of every member of the University community, and breaches of academic integrity constitute serious offenses.

Maintenance of the standards of academic integrity and the successful administration of this policy depend on the mutual cooperation of faculty and students.

Faculty cooperation is essential for the successful application of the procedures defined by this Academic Integrity Policy. Faculty members promote academic integrity by making clear on their syllabi their expectations concerning homework assignments, collaborative student efforts, research papers, examinations, computer-based infractions, and the like. Efforts should be made to detect and to prevent cheating and plagiarism in all academic assignments. If faculty members have evidence of academic dishonesty, they are expected to report such evidence promptly.

Students must assume responsibility for maintaining honesty in all work submitted for credit and in any other work designated by the instructor of the course. Students are also expected to

report incidents of academic dishonesty to the instructor or dean of the instructional unit.

The intent of this policy is to make clear the standards of academic integrity at UMass Dartmouth.

*For additional information on violations, infractions, and consequences visit the [UMass Dartmouth Student Academic Integrity Policy](#).

Center for Access and Success

In accordance with University policy, if you have a documented disability and require accommodations to obtain equal access in this course, please meet with the instructor at the beginning of the semester and provide the appropriate paperwork from the [Center for Access and Success](#). The necessary paperwork is obtained when you bring proper documentation to the Center.

Credit Hour Definition

One credit hour is an amount of work represented in intended learning outcomes and verified by evidence of student achievement that is an institutionally established equivalency that reasonably approximates not less than:

1. One hour of classroom or direct faculty instruction and a minimum of two hours of out-of-class student work each week for approximately fifteen weeks (includes exam week) for one semester or the equivalent amount of work over a different amount of time.
2. At least an equivalent amount of work as required in paragraph (1) of this definition for other academic activities as established by the institution, including laboratory work, internships, practica, studio work, and other academic work leading to the award of credit hours. Because this is a 3-credit class, 3 hours per week of in-class work and 6 hours per week of out-of-class work are required.

Other Resources for UMass Dartmouth Students

Tutoring

If you have difficulty with the coursework, please:

- Contact me directly using the contact information listed at the top of this document.
- Contact the Academic Resource Center (ARC) for support:
 - Location: Liberal Arts Room 007
 - Phone: 508.999.8708
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Technical Help

- 24/7 email, live chat, and phone support for myCourses are available at the [myCourses support portal](#).
- Support information for all other UMass Dartmouth technologies can be found on the [Technical Resources page](#).

Course Schedule

* The following course schedule is tentative and subject to change.

Week 1: June 11 – June 13, 2019

<ul style="list-style-type: none">• Syllabus Discussion <p>Chapter 1</p> <ul style="list-style-type: none">• Sec 1.1 Four Ways to Represent a Function• Sec 1.2 – 1.3 New Functions From Old• Sec 1.4 Exponential Functions• Sec 1.5 Inverse Functions and Logarithms <p>Chapter 2</p> <ul style="list-style-type: none">• Sec 2.2 The Limit of a Function• Sec 2.3 Calculating Limits Using the Limits Laws• Sec 2.5 Continuity• Sec 2.6 Limits at Infinity and Horizontal Asymptotes• Sec 2.7 (2.1) Derivatives as Rate of Change;• Sec 2.8 The Derivative as a Function (Wednesday)	<ul style="list-style-type: none">• WebAssign Homework Week 1 due by Monday June 17, 2019 at 11:59 pm;
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Week 2: June 18 – June 20, 2019

<p>Chapter 3</p> <ul style="list-style-type: none">• Sec 3.1 Derivatives of Polynomials and Exponential Functions;• Sec 3.2 The Product and Quotient Rules;• Sec 3.3 Derivatives of Trigonometric Functions;• Sec 3.4 Chain Rule• Sect 3.5 Implicit Differentiation• Sec 3.6 Derivatives of logarithmic Functions• Sec 3.9 Related Rates (Optional)• Sec 3.10 Linear Approximations and Differentials	<ul style="list-style-type: none">• Quiz 1 will be held in class on Tuesday June 18, 2019• Quiz 2 will be held in class on Thursday June 20, 2019• WebAssign Homework Week 2 due by Monday June 24, 2019 at 11:59 pm;
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Week 3: June 24 – June 26, 2019

<p>• Review Midterm Exam</p> <p>Chapter 4</p> <ul style="list-style-type: none">• Sec 4.1 Maximum and Minimum• Sec 4.3 How Derivatives Affect the Shape of a Graph;• Sec 4.5 Summary of Curve Sketching• Sec 4.4 Indeterminate Forms and l'Hospital Rule• Sec 4.7 Optimization Problems;	<ul style="list-style-type: none">• Quiz 3 will be held in class on Tuesday June 25, 2019• Midterm Exam will be held on Thursday June 27 covering chapters 1, 2 and 3;• WebAssign Homework Week 3 due by Monday July 1, 2019 at 11:59 pm;
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Week 4: – July 2 – 3, 2019

<p>Chapter 5</p> <ul style="list-style-type: none">• Sec 5.1 Areas and Distances;• Sec 5.2 Areas and Distances;• Sec 5.3 The Fundamental Theorem of Calculus;• Sec 5.4 Indefinite Integrals and Net Change Theorems	<ul style="list-style-type: none">• Quiz 4 will be held in class on Wednesday July 3, 2019• WebAssign Homework Week 4 due by Monday July 8, 2019 at 11:59 pm
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Week 5: – July 9 – 11, 2019

<ul style="list-style-type: none">• Sec 5.4 Indefinite Integrals and Net Change Theorems• Sec 5.5 Substitution Rule • Review	<ul style="list-style-type: none">• Quiz 5 will be held on Tuesday July 9, 2019; • Final Exam will be held on Thursday July 11, 2019 • WebAssign Homework Week 5 due by Friday July 12 1 at 11:59 pm
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This syllabus is a guide and every attempt is made to provide an overview of the course. However, circumstances and events may make it necessary for the instructor to modify the syllabus during the semester and may depend in part on the progress, needs and experiences of the students. Significant changes to the syllabus will be made with advance notice.