MTH141 Calculus I

Section 1001 - Summer 2023

Instructor: Juhyung Lee

Email: juhyung@uri.edu

Email Policy: Only URI email account should be used for communication

Office Hours: M-F 9AM-10AM or By appointment on Zoom

Website: Brightspace is the online learning platform used for URI

Course Description and Goals: Math 141 introduces the study of calculus. Topics discussed in the course include functions and their graphs, limits, the derivative, applications to finding rates of change and extrema and to graphing, the integral, and applications. The further study of calculus takes place in MTH 142 (Calculus II), MTH 243 (Calculus for Functions of Several Variables), and MTH 437/438 (Advanced Calculus and Application I/II).

The main goal of MTH 141 is to prepare students for further study in mathematics, basic sciences, or engineering by introducing them to fundamental ideas used in measuring change and limiting behavior of functions, including limits, derivatives, and integrals, as well as techniques of differentiation and how to apply these to solve real-world problems. Along the way, you will develop new skills in problem solving and critical reasoning.

Textbook: Calculus: Single Variable, 7th edition (Not the 8th edition) Deborah Hughes-Hallett, Andrew Gleason, William McCallum, et al. ISBN-13: 978-1-119-44419-0 (Not required)

Do not buy a "bundle." Some copies of the text come bundled with an access code for the publisher's homework system, WileyPlus. We will not be using the WileyPlus system for our homework. We will use WeBWork for the online homework. This is provided to you at no charge.

Grade Categories and Scale: Grades will be determined through a weighted average with categories and weights:

Categories	**Weights**	Exam I	10 %
Exam II	10 %	Exam III	10 %
Exam IV	10 %	Exam V	10 %
Worksheet	25 %	WeBWork	25 %

Letter grades for the course will be determined by considering your overall weighted percentage according to the following scale:

Scale (%)	**Grade**	87-89.99	B+	77-79.99	C+	67-69.99	D+
93-100	A	83-86.99	B	73-76.99	C	60-66.99	D
90-92.99	A-	80-82.99	B-	70-72.99	C-	-59.99	F

Learning Outcomes: Upon successfully completion of this course a student will be able to:

1. **Limits and continuity:** Select suitable techniques to/and perform analysis and computation of limits by analytic, graphical and numerical methods, and use limits to investigate properties of functions such as continuity and existence of asymptotes. Investigate continuity properties of functions.

2. **Derivatives**: Select suitable techniques to/and perform analysis and computation of derivative at a point using limits, numerical, and graphical methods. State the definition of derivative as a limit of a difference quotient, and use it to establish its value or non-existence. Perform analysis of differentiability of a function at a point or a set of points, using limits, numerical, or graphical methods.

3. **Computing derivatives algebraically**: Select suitable formulas and theorems to/and perform computation of first and higher order derivatives algebraically. Perform computation derivatives of functions defined implicitly.

4. **Using Derivatives**: Perform analysis and computation using differentiation to/and investigate velocity, acceleration, related rates, monotonicity, optimization problems, linear approximation, limits (L'Hopital's rule), and functions defined parametrically. Apply theorems about continuous and differentiable functions (Extreme Value Theorem, Mean Value Theorem, Rolle's Theorem).

5. **Integration**: Select appropriate technique to perform analysis and computation using Left and Right Riemann sums to approximate integrals. Select suitable formulas and theorems to/and calculate anti-derivatives, and verify answers by differentiation. State the First and Second Fundamental Theorem of Calculus and use it to compute integrals of simple functions, and apply them to total change. Use integrals to compute area of planar regions bounded by simple functions.

6. **Modeling, Approximation, Technology**: Select calculus methods and use technology to analyze mathematical models and determine their applicability. Use technology to analyze accuracy of approximations, perform numerical and symbolic calculations, and produce graphical representations of functions to investigate their properties.

7. **Written Mathematical Communication**: Communicate effectively in written form mathematical ideas and solutions, by stating in a complete, clear, concise, and organized manner steps, calculations, solution strategy, conclusions, and when appropriate, interpreting results in practical or applied terms.

Technology requirements: This is an online course and thus reliable computer access to the internet is required in order to successfully navigate this course. Zoom will be used for virtual meetings. Firefox is the recommended browser for Brightspace compatibility. You will require additional plug-ins (Adobe Reader, Adobe Flash). You should have the ability to upload your handwritten work as a pdf document. (See Appendix A)

Brightspace: For this online course, Brightspace is our "classroom". Please refer to the Brightspace tutorial video for details on which tools you will need, and how to use those tools. You will be required to upload your quizzes, homework assignments, and exams to Brightspace.

Meetings and Lectures: The lecture videos will be posted on Brightspace. You are required to watch the lecture videos according to the course schedule. Also, we will have virtual meetings on Zoom from Monday to Friday at 9:00 AM (about 1 hour). It is highly recommended that you attend the meetings regularly and ask questions directly. The recorded meeting videos will be uploaded to Brightspace.

Worksheet: You can write on your solution using tablet/smart device or scan your handwritten answer as single pdf document and upload it to Brightspace before it closes. Two with the lowest scores will be dropped in calculating your course grade. Make up assignments will not be given for any reason.

WeBWork: Online homework will be administered using the free system WeBWork. All questions about WeBWork should be directed to mth111webwork@gmail.com

Exams: Exam I, II, III, VI, and V will be given remotely. There is no cumulative final exam. Brightspace will open the exams as scheduled (see the course calendar). For each written response question, you can either type all your steps in the text box in Brightspace directly or submit written work as a pdf file.
You must complete each exam before it closes. If you miss the upload deadline on Brightspace, then you need to email me your solutions to be graded. If you email me your work within 30 minutes after the due time, your score will be capped at 90% of the available points. **No credit will be given for a submission after 30 minutes from the due time.**
You will be expected to use **your own note** from the lecture videos and complete the exams without the aid of books, science/graphing calculators, internet connection, or any other aid or device of any kind including any input from any other person.

Academic Integrity: Students are expected to be honest in all academic work. A student's name on any written work, quiz or exam shall be regarded as assurance that the work is the result of the student's own independent thought and study. Work should be stated in the student's own words, properly attributed to its source. Students have an obligation to know how to quote, paraphrase, summarize, cite and reference the work of others with integrity. The following are examples of academic dishonesty.

- Using material, directly or paraphrasing, from published sources (print or electronic) without appropriate citation
- Claiming disproportionate credit for work not done independently
- Unauthorized possession or access to exams
- Unauthorized communication during exams
- Unauthorized use of another's work or preparing work for another student
- Taking an exam for another student
- Altering or attempting to alter grades
- The use electronic devices to gain an unauthorized advantage during exams
- Fabricating or falsifying facts, data or references
- Facilitating or aiding another's academic dishonesty
- Submitting the same paper for more than one course without prior approval from the instructors

Makeup Policy: Makeup exams may be scheduled in the event you are unable to attend exams under the following conditions. See University Manual sections 8.51.10 to 8.51.14 for guidelines.

• If your reason for missing the exam as scheduled is (i) a University sanctioned event for which verifiable documentation can be provided, (ii) a responsibility to an employer that cannot be rescheduled (with documentation from your employer), or (iii) Religious holidays, then you must inform your instructor 48 hours in advance of the exam and provide documentation if requested. Makeup exams will be scheduled after the actual exam, and preferably before the class period when exams are to be handed back, but no later than one week after the original date.

• If the reason for missing the exam as scheduled is due to (i) illness (with verifiable documentation from a medical provider if requested), or (ii) an emergency (with appropriate documentation if requested), then you must contact your instructor within 24 hours of the exam. Makeup exams may be scheduled no later than a week after the original date, unless the illness or emergency precludes this, in which case we will follow the University Manual sections 8.51.10 to 8.51.14.

• Failure to notify your instructor within 7 calendar days of your absence will result in a 0 for the exam, see section 8.51.14 University Manual.

Anti-Bias Syllabus Statement: We respect the rights and dignity of each individual and group. We reject prejudice and intolerance, and we work to understand differences. We believe that equity and inclusion are critical components for campus community members to thrive. If you are a target or a witness of a bias incident, you are encouraged to submit a report to the URI Bias Response Team at www.uri.edu/brt. There you will also find people and resources to help.

Disability Services for Students Statement: Your access in this course is important. Please send me your Disability Services for Students (DSS) accommodation letter early in the semester so that we have adequate time to discuss and arrange your approved academic accommodations. If you have not yet established services through DSS, please contact them to engage in a confidential conversation about the process for requesting reasonable accommodations in the classroom. DSS can be reached by calling: 401-874-2098, visiting: web.uri.edu/disability, or emailing: dss@etal.uri.edu. We are available to meet with students enrolled in Kingston as well as Providence courses.

No Work Submitted and Incomplete Grades: University of Rhode Island regulations concerning no work submitted and incomplete grades will be followed. See the University Manual section 8.53.12 regarding no work submitted and sections 8.53.20 and 8.53.21 regarding incomplete grades for details.

Religious Holidays: It is the policy of the University of Rhode Island to accord students, on an individual basis, the opportunity to observe their traditional religious holidays. Students who plan to be absent from classes or examinations for religious holy days that traditionally preclude secular activity shall discuss this with the appropriate instructor(s) in advance of the holy day. See the University Manual section 8.51.11 for details.

Standards of Behavior: Students are responsible for being familiar with and adhering to the published "Community Standards of Behavior: University Policies and Regulations" which can be accessed in the University Student Handbook

web.uri.edu/studentconduct/university-student-handbook/

In particular, students are expected to support and promote the creation of a positive and productive learning environment. Examples of disruptive behaviors include inappropriate use of electronic

devices, failure to set cell phones/pagers to silent, texting, carrying on unnecessary conversations, rudeness, etc. These behaviors and any behavior that interferes with the instructor's ability to conduct the class or other students' ability to have a quality learning experience will not be tolerated.

Appendix : PDF Files

You will need to submit written work as a **single pdf** file (do not spend time trying to type your answers). If you already know how to do this, feel free to skip the text below.

There are several ways one can convert handwritten notes into a pdf file. Here are some freely available ways of going about this:

1. Using a scanner if available.

2. Using a smart device, e.g., phone or a tablet. Here is a couple apps FREE applications:

   (a) Apple iOS – Scannable or Office Lens (later syncs with One Drive)

   (b) Android - ScannerApp or Office Lens (later syncs with One Drive)

   Whichever application you choose, you should not have to purchase it!

3. If none of the above options work, then you can do the following:

   (a) Take photos of individual handwritten pages.

   (b) Import each photo in a single Word document (one photo per page, enlarged as much as possible).

   (c) Export/save the Word document as pdf.

4. Finally, if you need to merge multiple pdf files into a single pdf file, you can use tools freely available on internet, e.g., https://www.pdf2go.com/merge-pdf

Course Calendar for MTH 141 Summer 2023

This is a tentative course calendar. It is subject to change.

Week	Date	Topics	Exams/Events
1	May 22	(1.2) Exponential Functions (1.3) New Functions from Old (1.4) Logarithmic Functions	
	May 23	(1.5) Trigonometric Functions (1.6) Powers, Polynomials, Rational Functions	
	May 24	(1.7) Introduction to Limits and Continuity (1.8) Extending the Idea of a Limit	
	May 25	(1.9) Further Limit Calculations using Algebra (2.1) How do we measure speed?	
	May 26	(2.2) The Derivative at a Point (2.3) The Derivative Function	**Exam I** on May 27
2	May 29	No Class	Memorial Day
	May 30	(2.4) Interpretations of the Derivative (2.5) The Second Derivative	
	May 31	(2.6) Differentiability (3.1) Powers and Polynomials	
	June 1	(3.2) The Exponential Function (3.3) The Product and Quotient Rules	
	June 2	(3.4) The Chain Rule	**Exam II** on June 3
3	June 5	(3.5) The Trigonometric Functions (3.6) The Chain Rule and Inverse Functions	
	June 6	(3.7) Implicit Functions (3.8) Hyperbolic Functions	
	June 7	(3.9) Linear Approximation and the Derivative (3.10) Theorems about Differentiable Functions	
	June 8	(4.1) Using First and Second Derivatives	
	June 9	(4.1) continued	**Exam III** on June 10
4	June 12	(4.2) Optimization	
	June 13	(4.3) Optimization and Modeling	
	June 14	(4.6) Rates and Related Rates	
	June 15	(4.7) L'Hopital's Rule, Growth, Dominance	
	June 16	(4.8) Parametric Equations	**Exam IV** on June 17
5	June 19	No class	Juneteenth
	June 20	(5.1) How do we Measure Distance Traveled? (5.2) The Definite Integral	
	June 21	(5.3) First Fundamental Theorem of Calculus (5.4) Theorems about Definite Integrals	
	June 22	(6.1) Antiderivatives Graphically, Numerically (6.2) Constructing Antiderivatives Analytically	
	June 23	(6.4) Second Fundamental Theorem of Calculus	**Exam V** on June 24