MATH 1910: Calculus I Syllabus

Course Information

This course provides you with the mathematical material foundational for engineering and the sciences. It focuses on differentiation and integration, the two central concepts of differential and integral calculus. The use of these concepts is illustrated in applications to problems arising from various disciplines.

Course Details

Calculus I MATH 1910-006
Tuesdays/Thursdays 11.20am-12.45pm, Fridays 11.30am-12.25pm
Instructor: Dr. Thomas Hagen
Note: This course will be taught in live online lectures ("remote synchronous").

Course Goals

At the end of the course, students will:

- employ the concept of derivative of a function within the underlying framework of limits
- determine derivatives using the rules of differentiation
- demonstrate the use of derivatives in analyzing geometric properties of function graphs
- illustrate the concept of integral of a function
- determine integrals using antiderivatives and the Fundamental Theorem of Calculus
- solve applied problems utilizing the concepts of derivative and integral

Prerequisites and Co-requisites

According to the Undergraduate Catalog one of the following criteria must be met to enroll in MATH 1910:

- MATH 1720 with a grade of C- or better
- MATH 1730 with a grade of C- or better
- an ACT MATH subscore of at least 26

This prerequisite demonstrates that you have the required proficiency in algebra and trigonometry.

Course Topics

- Introduction: The tangent and velocity problems
- The concept of limit
    - The limit of a function

    - Laws of limits (and finding limits algebraically)
- Continuity and more limits
    - Continuity (including classifying discontinuities)
    - Limits and infinite limits at infinity (including asymptotes)
- The concept of derivative
    - Derivatives and rates of change
    - Derivatives and differentiability (including higher derivatives and the relation between a function and its derivatives)
- Differentiation rules I
    - Basic rules and derivatives of polynomials
    - Derivatives of exponential functions
    - The product and quotient rules: Derivatives of rational functions
    - Derivatives of trigonometric functions
- Differentiation rules II
    - The chain rule: Derivatives of composite functions
    - Implicit differentiation
    - Derivatives of logarithmic and inverse trigonometric functions
- Applications of the derivative I
    - Related rates
    - Linear approximation, differentials and error estimates
- Applications of the derivative II
    - Local and absolute extreme values
    - Monotonicity and concavity
    - The Mean Value Theorem and applications
- Applications of the derivative III
    - L'Hospital's rule and indeterminate forms
    - Curve sketching
    - Finding maxima and minima: Optimization problems
    - Antiderivatives and antidifferentiation
    - Illustrating antiderivatives: Rectilinear motion
- The concept of integral
    - Illustrating integrals: Net area and distance
    - The definite integral and its properties
    - Riemann sums and the midpoint rule
    - Basic rules of integration
- The Fundamental Theorem of Calculus
    - Derivatives of antiderivatives and antiderivatives of derivatives
    - Finding definite integrals via antiderivatives
    - The concept of indefinite integral
    - Net change and applications
- Substitution
    - Substitution and the chain rule
    - Finding definite and indefinite integrals with substitution
    - Substitution and symmetry

Textbooks, Supplementary Materials, Hardware and Software Requirements

Required Textbooks

This course will use the textbook

- Calculus: Early Transcendentals by James Stewart, 8th edition, Cengage Learning, 2016

If you purchase this textbook from the University of Memphis bookstore opens in new window, it comes as a bundle of a loose-page book with access to WebAssign, the Cengage online learning and testing platform which we will use during this course. WebAssign allows you to access an online version of the textbook, homework assignments and additional content.

For this course you may, alternatively, purchase stand-alone WebAssign access only. If you purchase stand-alone WebAssign access, you will not get the bundled textbook. However, you will still have access to the online version of the textbook.

To get started with WebAssign, check out the unit WebAssign, which contains the WebAssign Launch Tool WebAssign - MATH 1910-006 opens in new window. There is a grace period of up to two weeks before you must purchase WebAssign access.

Note: Multi-term access to WebAssign might be a good option for you if your program of study requires you to take Calculus II as well. However, even though it is likely that your future calculus instructors will keep the current version of the textbook, there is no guarantee that they will. Your multi-term access to WebAssign works only for the version of the textbook we use in this course.

Supplementary Materials

You may use a scientific, non-CAS calculator (with or without graphing features) for numerical work. The TI 83 Plus or TI 84 Plus or Silver Edition (or weaker) are permitted. Note, however, that TI 89s, TI 92s and similar models are prohibited.

Hardware and Software Requirements

Homework and additional content will be made available online via Brightspace/eCourseware and WebAssign. Live lectures will be given in Zoom (or an equivalent video conferencing platform). Hence you will need access to a device that satisfies certain minimum requirements opens in new window. For full participation in the online course you will also need a web camera and microphone (both are usually integrated in laptops). A web camera is **required** for all online, live testing.

To submit assignments online, you will need to make use of your smartphone/tablet with a PDF scanner app and an approved timestamp app:

- Suggested PDF scanner: CamScanner app, freely available for iOS opens in new window and Android opens in new window
- Mandatory timestamp: Timestamp Camera Enterprise app, freely available for iOS opens in new window and Android opens in new window.

Note: The newest versions of "Timestamp Camera Enterprise Free" (freely available) and "Timestamp Camera Enterprise Pro" (not freely available) are the **only** two timestamp apps which I accept. Watch out: The same software company offers similar timestamp apps which are **not** acceptable. Feel free to use a different PDF scanner if you prefer.

Timed online assignments require that you finish your work during the testing period and that you upload your work in Brightspace/eCourseware before this testing period is over. To this end, the testing period usually includes a short time span (ca. 10-15 minutes) set aside for scanning your work using the PDF scanner app and submitting scans. Work received in Brightspace/eCourseware after the testing period is typically not acceptable. However, there is one exception:

You have the option to make use of the approved timestamp app instead. If you use the timestamp app, it suffices if you take timestamped pictures of your work during the testing period without uploading your work immediately. You would then have about one hour (or longer as specified) to upload your timestamped work together with the corresponding pdf scanned pictures in Brightspace/eCourseware. Hence using the timestamp app is a way for you to make use of an extended time period during which you can submit your work. The timestamp lets you prove that your work was not altered after the testing period ended.

Recording Guidelines

All online activity, including class sessions and video lectures, can be recorded. Please refer to the Recording Guidelines in the **Communication** tab for more information.

Assessment and Grading

Testing Procedures

- Homework assignments will be given online in WebAssign. Due dates will be posted. Make sure you turn in your homework on time, following the instructions for submission. **No exceptions!**
- Each homework assignment will have the same weight towards your homework score.
- End-of-topic quizzes will be posted online at the end of every content unit starting with Unit 2. End-of-topic quizzes have a time limit and need to be completed by a stated deadline away from class ("asynchronously"). Usually you can choose the start time on an end-of-topic quiz at any time during a 24-hour (or longer) time window. An end-of-topic quiz may be taken up to three times, but only the **last** attempt will count.
- Each end-of-topic quiz will have the same weight towards your quiz score.
- Three mid-term tests (each ca. 55-70 min plus some time to upload your work) will be given online throughout the semester.

- A comprehensive final exam will be given online at the end of the semester.
- You must be online and allow to be monitored through your webcam for the **whole** testing period until you finish working when taking part in any online, in-class test (mid-term test, final exam). If you violate or fail to follow these test taking rules, your assignment will incur a penalty, up to and including being counted as zero points.
- **Any missed work (test, quiz etc.) will count as zero points.** I do not allow make-up, late or rescheduled work for any reason (except when official university rules require an accommodation). Hence if you miss a test because you got sick, had jury duty, attended a job interview or had another commitment, this test will count as zero points.
- Permitted calculators may be used during testing. Your computer and cell phone may be used for test taking purposes only and nothing else.
- A letter-sized "cheat sheet" in your own handwriting (with empty back side) is permitted for mid-term tests and the final exam. What you write on this cheat sheet is entirely up to you.
- The work you upload must be legible and in PDF format (hence use a PDF scanner). If you use a permitted timestamp app, you must upload the pictures of your work as well. Timestamped pictures must be in JPG, GIF or PDF format. Other picture formats (like HEIC) are not as easily accessible and are thus not acceptable. Each picture must show the timestamp, must be fully readable and must be identical with the uploaded work in PDF format.

Grading Procedure

By the end of the semester, you will have scores (0-100) in each of the following categories:

1. Attendance (A)
2. Homework: 26 assignments (H)
3. Quizzes: 11 assignments (Q)
4. Mid-Term Test 1 (T1)
5. Mid-Term Test 2 (T2)
6. Mid-Term Test 3 (T3)
7. Final Exam (F)

Occasionally, scores may exceed 100 if bonus points are awarded. Your score in the homework category is the average of all individual homework percentages, with each individual assignment given the same weight and the two lowest percentage scores dropped. Your score in the quiz category is the average of all individual quiz percentages, with each individual assignment given the same weight and the lowest percentage score dropped. Scores are usually rounded to two decimal places.

The final course score is calculated as follows:

$$0.05\,A + 0.2\,H + 0.15\,Q + 0.2\,(T1 + T2 + T3 + F) - 0.2\,\mathrm{Min}(T1, T2, T3, F)$$

Hence

- attendance counts with 5% to your final score,
- homework counts with 20% to your final score,
- quizzes count with 15% to your final score,
- each mid-term test and the final exam count with 20% to your final score, with the lowest result dropped.

Final course scores are rounded to the nearest integer. A final course score of 86 or more constitutes high achievement

Grading Scale

96-100+:	A+
91-95:	A
86-90:	A-
81-85:	B+
76-80:	B
71-75:	B-
66-70:	C+
61-65:	C
56-60:	C-
51-55:	D+
41-50:	D
0-40:	F

If you demonstrate **effective and consistent** participation in the learning community through questions, contributions to discussions etc. and your final score is less than 1 point from the next higher grade, I will award you the higher grade. Occasionally, your contributions to the online discussion forum about calculus might receive recorded feedback. A high overall feedback score is an excellent way to demonstrate your participation.

Awards

After reaching certain milestones (homework achievements etc.) you will be awarded badges to recognize your success. These badges are meant to motivate and encourage you on the road to success. However, they don't count towards your final grade.

Assignments and Participation

Tentative Assignments

Unit 1: Introduction

Unit 2: The Concept of Limit

- WebAssign Homework 1
- WebAssign Homework 2
- Unit 2 Quiz

Unit 3: Continuity and More Limits

- WebAssign Homework 3
- WebAssign Homework 4
- Unit 3 Quiz

Unit 4: The Concept of Derivative

- WebAssign Homework 5
- WebAssign Homework 6
- Unit 4 Quiz
- Mid-Term Test 1: Units 1-4, 100 points

Unit 5: Rules of Differentiation I

- WebAssign Homework 7
- WebAssign Homework 8
- WebAssign Homework 9
- Unit 5 Quiz

Unit 6: Rules of Differentiation II

- WebAssign Homework 10
- WebAssign Homework 11
- WebAssign Homework 12
- Unit 6 Quiz

Unit 7: Applications of the Derivative I

- WebAssign Homework 13
- WebAssign Homework 14
- Unit 7 Quiz

Unit 8: Applications of the Derivative II

- WebAssign Homework 15
- WebAssign Homework 16
- WebAssign Homework 17
- Unit 8 Quiz
- Mid-Term Test 2: Units 5-8, 100 points

Unit 9: Applications of the Derivative III

- WebAssign Homework 18
- WebAssign Homework 19
- WebAssign Homework 20
- WebAssign Homework 21
- Unit 9 Quiz

Unit 10: The Concept of Integral

- WebAssign Homework 22
- WebAssign Homework 23
- Unit 10 Quiz

Unit 11: The Fundamental Theorem of Calculus

- WebAssign Homework 24
- WebAssign Homework 25
- Unit 11 Quiz

Unit 12: Substitution

- WebAssign Homework 26
- Unit 12 Quiz
- Mid-Term Test 3: Units 9-12, 100 points

Throughout the semester, we will have 11 end-of-topic quizzes (online, asynchronous, timed and to be taken before a deadline). Quizzes are useful to assess your understanding of concepts and your progress with solution strategies for the material presented.

Class Participation and Attendance

Class participation in this course is broadly defined: You must participate in all live lectures, submit complete homework solutions and read the relevant sections in the textbook. I will assume that, as part of class participation, you check the news bulletin board on Brightspace/eCourseware for important announcements, that you follow up on the additional content posted in eCourseware or WebAssign (including discussion boards and instructional videos) and that you take part in online tutoring as a key learning resource.

If you miss a lecture, it is your responsibility to find out what material was covered and what assignments were given. Do not expect an immediate response if you contact me. Lecture recordings can be found here opens in new window.

Failing to participate in class as outlined above will have a negative impact on your grade, either directly (missed assignments) or indirectly (missed content, missed opportunities). I reserve the right to inform your advisers if you fail to show up to lectures or to do your assignments.

Attendance in online lectures is taken at random and recorded in Zoom. Only a fraction of the lectures will be used to evaluate your attendance. You will be considered in attendance if you are present for at least 90% of a class period. Otherwise your attendance will not be counted, and you will be considered absent. Your attendance score will count with 5% to your overall course score and will be determined as follows:

0-2 absences: 100

3-4 absences: 80

5-6 absences: 60

7-8 absences: 40

9-10 absences: 20

>10 absences: 0

Punctuality

Stay abreast of the material we cover in class. Do not delay homework. Do not fail to follow up if there is something you don't understand. Make use of our free tutoring service, use discussion boards etc. Also, showing up to online lectures late or leaving early may count as being not in attendance. Being late for an online test or unannounced quiz might disqualify you from taking part.

Course topics open as you move along. If you fail to visit course topics or do mandatory tasks, you may be blocked from accessing course contents, including tests. Any missed assignment counts as zero points.

Course Rules

- It is expected that you attend every class meeting.
- If you miss any graded assignment, it counts as zero. No make-up work, rescheduled work or late work is accepted.
- Learn to navigate in WebAssign and Brightspace/eCourseware. Address any technical issues without delay.

- Stay abreast of online course announcements. Check the news bulletin board on Brightspace/eCourseware often.
- Students must observe course netiquette and proper communication rules at all times. See the guidelines for communication below.

Guidelines for Communication

Office hours AND video/audio conferences

I will offer online office hours upon request. Please contact me by email ahead of time to schedule a video/audio conference. I will try to accommodate you, but you might have to wait a few business days.

Email

- Please use the eCourseware email platform to contact me (see Email in the **Communication** tab). Alternatively, you can reach me at thagen@memphis.edu.
- **Please make sure you use your university assigned email address or your eCourseware email address to contact me**. Any email you send me must have a subject line. I do usually not respond to inquiries from unofficial email addresses.
- Use standard fonts.
- Respect the privacy of other class members.

Feedback

- Allow up to two business days for responses to your email inquiries.
- Scores for mid-term tests and the final exam take usually a minimum of five business days to post. Please be patient.

Online Classroom Conduct

- Be on time. Late arrivals are disruptive.
- Please concentrate on the lecture. Don't do anything else. Avoid background noise and be considerate to the other class participants.
- **Please keep your web camera on for all face-to-face interactions with your instructor.** When your instructor works on the virtual whiteboard or discusses content slides, you need not keep your camera on. However, people want to know with whom they are together. Hence you should upload a ZOOM profile picture of yourself with professional appearance.
- During lectures please silence your microphone when you are not speaking. This is particularly important if there is a lot of background noise.

Discussion Groups

- Review the discussion threads thoroughly before entering the discussion.
- Try to maintain threads by using the "Reply" button rather than starting a new topic.

- Do not make insulting or inflammatory statements to other members of the discussion group. Be respectful of others' ideas.
- Be patient and read the comments of other group members thoroughly before entering your remarks.
- Be positive and constructive in group discussions.
- Respond in a thoughtful and timely manner.

Netiquette

- Be respectful and polite in **all** your online communication.
- To participate in online lectures, please switch your web camera on.
- Read up on the material posted online and check for answers to your questions before asking them.
- Your emails must be clear and self-contained.
- Do not submit any large files without prior approval.

Plagiarism and Integrity

Plagiarism, cheating, and other forms of academic dishonesty are prohibited. Students guilty of academic misconduct, either directly or indirectly, through participation or assistance, are immediately responsible to the instructor of the class in addition to other possible disciplinary sanctions which may be imposed through the regular institutional disciplinary procedures. Expectations for academic integrity and student conduct are described in detail on the website of the Office of Student Accountability opens in new window. Please read in particular, the section about "Academic Misconduct opens in new window".

Library, Tutoring and Other Resources

- The myMemphis Portal system, eCampus Student tab provides access to the University Library opens in new window.
- The **Tutoring** tab in the course navigation bar provides access to free online tutoring through UpSwing.
- The **LinkedIn Learning** tab in the course navigation bar provides free access to thousands of video tutorials.
- Other support services are available through the Educational Support Program opens in new window.

Student Accommodations

Qualified students with accessibility issues or learning accommodation issues due to a disability will be provided reasonable and necessary academic accommodations if determined eligible by disability services staff at the University of Memphis. Prior to granting disability accommodations in this course, the instructor must receive written verification of a student's eligibility for specific accommodations from the disability services staff. It is the student's responsibility to initiate contact with Disability Resources for Students opens in new

window(DRS) and to follow the established procedures for having the accommodation notice sent to the instructor. You may contact DRS directly by phone at 901.678.2880 or by email at drs@memphis.edu.

Student Health

Students who have a positive COVID-19 test should contact the Dean of Students at deanofstudents@memphis.edu.

Student Resources

Students who need additional resources, especially in times of personal or financial difficulties, can visit the Dean of Students Office website opens in new window.

COVID-19 Information

The Department of Mathematical Sciences maintains a collection opens in new window of links and resources concerning issues pertaining to COVID-19, on-campus conduct and important points of contact for students.

Sexual Misconduct and Domestic Violence Policy

This policy specifically addresses sexual misconduct which includes dating violence, domestic violence, sexual assault, and stalking. The policy establishes procedures for responding to Title IX-related allegations of sexual misconduct. Complaints can be reported to the Office for Institutional Equity (OIE). The OIE office is located in the Administration Building, Room 156. You may contact the OIE by phone at 901.678.2713 or by email at oie@memphis.edu opens in new window. Complaints can be submitted online at File a Complaint opens in new window.

Non-Discrimination and Anti-Harassment Policy

University policy prohibits discrimination and harassment based on protected characteristics and classes. Complaints of discrimination and harassment can be reported to the Office for Institutional Equity (OIE). You may contact OIE by phone at 901.678.2713 or by email at oie@memphis.edu opens in new window. The full text of the policy can be found at GE2030 - NONDISCRIMINATION AND ANTI-HARASSMENT opens in new window.

Technology Requirements

The following is a list of the minimum requirements to use our learning management system.

- Access to a reliable, high-speed Internet connection.

- Test your device to ensure it is compatible with our LMS (Learning Management System) using the System Check Wizard opens in new window.
- Open PDF files using the free downloadable software at Adobe Acrobat Reader DC.
- Use Microsoft Office Software for Faculty, Staff, and Students for document creation. (Available for students via umApps opens in new window)
- Play media content with Real Player opens in new window (free), Quick Time opens in new window (free), or Windows Media Player opens in new window(free).

Syllabus Changes

The instructor reserves the right to make changes as necessary to this syllabus. If substantial changes are necessitated during the term of the course, the instructor will immediately notify students of such changes by individual email communication and by posting notification and nature of change(s) on the news bulletin board.

Technical Support

Call the Helpdesk: 901.678.8888

Online Helpdesk opens in new window: To report an issue or request assistance, contact umTech - Information Technology Services.