Master Course Syllabus

For additional course information, including prerequisites, corequisites, and course fees, please refer to the Catalog: https://catalog.uvu.edu/

Semester: Spring
Year: 2025
Course Prefix: MATH
Course and Section #: 1210-X02
Course Title: Calculus I
Credits: 4

Course Description

Covers limits, continuity, differentiation, applications of differentiation, integration, and applications of integration, including derivatives and integrals of polynomial functions, rational functions, exponential functions, logarithmic functions, trigonometric functions, inverse trigonometric functions, and hyperbolic functions. This course is a prerequisite for calculus-based sciences.

Course Attributes

This course has the following attributes:
☐ General Education Requirements
☐ Global/Intercultural Graduation Requirements
☐ Writing Enriched Graduation Requirements
☒ Discipline Core Requirements in Program
☒ Elective Core Requirements in Program
☐ Open Elective
Other: *Click here to enter text.*

Instructor Information

Instructor Name: Dr. Harish Bhatt

Student Learning Outcomes

Upon successful completion, students should be able to:

1. Compute one- and two-sided limits of functions
2. Determine if a function is continuous at a number or on an interval
3. Find the derivatives of polynomial, trigonometric, exponential, logarithmic, inverse trigonometric, and hyperbolic functions, and find the derivatives of sums, products, quotients, and compositions of such functions
4. Perform implicit differentiation and solve problems involving related rates

5. Apply Newton's method
6. Apply knowledge of the first and second derivatives of a function to determine where the graph is increasing/decreasing and concave upward or downward
7. Solve optimization problems by using calculus methods
8. Apply L'Hospital's Rule to solve limit problems
9. Compute indefinite and definite integrals, find integrals using substitution and the Fundamental Theorem of Calculus.

Course Materials and Texts

1. Textbook: Calculus Volume 1
2. Lumen OHM
3. Laptop with Webcam
4. Internet Access
5. Graphing Calculator

Course Requirements

Course Assignments, Assessments, and Grading Policy

- Homework (20% of the overall grade)
- Three Midterm Exams (48% of the overall grade)
  - Midterm 1 (Chapters 2 & 3)
  - Midterm 2 (Chapter 4)
  - Midterm 3 (Chapters 5 & 6)
- Class Participation (5% of the overall grade)
- Final Exam (Comprehensive & 27% of the overall grade)

General Description of the Subject Matter of Each Lecture or Discussion

Jan 6-9	Course Orientation and Review of Functions and Graphs
	Chapter 2: Limits
Jan 13	Section 2.1: A preview of Calculus
Jan 14	Section 2.2: The limits of a function
Jan 15	Section 2.3: The limits laws

Jan 16 & 21	Section 2.4: Continuity
	Chapter 3: Derivatives
Jan 22	Section 3.1: Defining the derivative
Jan 23&27	Section 3.2: The derivative as a function
Jan 28-29	Section 3.3: Differentiation rules
Jan 30	Section 3.4: Derivatives as rates of change
Feb 3	Section 3.5: Derivatives of Trigonometric functions
Feb 4	Section 3.6: The chain rule
Feb 5	Section 3.7: Derivatives of inverse functions
Feb 6	Section 3.8: Implicit differentiation
Feb 10	Section 3.9: Derivatives of exponential and logarithmic functions
Feb 11	Practice Exam 1
Feb 12-13	Exam 1
	Chapter 4: Applications of Differentiation
Feb 13 & 18	Section 4.1: Related rates
Feb 19	Section 4.2: Linear approximations and differentials
Feb 20 & 24	Section 4.3: Maxima and minima

Feb 25	Section 4.4: The mean value theorem
Feb 26-27	Section 4.5: Derivatives and the shape of a graph
March 3-4	Section 4.6: Limits at infinity and asymptotes
March 5	Section 4.7: Applied optimization problems
March 6&17	Section 4.8: L'Hospital's rule
March 18	Section 4.9: Newton's method
March 19	Practice Exam 2
March 20-21	Exam 2
March 24	Section 4.10: Antiderivative.
	Chapter 5: Integration
March 25	Section 5.1: Approximating areas
March 26-27	Section 5.2: The definite integral.
March 31	Section 5.3: The fundamental theorem of calculus.
April 1-2	Section 5.4: Integration formulas and the net change theorem.
April 3&7	Section 5.5: Substitution
April 8-9	Section 5.6: Integral involving exponential and logarithmic functions
April 10	Section 5.7: Integral resulting in inverse trigonometric function
	Chapter 6: Applications of Integration
April 11&14	Section 6.7: Integrals, exponential functions, and logarithms

April 15	Section 6.9: Calculus of the hyperbolic functions
April 16	Practice Exam 3
April 17-18	Exam 3
April 21-22	Final Exam Review
April 28-29	Final Exam (Comprehensive)

Required Course Syllabus Statements

Generative AI

In this course, you can optimize your learning experience with the help of AI tools like **Wolfram Alpha (https://www.wolframalpha.com/)**, **Symbolab (https://www.symbolab.com/)** , **Khanmingo (https://www.khanmigo.ai/)** , and **thetawise (https://thetawise.ai/chat)** . With Wolfram Alpha, access computational knowledge to solve complex mathematical problems and generate step-by-step solutions. Symbolab provides interactive step-by-step solutions, aiding in understanding problem-solving processes. Khanmingo offers personalized practice exercises and video lessons tailored to your needs, while thetawise utilizes adaptive learning algorithms to provide personalized tutoring sessions and practice materials. These tools collectively support your problem-solving skills, and overall success in your math coursework.

However, you should note that the material generated by these tools may be inaccurate, incomplete, or otherwise problematic. For example, an AI tool might incorrectly simplify a complex trigonometric identity, leading to a wrong solution. Additionally, relying too much on AI may inhibit your own independent thinking and creativity, potentially hindering your overall learning and understanding of mathematical concepts, so use it thoughtfully to enhance rather than replace your learning process.

Using Remote Testing Software

☐ This course does not use remote testing software.

☒ This course uses remote testing software. Exams will be administered using an online proctoring software called Proctorio and requires the following:

- Webcam
- Google Chrome (Proctorio does not work without Chrome)
- A quiet location where you can focus dedicated uninterrupted time to take the exams

- Some way of scanning your work (e.g. a scanner or a phone using an app like Microsoft Office LensLinks to an external site.). You will upload your scanned work to Canvas as a pdf document.

Proctorio Resources:

See: **UVU Student Proctorio Instructions (https://www.uvu.edu/otl/docs/proctorioguides/updated_student_proctorio_instructions.pdf)** Take the **Practice Proctorio Exam (https://uvu.instructure.com/courses/600031/quizzes/2017420)** to ensure you are ready for your exams

Need Proctorio Help:

- Email your professor (general exam procedures)
- Technical difficulties with Proctorio email **canvas_support@uvu.edu (mailto:canvas_support@uvu.edu)** or, if you are logged into Canvas, you can use the **Proctorio Helpdesk. (https://proctorio.com/support)**

Practice Exams

For each exam, a sample practice exam will be provided, constructed under the same constraints as the actual exam in terms of difficulty level and time requirements. It is advisable to attempt this practice exam without referring to your textbook or notes initially, to assess readiness for the actual exam. Additionally, practicing problems similar to those in the practice exam from the textbook is recommended. The chapter reviews in the book offer valuable sources for more comprehensive practice problems.

1. Scan your completed work and ensure it is in PDF format
2. Upload a single PDF copy of your work for grading purposes
3. Failure to submit a single PDF file may result in receiving 0 points
4. Remember to write your name on each of your worksheets
5. Aim to maintain a neat and clean presentation of your work

Note: You can earn 10 bonus points If you finish the practice exam by the specified due date

- These points will be added to the respective exam grade
- Grade for practice exams is based on completion rather than accuracy
- Aim to complete every problem in the practice exam. Consider the practice exam as a demo exam, similar problems may appear in the actual exam. Practice these and similar problems from the textbook until you feel confident in your abilities.

- Answer key will be provided after the due date expires

Exam Instructions

Ensure that all exams are submitted by the respective due date, no later than 11:59 pm. Upload your submission as a SINGLE PDF file. Before uploading, verify that the PDF file is not corrupt.

- To begin your exam, simply click on the "Exam #" link provided (Remotely Proctored), carefully read through the instructions, and proceed with your exam. Printing is not permitted (as Proctorio does not support this feature), so you'll need to complete all your work on a separate sheet of paper.
- At the end of the exam, you'll be required to show your work and your ID via webcam.
- After showing your work and ID, click "submit" to exit Proctorio.
    - Following that, you'll need to scan and upload your work (the same pages shown to the webcam) to the "Exam #" Assignment (located just below Exam # (Remotely Proctored)).

Submitting Exams

All written exams must be submitted on the respective due date by 11:59 pm.

1. Each exam scan must be uploaded as a **single PDF** to the respective assignment to Canvas.
    - If you do not have a scanner, then there are many free apps that you can use on your phone, such as Adobe Scan or CamScanner.
2. Once you uploaded, verify that the PDF is not corrupt.
    - If it is corrupt, then you will receive no credit for it, as there is no make-up exam in this course.
3. If there is more than a 10-minute gap between exiting and uploading the exam, I will not accept the submission, and you will receive zero points.
4. Once grades are posted, you will be able to review your graded assignment and feedback on Canvas.

Discussion

To demonstrate your participation, it is mandatory to respond to Discussion Questions located within the modules on Canvas. These discussions are time-stamped (It is your responsibility to stay informed about these dates, as they may not always be announced or reminded of in Canvas) and recurring, asking about your learning experience and any related inquiries. They are designed to foster collaborative discussions among you and your peers. Additionally, if you have specific questions that require my attention, please email me via Canvas, as I may overlook them if they are only posted in the discussion threads. Participation in these discussions contributes to 5% of your final grade. At the

end of the course, the two lowest discussion grades will be excluded from the final calculation.

Homework Problems

All homework submissions will be facilitated through Lumen OHM. Each homework question allows for up to 4 attempts to input the correct answer. Most of the homework problems are linked to videos, so if need help on how to solve the problem watch the linked videos.

Homework assignments will be accessible for a few days and are due at midnight. Students can begin using OHM immediately with a trial period. However, to continue accessing homework after the trial period, students will need to pay approximately $35 for course activation. See Instructions for course activation payment can be found in the link titled "How to access course material-Lumen OHM" in the Course Orientation module.

The two (2) lowest homework grades will be dropped from the final grade calculation.

Timely completion of homework assignments aids in comprehending the topics covered in lectures and prepares you for subsequent material. However, it is crucial to note that mere completion of homework assignments does not guarantee success in the course.
Persistent engagement in the thought process for developing concepts and skills is necessary for success.

Note: ***If you have any questions regarding the homework, reach out to me through email. I will not respond if you send me a message on the Lumen OHM***

Required University Syllabus Statements

Accommodations/Students with Disabilities
Students needing accommodations due to a permanent or temporary disability, pregnancy or pregnancy-related conditions may contact UVU Accessibility Services at accessibilityservices@uvu.edu or 801-863-8747.

Accessibility Services is located on the Orem Campus in BA 110.

Deaf/Hard of Hearing students requesting ASL interpreters or transcribers can contact Accessibility Services to set up accommodations. Deaf/Hard of Hearing services can be contacted at DHHservices@uvu.edu

DHH is located on the Orem Campus in BA 112.

Academic Integrity

At Utah Valley University, faculty and students operate in an atmosphere of mutual trust. Maintaining an atmosphere of academic integrity allows for free exchange of ideas and enables all members of the community to achieve their highest potential. Our goal is to foster an intellectual atmosphere that produces scholars of integrity and imaginative thought. In all academic work, the ideas and contributions of others must be appropriately acknowledged and UVU students are expected to produce their own original academic work.

Faculty and students share the responsibility of ensuring the honesty and fairness of the intellectual environment at UVU. Students have a responsibility to promote academic integrity at the university by not participating in or facilitating others' participation in any act of academic dishonesty. As members of the academic community, students must become familiar with their rights and responsibilities. In each course, they are responsible for knowing the requirements and restrictions regarding research and writing, assessments, collaborative work, the use of study aids, the appropriateness of assistance, and other issues. Likewise, instructors are responsible to clearly state expectations and model best practices.

Further information on what constitutes academic dishonesty is detailed in UVU Policy 541: *Student Code of Conduct*.

Definitions and Examples:

Definition: Academic integrity is a basic principle which requires that students take credit only for ideas and efforts that are their own. Cheating, plagiarism, fabrication, and other forms of academic dishonesty are often defined as the submission of materials in assignments, exams, or other academic work that is based on sources that are prohibited by the faculty member or in ways that do not properly cite the source of a student's ideas and content. Further information on what constitutes academic dishonesty is detailed in**UVU Policy 541: *Student Code of Conduct* (https://policy.uvu.edu/getDisplayFile/5bedd0ef7b23736d542192e3)** .

Definition: The act of using or attempting to use or providing others with unauthorized information, materials or study aids in academic work. Cheating includes, but is not limited to, passing examination answers to or taking examinations for someone else, or preparing or copying others' academic work.

Examples include but are not limited to:

- Submission of work that is not the student's own for papers, assignments or exams.
- Submission or use of falsified data.
- Theft of or unauthorized access to an exam.
- Use of an alternate, stand-in or proxy during an examination.
- Use of unauthorized material including textbooks, notes or computer programs in the preparation of an assignment or during an examination.
- Supplying or communicating in any way unauthorized information to a "homework help site" such as CourseHero or to another student in the preparation of an assignment or during an examination.
- Collaboration in the preparation of an assignment. Unless specifically permitted or required by the instructor, collaboration will usually be viewed by the university as cheating. Each student, therefore, is responsible for understanding the policies of the department offering any course as they refer to the amount of help and collaboration permitted in preparation of assignments. Submission of the same work for credit in two courses without obtaining the permission of the instructors beforehand.

Definition: Plagiarism is the act of presenting another person's ideas, research or writing as your own.

Examples include but are not limited to:

- Using another person's exact language without the use of quotation marks and proper citation.
- Rearranging another's ideas or material and presenting them as original work without providing proper citation. Submitting another's work as one's own; this includes purchasing work from sources such as the internet.
- Submitting a translation of someone else's words claiming them as one's own Failing to acknowledge collaborators on homework and laboratory assignments.
- Duplicating or submitting work that was originally prepared for another class without the explicit permission of the instructor; or knowingly aiding another student who is engaged in plagiarism.

Resources: Citation guide (https://uvu.libguides.com/citations)

Definition: The use of invented information or the falsification of research or other findings.
Examples include but are not limited to:

- Citation of information not taken from the source indicated. This may include the incorrect documentation of secondary source materials.
- Listing sources in a bibliography not used in the academic exercise.
- Submission in a paper, thesis, lab report or other academic exercise of falsified, invented, or fictitious data or evidence, or deliberate and knowing concealment or distortion of the true nature, origin, or function of such data or evidence.
- Submitting as your own any academic exercise, (e.g., written work, printing, sculpture, etc.) prepared totally or in part by another.

Equity and Title IX
Utah Valley University does not discriminate on the basis of race, color, religion, national origin, sex, sexual orientation, gender identity, gender expression, age (40 and over), disability, veteran status, pregnancy, childbirth, or pregnancy-related conditions, citizenship, genetic information, or other basis protected by applicable law, including Title IX and 34 C.F.R. Part 106, in employment, treatment, admission, access to educational programs and activities, or other University benefits or services. Inquiries about nondiscrimination at UVU may be directed to the U.S. Department of Education's Office for Civil Rights or UVU's Title IX Coordinator at 801-863-7999 – TitleIX@uvu.edu – 800 W University Pkwy, Orem, 84058, Suite BA 203.

Religious Accommodation
UVU values and acknowledges the array of worldviews, faiths, and religions represented in our student body, and as such provides supportive accommodations for students. Religious belief or conscience broadly includes religious, non-religious, theistic, or non-theistic moral or ethical beliefs as well as participation in religious holidays, observances, or activities. Accommodations may include scheduling or due-date modifications or make-up assignments for missed class work.
To seek a religious accommodation, a student must provide written notice to the instructor and the Director of Accessibility Services at accessibilityservices@uvu.edu. If the accommodation relates to a scheduling conflict, the notice should include the date, time, and brief description of the difficulty posed

by the conflict. Such requests should be made as soon as the student is aware of the prospective scheduling conflict.

While religious expression is welcome throughout campus, UVU also has a specially dedicated space for meditation, prayer, reflection, or other forms of religious expression.

General Disclaimer

I reserve the right to modify the information, schedule, assignments, deadlines, and course policies in this syllabus when necessary. I will announce such changes in a timely manner during regularly scheduled lecture periods.