

Identification	Subject	Math 101, Calculus I, 6 ECTS
	Department	Mathematics
	Program	Undergraduate
	Term	Fall 2026
	Instructor	Orkhan Ashrafov
	E-mail:	ashrafovoha@gmail.com
	Lecture hours	Wednesday: 08:30 – 10:00, 10:10 – 11:40
Prerequisites	The prerequisites are high school algebra and trigonometry. Prior experience with calculus is helpful but by no means necessary.	
Language	English	
Compulsory / Elective	Required	
Required textbooks and course materials	Core textbook: 1. Thomas, G., et al. (2014). <i>Thomas' Calculus: Early Transcendentals</i> (13th edition). Pearson. Supplementary book: 1. Stewart, J. (2016). <i>Calculus: Early Transcendentals</i> (8th edition). Cengage Learning.	
Course outline	Calculus is a transition course to upper-division mathematics and computer science courses. Students will extend their experience with functions as they study the fundamental concepts of calculus: limiting behaviors, difference quotients and the derivative, Riemann sums and the definite integral, antiderivatives and indefinite integrals, and the Fundamental Theorem of Calculus. Students review and extend their knowledge of trigonometry and basic analytic geometry. Important objectives of the calculus sequence are to develop and strengthen the students' problem-solving skills and to teach them to read, write, speak, and think in the language of mathematics. In particular, students learn how to apply the tools of calculus to a variety of problem situations. Calculus plays an important role in the understanding of science, engineering, economics, and computer science, among other disciplines. As mentioned above, this introductory calculus course covers differentiation and initial techniques of integration of functions of one variable, with applications. Topics include: • Concept of functions; trigonometric functions • Limits and continuity • Derivative; Differentiation rules • Applications of derivative to investigation of extremes and graphing • Antiderivative	
Course objectives	The concepts of limit; tangent to a curve; differentiation; the chain rule; extreme values of a function; concavity of a curve; antiderivatives; definite and indefinite integrals; and the area between curves.	
Learning outcomes	By the end of the course, students should be able to: • find one-sided limits of functions; • find limits of functions at points and at infinity; • find derivatives of functions; • draw graphs of nontrivial functions using limits and derivatives; • show the connection between area and the definite integral; • apply the Fundamental Theorem of Calculus to evaluate definite integrals; • apply differentiation and integration to solve real-world problems.	

Teaching methods	Lecture		x
	Group discussion		x
	Experimental exercise		x
	Simulation		
	Case analysis		
	Course paper		x
	Others		
Evaluation	Methods	Date/deadlines	Percentage (%)
	Midterm Exam	Week 9	30
	Case studies		
	Class Participation		5
	Quizzes	Week 4, 7, 11, 14	20 (four quizzes of equal weight)
	Activity		5
	Laboratory work		
	Final Exam	TBA	40
	Others		
Total		100	
Policy	▪ Use of Generative AI Tools The use of generative artificial intelligence (GenAI) tools is strictly prohibited in this course. The primary aim of the course is to develop students' independent mathematical reasoning, problem-solving skills, and creative thinking. While GenAI tools are a great way to learn the topics that a student is falling behind on, students are expected to complete all assignments and assessments independently without any use of GenAI tools. If any usage of GenAI tools (e.g., LLMs) is suspected while completing the assignments, one of the following measures will be applied: • Issuing an oral or written warning; • Requiring the resubmission of the assignment; • Reducing the grade for the assignment or assigning a zero (0) grade. ▪ Preparation for class The structure of this course makes your individual study and preparation outside the class extremely important. The lecture material will focus on the major points introduced in the text. Reading the assigned chapters and having some familiarity with them before class will greatly assist your understanding of the lecture. After the lecture, you should study your notes and work relevant problems and cases from the end of the chapter and sample exam questions. Throughout the semester we will also have a large number of review sessions. These review sessions will take place during the regularly scheduled class periods. ▪ Quizzes and examinations Quizzes may be given unannounced throughout the term. There will be no make-up quizzes. ▪ Withdrawal (pass / fail) This course strictly follows the grading policy of the School of Science and Engineering. Thus, a student is normally expected to achieve a mark of at least 60% to pass. In case of failure, he/she will be required to repeat the course the following term or year.		

	▪ Cheating / plagiarism Cheating or any other form of plagiarism during the Quizzes, Midterm and Final Examinations will lead to paper cancellation. In this case, the student will automatically get zero (0) grade without any consideration. ▪ Professional behavior guidelines Students shall behave in a way that creates a favorable academic and professional environment during class hours. Unauthorized discussions and unethical behavior are strictly prohibited. ▪ Ethics Use of any electronic devices is prohibited in the classroom. All devices should be turned off before entering class. Students should not arrive late to class.
--	---

Tentative Schedule

Week	Date/Day (tentative)	Topics	Textbook/ Assignments
1	16.09.26 16.09.26	• Rates of Change and Tangents to Curves • Limit of a Function and Limit Laws	Ch. 2.1, 2.2
2	23.09.26 23.09.26	• The Precise Definition of a Limit • Practice	Ch. 2.3
3	30.09.26 30.09.26	• One-Sided Limits • Continuity	Ch. 2.4, 2.5
4	07.10.26 07.10.26	• Limits Involving Infinity; Asymptotes of Graphs • Tangents and the Derivative at a Point	Ch. 2.6, 3.1 Quiz (5 pts)
5	14.10.26 14.10.26	• The Derivative as a Function • Differentiation Rules	Ch. 3.2, 3.3
6	21.10.26 21.10.26	• The Derivative as a Rate of Change • Derivatives of Trigonometric Functions	Ch. 3.4, 3.5
7	28.10.26 28.10.26	• The Chain Rule • Implicit Differentiation	Ch. 3.6, 3.7 Quiz (5 pts)
8	04.11.26 04.11.26	• Derivatives of Inverse Functions and Logarithms • Practice	Ch. 3.8
9	11.11.26 11.11.26	• MIDTERM EXAM • Inverse Trigonometric Functions, Related Rates	Ch. 3.9, 3.10
10	18.11.26 18.11.26	• Linearization and Differentials • Extreme Values of Functions	Ch. 3.11, 4.1
11	25.11.26 25.11.26	• The Mean Value Theorem • Monotonic Functions and the First Derivative Test	Ch. 4.2, 4.3 Quiz (5 pts)
12	02.12.26 02.12.26	• Concavity and Curve Sketching, Indeterminate Forms and L'Hôpital's Rule • Antiderivatives	Ch. 4.4, 4.5, 4.8
13	09.12.26 09.12.26	• Area and Estimating with Finite Sums • Sigma Notation and Limits of Finite Sums	Ch. 5.1, 5.2
14	16.12.26 16.12.26	• The Definite Integral • The Fundamental Theorem of Calculus	Ch. 5.3, 5.4 Quiz (5 pts)
15	23.12.26 23.12.26	• Indefinite Integrals and the Substitution Method • Definite Integral Substitution and the Area Between Curves	Ch. 5.5, 5.6
	TBA	Final Exam	

This syllabus is a guide for the course and any modifications to it will be announced in advance. Students are responsible for keeping up with any announced modifications.