Identification	**Subject**	MATH101, Calculus I, 6 ECTS
	Department	Mathematics
	Program	Undergraduate
	Term	Fall, 2025
	Instructor	Baharchin Ahmadli
	E-mail:	a_beherchin@mail.ru
	Phone:	
	Classroom/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 not necessary.	
Language	English	
Compulsory/Elective	Required	
Required textbooks and course materials	***Core Textbooks:*** 1. George Thomas, et al, Thomas' Calculus: Early Transcendental, 12th edition, Addison-Wesley (2010), (http://libgen.org/) ***Supplementary book*** 1. James Stewart,Essential calculus. Early transcendentals, Second Edition, Brooks/Cole (2013) (http://libgen.org/)	
Course website		
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 understandaing of science, engineering, economics and computer science, among other disciplines. As it's mentioned 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 main objective of Calculus 1 is to provide students with a solid foundation in differential and integral calculus. The course aims to develop students' understanding of limits, continuity, derivatives, and integrals of functions of a single variable. Emphasis is placed on both theoretical concepts and practical	

<table>
<tr><td></td><td colspan="3">problem-solving techniques. By the end of the course, students will be able to apply calculus methods to analyze and model real-world problems in mathematics, engineering, and the sciences.
The concepts of limit; tangent to curve;differentiation; chain rule; extreme values of a function,concavity of a curve,antiderivative,definite and indefinite integrals, area between curves.</td></tr>
<tr><td>Learning outcomes</td><td colspan="3">By the end of this course, students will be able to understand and explain the fundamental concepts of limits, continuity, derivatives, and definite and indefinite integrals. They will be able to compute limits and determine the continuity of algebraic and transcendental functions. Students will apply differentiation techniques to analyze the behavior of functions, including identifying extrema, inflection points, and intervals of increase or decrease. They will solve applied problems involving rates of change, optimization, and motion using derivatives. Furthermore, students will understand the concept of the definite integral as a limit of Riemann sums and as the area under a curve. They will apply the Fundamental Theorem of Calculus to evaluate definite integrals and solve basic initial value problems. Integration techniques will be used to solve applied problems in geometry, physics, and other related fields. Finally, students will be able to communicate mathematical reasoning clearly and effectively in both written and verbal form.</td></tr>
<tr><td rowspan="8">Teaching methods</td><td colspan="2">Lecture</td><td>x</td></tr>
<tr><td colspan="2">Group discussion</td><td>x</td></tr>
<tr><td colspan="2">Experiential exercise</td><td>x</td></tr>
<tr><td colspan="2">Simulation</td><td></td></tr>
<tr><td colspan="2">Case analysis</td><td></td></tr>
<tr><td colspan="2">Course paper</td><td>x</td></tr>
<tr><td colspan="2">Others</td><td></td></tr>
<tr><td></td><td></td><td></td></tr>
<tr><td rowspan="10">Evaluation</td><td>Methods</td><td>Date/deadlines</td><td>Percentage (%)</td></tr>
<tr><td>Midterm Exam</td><td></td><td>30</td></tr>
<tr><td>Case studies</td><td></td><td></td></tr>
<tr><td>Class Participation</td><td></td><td>5</td></tr>
<tr><td>Quizzes</td><td></td><td>20 (4 quizzes)</td></tr>
<tr><td>Activity</td><td></td><td>5</td></tr>
<tr><td>Laboratory work</td><td></td><td></td></tr>
<tr><td>Final Exam</td><td></td><td>40</td></tr>
<tr><td>Others</td><td></td><td></td></tr>
<tr><td>Total</td><td></td><td>100</td></tr>
<tr><td>Policy</td><td colspan="3">▪ 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</td></tr>
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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 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 other plagiarism during the Quizzes, Mid-term and Final Examinations will lead to paper cancellation. In this case, the student will automatically get zero (0), without any considerations.

- **Professional behavior guidelines**
  The students shall behave in the way to create favorable academic and professional environment during the class hours. Unauthorized discussions and unethical behavior are strictly prohibited.

- **Ethic**
  Use of any electronic devices is prohibited in the classroom. All devices should be turned off before entering class. This is a university policy and violators will be reprimanded accordingly!

  Students should not arrive in late to class!

Tentative Schedule

Week	Date/Day (tentative)	Topics	Textbook/ Assignments
1	17.09.25	• Rates of Change and Tangents to Curves • Limit of a Function and Limit Laws	**Ch.2.1, 2.2**
2	24.09.25	• The Precise Definition of a Limit • Practice	**Ch. 2.3**
3	1.10.25	• One-Sided Limits • Continuity	**Ch. 2.4, 2.5**

4	08.10.25	• Limits Involving Infinity; Asymptotes of Graphs • Tangents and the Derivative at a Point	**Ch. 2.6, 3.1, Quiz 1(5 pts)**
5	15.10.25	• The Derivative as a Function • Differentiation Rules	**Ch. 3.2, 3.3**
6	22.10.25	• The Derivative as a Rate of Change • Derivatives of Trigonometric Functions.	**Ch.3.4,3.5**
7	29.10.25	• The Chain Rule • Implicit Differentiation	**Ch. 3.6, 3.7 Quiz 2(5 pts)**
8	5.11.25	• Derivatives of Inverse Functions and Logarithms • **Midterm Exam**	**Ch. 3.8**
9	12.11.25	• Inverse Trigonometric Functions • Related Rates	**Ch. 3.9, 3.10**
10	19.11.25	• Linearization and Differentials • Extreme Values of Functions	**Ch.3.11,4.1 Quiz 3(5 pts)**
11	26.11.25	• The Mean Value Theorem • Monotonic Functions and the First Derivative Test	**Ch.4.2, 4.3**
12	03.12.25	• Concavity and Curve Sketching, Indeterminate Forms and L'Hôpital's Rule • Antiderivatives.	**Ch. 4.4, 4.5, 4.8**
13	10.12.25	• Area and Estimating with Finite Sums • Sigma Notation and Limits of Finite Sums	**Ch. 5.1,5.2**
14	17.12.25	• The Definite Integral • The Fundamental Theorem of Calculus	**Ch. 5.3, 5.4** **Quiz 4(5 pts)**
15	24.12.25	• Indefinite Integrals and the Substitution Method • Substitution and 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.