Identification	Subject	Math 101, Calculus I A, 6 ECTS
	Department	Mathematics
	Program	Undergraduate
	Term	Spring, 2024
	Instructor	Reyhan Taghiyeva
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	Classroom/hours	Monday: 10:10-11:40, Friday 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 funcrions • Limits and continuity • Derivative; Differentiation rules • Applications of derivative to investigation of extremes and graphing • Antiderivative

Course objectives	*The concepts of limit; tangent to curve; differentiation; chain rule; extreme values of a function and concavity of a curve*		
Learning outcomes	At the end of the course the students should be able: • To find one-sided limits of functions; • To find limit of functions at points and infinity; • To find derivative of functions; • To draw a graphs of nontrivial functions using limits and derivatives; • To show the connection between area and the definite integral; • To apply fundamental theorem of calculus to evaluate definite integral; • To apply differentiation and integration to solve real world problems.		
Teaching methods	**Lecture**		x
	Group discussion		x
	Experiential exercise		x
	Course paper		x
	Others		
Evaluation	**Methods**	**Date/deadlines**	**Percentage (%)**
	Midterm Exam		30
	Class Participation		5
	Quizzes		20 (3 quizzes)
	Activity		5
	Final Exam		40
	Total		100
Policy	▪ **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 grading policy of the School of Engineering and Applied Science. 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.		

Tentative Schedule

Week	Date/Day (tentative)	Topics	Textbook/ Assignments
1	12.02.24 16.02.24	• Rates of Change and Tangents to Curves • Limit of a Function and Limit Laws	**Ch.2.1, 2.2**
2	19.02.24 23.02.24	• The Precise Definition of a Limit • Practice	**Ch. 2.3**
3	26.02.24 01.03.24	• One-Sided Limits • Continuity	**Ch. 2.4, 2.5**
4	04.03.24 08.03.24	• Limits Involving Infinity; Asymptotes of Graphs • Holiday	**Ch. 2.6**
5	11.03.241 15.03.24	• Tangents and the Derivative at a Point • The Derivative as a Function • Differentiation Rules	**Ch. 3.1, 3.2, 3.3**
6	18.03.242 22.03.24	• The Derivative as a Rate of Change • Holiday	**Ch.3.4 Quiz (10 pts)**
7	25.03.24 29.03.24	• Holiday • Derivatives of Trigonometric Functions. The Chain Rule Implicit Differentiation	**Ch. 3.5, 3.6**
8	01.04.24 05.04.24	• Implicit Differentiation • Derivatives of Inverse Functions and Logarithms	**Ch. 3.7, 3.8**
9	08.04.24 12.04.24	• **Midterm Exam** • Inverse Trigonometric Functions, Related Rates	**Ch. 3.9, 3.10**
10	15.04.24 19.04.24	• Linearization and Differentials • Extreme Values of Functions	**Ch. 3.11, 4.1**
11	22.04.24 26.04.24	• The Mean Value Theorem • Monotonic Functions and the First Derivative Test	**Ch.4.2, 4.3**
12	29.04.24 03.05.24	• Concavity and Curve Sketching, Indeterminate Forms and L'Hôpital's Rule • Antiderivatives.	**Ch. 4.4, 4.5,**

			4.8
13	06.05.24 10.05.24	• Area and Estimating with Finite Sums • Sigma Notation and Limits of Finite Sums • Ramadan Holiday	**Ch. 5.1,5.2**
14	13.05.24 17.05.24	• The Definite Integral • The Fundamental Theorem of Calculus	**Ch. 5.3, 5.4** **Quiz (10 Pts)**
15	20.05.24 24.05.24	• 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.