Instructors: Yagub Aliyev, Javanshir Azizov
Email: yaliyev@ada.edu.az , jazizov@ada.edu.az (include your CRN in your messages and no gmail or other personal email, please)
Place: On campus Building D room D108, The Blackboard Collaborate Ultra
Classes: General Lectures: Monday 14:45 PM-16:00 PM. Seminars according to the schedule.
Office Hours: Monday, Wednesday 9:00 AM-11:00 AM. (online, Course room in The Blackboard) Inform me beforehand so that I unlock the Courseroom and be present there. You can also stay after the lessons and ask your questions.
My Office: B217 (all office hours are online)

Note for smokers: We are very sensitive to the smell of smoking. Please, don't smoke cigarettes or e-cigarettes before coming to our lectures, exams, and offices. Thank you for your understanding.

Course Description
Calculus plays a significant role in understanding science and engineering. It provides students with an important foundation for more advanced mathematical courses such as differential equations, probability and statistics, real and complex analysis, etc. This course covers differentiation and integration of functions of one real variable. Main topics include: limits and continuity, differentiation and applications to extremum problems, definite and indefinite integration, applications to geometry (area and volume).

Course Objectives
Upon completion students should have a comprehensive understanding of major concepts of the differential and integral calculus. Namely students should be able to:
1. Learn the fundamental concepts of limit and continuity.
2. Calculate derivative for various types of functions using definition and differentiation rules.
3. Use the concept of derivative to analyze and sketch graph of a function.
4. Apply differentiation to solve extremum problems.
5. Evaluate integrals using the Fundamental Theorem of Calculus, integration by parts and other integration techniques.
6. Apply integration to compute arc lengths, areas under curves and volumes of revolution.
7. Determine convergence and divergence of improper integrals.

Prerequisites
There are not specific prerequisites for this course. Review of school mathematics will be helpful.

Textbooks
Thomas' Calculus Early Transcendentals, Twelfth Edition. We'll cover most of chapters 1 – 8.
James Stewart's Calculus, 7th edition
Frank Ayres, Elliot Mendelson, Calculus, 4th edition, Schaum's Outlines.
Howard Anton, Calculus, John Wiley and Sons / New York – 1999.
C. Henry Edwards, David E. Penney, Calculus (6th Edition)
Robert Adams, Calculus A Complete Course, Pearson, Toronto, 2006
Calculus by Jon Rogawski

Course Assessment.
The assessment of objectives is achieved through Assignment, quizzes, and exams (midterm and final)

Grading Policy
Grade components are the following:
Homework (Blackboard Assignment) – 15%
Quizzes (10 Quizzes each giving 3%)– 30%
Assignment (Hard Problem) – 5%
Assignment (GeoGebra Applet) – 5%
Assignment (Flipgrid) – 5%
Midterm exam – 15%
Final exam – 25%
A passing grade is 60 (D)

Assignment (Hard Problem)
We will give you one hard problem from an old problem book about **Calculus**. You need to write and present the solution as a YouTube video. **The solutions without a YouTube presentation won't be accepted.**

Assignment (GeoGebra Applet)
You will be asked to create and submit a GeoGebra Applet demonstrating the task assigned to you. The use of sliders (if possible) is strongly recommended. Be careful to put reasonable limits to the sliders. The details will be given in the Assignments page of Blackboard. All the submissions should be through the Blackboard.

Assignment (Flipgrid)
You will be asked to create and submit a video about the topic assigned to you. Use of special effects available in Flipgrid camera is strongly recommended.

Exam Rules
No electronic devices (cellphones, laptops, smart watches, calculators) are permitted.
No collaboration during in-class quizzes and exams.

Attendance Policy
Regular attendance is important. Some lecture material is not in the textbook. You are not allowed to come to class late.

Academic Integrity
In order to maintain a culture of academic integrity, members of the ADA University community are expected to promote honesty, trust, fairness, respect and responsibility. Check
https://www.ada.edu.az/frq-content/plugins/policies_x1/entry/20210820115209_06140500.pdf

for more information. A student who is unsure whether an action constitutes an offence, or who needs help in learning how to avoid offences (e.g., plagiarism, cheating) or about "rules" for group work/collaboration should seek guidance from the course instructor or academic advisor.

Course Content

Week	Topic	Reading
I	Functions, Limit of a Function; Limit Laws	Thomas', Ch. 2: 2.1-2.3
II	One-Sided Limits; Continuity; Limits to Infinity; Asymptotes	Thomas', Ch. 2: 2.4-2.6
III	Definition of the Derivative at a Point; The Derivative as a Function; Differentiation Rules	Thomas', Ch. 3: 3.1-3.4
IV	Derivatives of Trigonometric Functions; The Chain Rule; Implicit Differentiation; Derivatives of Inverse Functions	Thomas', Ch. 3: 3.5-3.8
V	Inverse Trigonometric Functions; Linearization and Differentials	Thomas', Ch. 3: 3.9-3.11
VI	Extremums; The Mean Value Theorem; Monotonic Functions; The First Derivative Test	Thomas', Ch. 4: 4.1-4.3
VII	Concavity; The Second Derivative Test; Curve Sketching; Indeterminate Forms; L'Hospitale's Rule	Thomas', Ch. 4: 4.4-4.5
VIII	**Midterm exam**	
IX	Area; Sigma Notation; Riemann Sums; The Definite Integral	Thomas', Ch. 5: 5.1-5.3
X	The Fundamental Theorem of Calculus; Indefinite Integrals; The Substitution Method; Area Between Curves	Thomas', Ch. 5: 5.4-5.6
XI	Applications of Definite Integrals: Volumes, Arc Length, Areas of Surfaces of Revolution	Thomas', Ch. 6: 6.1-6.4
XII	Integrals and Transcendental Function	Thomas', Ch. 7
XIII	Integration by Parts; Trigonometric Integrals; Trigonometric Substitutions; Integration of Rational Functions by Partial Fractions	Thomas', Ch. 8: 8.1-8.4
XIV	Improper Integrals; Review	Thomas', Ch. 8: 8.6-8.7