KHAZAR UNIVERSITY

DEPARTMENT OF MATHEMATICS

Course Syllabus

Calculus 1

Identification

Subject:	Calculus 1 (MATH 101)
Department:	Mathematics
Instructor:	Vugar Aliyev
Mobile:	(055) 602 01 88 (mob)
Semester:	Spring 2010

Prerequisites

Precalculus (MATH 098)

Textbooks and Materials:

Core Textbook:

1.Anton, Howard. Calculus with Analytic Geometry, 4th ed.,1992.

Supplementary:

2.Harshbarger, Ronald J. Calculus with Applications, 2nd ed.,1993.

3.Lial, Margaret L. Calculus with Applications, 5th ed., 1993.

Objectives

General objective of the Course:

- To meet curriculum requirements of the School of Engineering and Applied Sciences.

- To support the students academically, to improve their chance of realizing their potential.

Developed Skills

Throughout the course the students should develop and maintain the following skills:

- Analytical thinking
- Ability to analyse functions, to find limits of the functions, to determine their continuity
- Finding the derivatives of different functions
- Determining maximum or minimum of the function with the help of derivative
- Finding absolute extrema.

Evaluation

Mid-term Examination:	40%
Participation, Activity:	10%
Quiz:	10%
Final Examination:	40%
Total:	100%.

.

Learning and Teaching Methods

This course considers active learning process rather than passive one. Lectures, discussions, practice, typing.

Web sites**:** www.calculus.org
www.math.hmc.edu/calculus/tutorials

Learning outcomes**:**

Ability to analyse function, to find its domain and range, to find limits of the functions, to analyse their continuity. Finding convergent and divergent sequences; finding the derivatives of different functions. Applications of the derivative, finding maximum and minimum values of the function, absolute extrema.

Appendix: A (*brief course description)*

COURSE: CALCULUS 1

Week	**Topics**	**Note**
1	**2**	**3**
1.	Coordinate planes and graphs. Slope of a line. Equations of straight lines. Distance; circles; equations of the form $y = ax^2 + bx + c$	([1], p.27-55, ex., p.54-55)
2.	Functions The general concept of a function. Domain & range of a function. Operations on functions. Even & odd functions. Graphs of functions. Inverse functions. Existence of inverse functions.	([1], p.70-80, 83-99, 446-454, exercise, p.81-82, 90-91, 455)
3.	Sequences . Definition. Limit of a sequence. Convergent & divergent sequences. Monotone sequences. Convergence of	([1],p.642-654,ex., p.658)

	monotone sequences	
4.	Limit & continuity of function. Definition of a limit of a function. Existence of limits, limits at infinity, some basic limits. Definition of continuous function. Points of discontinuity. Some properties of continuous functions. Continuity of compositions. The intermediate value theorem.	([1],p.108-120, 140-147, ex., p.115-116, 129, 148-149)
5.	The derivative. Techniques of differentiation. Definition of the derivative. Geometric interpretation of the derivative. Differentiable functions. Derivatives of sums, of a product & quotient.	([1],p.174-182, 186-193, ex.,p.183-186, 197-198)
6.	Derivative of a reciprocal. The reciprocal rule. Higher derivatives. The n-th order derivative of function	([1], p. 193-197,ex.,p. 198-199)
7.	Trigonometric functions. Derivatives of trigonometric functions.	([1], p. 201-203, ex.., p. 204)
8.	Mid-term Exam	
9.	Derivatives of compositions. The chain rule. Generalized derivative formulas.	([1], p.206-211,ex., p.211-212)
10.	Implicit differentiation. Differentials. The method of implicit differentiation. Differential formulas.	([1], p.214-220, 228, ex. , p.220-221,228-229)
11.	Intervals of increase & decrease. Increasing & decreasing functions.	([1], p.242-245, ex., p.248-249)
12.	Concavity. Concave up & concave down function. Inflection point of function.	([1], p. 245-248, ex., p. 248-249)
13.	Relative maxima and minima.. First & second derivative tests. Critical points. Classification of critical points.	([1], p.250-254, ex.,p.255)
14.	Graphs of polynomials and rational functions.	([1], p.256-264, ex., p.264)
15.	Absolute extrema. Finding maximum and minimum values of a function. Extreme-value theorem.	([1], p.270- 278, ex.,p.278-279)
16.	Applied maxima and minima problems.	([1], p. 280-285, ex., p. 288)
17	Final Exam	