



## AYDIN ADNAN MENDERES UNIVERSITY COURSE INFORMATION FORM

Course Title		Calculus I							
Course Code		MAT153		Course Level		First Cycle (Bachelor's Degree)			
ECTS Credit	6	Workload	150 ( <i>Hours</i> )	Theory	4	Practice	0	Laboratory	0
Objectives of the Course		The aim of the course is to give knowledge about relation, function, limit, continuity, derivation and integral in order to construct a basic mathematical structure, and to gain the ability of thinking rationally for solving problems.							
Course Content		Numbers, functions, concepts of limit and continuity at functions, derivation and its applications, technique of integration.							
Work Placement		N/A							
Planned Learning Activities and Teaching Methods				Explanation (Presentation), Demonstration, Discussion, Case Study, Problem Solving					
Name of Lecturer(s)		Assoc. Prof. Algin OKURSOY, Ins. Nihal GÜNEL, Lec. Ahmet GENÇ, Lec. Muhammet Ali OKUR, Lec. Seçkin GÜNSEN							

### Assessment Methods and Criteria

Method	Quantity	Percentage (%)
Midterm Examination	1	40
Final Examination	1	70

### Recommended or Required Reading

1	Kenneth A. Ross, Elementary Analysis: The Theory of Calculus, Springer-Verlag(1980)
2	Çoker ., Özer O., Taş K. " Genel Matematik", Cilt 1 (1996)
3	Thomas, G.B. and Finney, R.L., "Calculus and Analytic Geometry", 9th ed., Addison Wesley, (1998)
4	Prof.Dr.Mustafa Balcı "Genel Matematik I" Balcı Yayınları
5	Doç.Dr.Cevdet Cerit, "Yüksek Matematik I"

Week	Weekly Detailed Course Contents	
1	Theoretical	Precalculus, basic functions
2	Theoretical	Inverse functions, trigonometric, logarithmic, exponential functions
3	Theoretical	Limit of functions, Formal definition of limit, Limit laws
4	Theoretical	Continuity, One sided continuity
5	Theoretical	Definition of derivative, Functions derivative, Derivative rules
6	Theoretical	Rate of Change, Related rates, Linearization and differential
7	Theoretical	Chain rule, derivative of implicit functions, derivative of inverse functions
8	Intermediate Exam	Midterm Exam
9	Theoretical	Application of derivative, Extreme values of functions, Mean value theorem
10	Theoretical	First and second derivative test, Monotonic functions, Concavity, Sketching graph of functions
11	Theoretical	L'Hospital rule, Optimization
12	Theoretical	Antiderivative
13	Theoretical	Definite integral, Riemman integral
14	Theoretical	The fundamental theorem of calculus, substitution
15	Theoretical	Indefinite integrals, Techniques of integration
16	Final Exam	Final Exam

### Workload Calculation

Activity	Quantity	Preparation	Duration	Total Workload
Lecture - Theory	14	4	4	112
Midterm Examination	1	13	2	15



Final Examination	1	21	2	23
Total Workload (Hours)				150
[Total Workload (Hours) / 25*] = ECTS				6
*25 hour workload is accepted as 1 ECTS				

### Learning Outcomes

1	Ability to understand definition of function and basic functions,
2	Ability to draw the special functions practically
3	Ability to interpret limit and continuity of functions at given points
4	Ability to find derivation of given function at a point
5	Ability to use derivation in daily life problems
6	Finding the antiderivative of a function and the importance of the fundamental theorem of calculus

### Programme Outcomes (Physics)

1	To understand the importance of physics by understanding the general concepts of physics, matter and energy
2	To be able to define the movements of matter and to distinguish the characteristics of movements under different force (potential)
3	Be able to say the meaning of Lagrange and Hamiltonian formulations of the movement and apply them to simple problems,
4	To be able to express the fundamental concepts such as time, space, force, momentum and energy in the movements of matter close to the speed of light and be able to solve and interpret the simple problems related to
5	To be able to establish the relationship between electric and magnetic forces and to be able to illustrate their applications to technology and solve problems related to the movement of particles in electric and magnetic fields
6	Be able to say the basic laws of electromagnetics and apply them to problems, illustrate their applications to simple technology
7	To be able to tell the reasons of the differences between the classical cases and the quantum scale and explain the reasons
8	Explain the concepts of discontinuity, uncertainty, matter-antimatter, indecisiveness of quantum physics with examples and explain simple problems related to the subject.
9	To be able to solve the problems of micro-particles under different simple potentials and be able to say their meanings
10	To be able to establish the relationship between the movements and properties of multi-particle systems and the laws of probability and solve simple problems
11	To be able to illustrate the laws, meanings and applications of thermodynamics and use them
12	Be able to use their knowledge about quantum physics and mechanics in explaining some properties of atoms and nuclei
13	To be able to show the meanings of some theoretical concepts by experimenting, and develop a strong relationship between thought and the real world, develop analytical thinking
14	To be able to apply the meanings of the basic laws of physics, their comprehension of universality and the relations between them and the unity of the laws of nature.
15	Use computer to solve physics problems
16	To be able to understand the problems by using their analytical knowledge skills and to propose solutions by dealing with the laws of physics
17	Be able to use the knowledge of physics to understand new technologies
18	To be able to tell the relations between symmetry and conservation laws in laws of physics

### Contribution of Learning Outcomes to Programme Outcomes 1:Very Low, 2:Low, 3:Medium, 4:High, 5:Very High

	L1	L2	L3	L4
P1	3	2	3	2
P2	4	4	4	4
P3	5	3	5	5
P4	3	4	4	4
P5	2	2	4	5
P6	2	3	4	4
P7	1	3	2	3
P8	3	4	4	3
P9	4	2	4	4
P10	2	3	4	4
P11	4	2	5	5
P12	3	2	4	4
P13	1	1	1	1
P14	3	5	3	4



P15	1	1	1	1
P16	2	3	3	5
P17	1	1	2	4
P18	3	3	4	4

