AYDIN ADNAN MENDERES UNIVERSITY
COURSE INFORMATION FORM

Course Title	Classical Mechanics								
Course Code	FİZ323		Couse Level	First Cycle (Bachelor's Degree)					
ECTS Credit	8	Workload	206 *(Hours)*	Theory	4	Practice	0	Laboratory	0
Objectives of the Course	to develop a clear understanding of the foundations of classical mechanics, and to be able to use these mathematical tools to solve a variety of problems								
Course Content	Linear motion, Energy and angular momentum, Central conservative forces, Rotating frames, Potential theory, The two-body problem, Many body systems, Rigid bodies, Lagrange mechanics, Small oscillations and normal modes, Hamilton's mechanics								
Work Placement	N/A								
Planned Learning Activities and Teaching Methods	Explanation (Presentation), Discussion, Problem Solving								
Name of Lecturer(s)	Prof. Aytaç Gürhan GÖKÇE								

Assessment Methods and Criteria		
Method	Quantity	Percentage (%)
Midterm Examination	1	20
Final Examination	1	70
Quiz	4	10
Assignment	4	10

Recommended or Required Reading	
1	Klasik Mekanik, T. W. Kibble and F. H. Berkshire, Çeviri editörü: Kemal Çolakoğlu
2	Klasik Mekanik, Emine Rızaoğlu, Naci Sünel
3	Classical Mechanics: An introductory course, Richard Fitzpatrick

Week	Weekly Detailed Course Contents	
1	Theoretical	Linear motion, conservative forces, conservation of energy, the harmonic oscillator, the damped oscillator, oscillator under simple periodic force,
2	Theoretical	Energy and angular momentum, moments, central forces, polar co-ordinates
3	Theoretical	Central conservative forces, the isotropic harmonic oscillator, the conservation laws, the inverse square laws, orbits,
4	Theoretical	Scattering cross-sections, mean free path, Rutherford scattering,
5	Theoretical	Rotating frames, angular velocity, angular acceleration, coriolis force, Larmor effect,
6	Theoretical	Gravitational and electrostatic potentials, the dipol and quadrupole,
7	Theoretical	spherical charge distributions, expansion of potential at large distances, the shape of the Earth, the tides, the field equations,
8	Intermediate Exam	MIDTERM EXAM
9	Theoretical	The two-body problem, center-of-mass co-ordinates, elastic collisions, center-of-mass and lab cross-sections,
10	Theoretical	Many body systems, centre-of-mass motion, the Earth-Moon system,
11	Theoretical	Rigid bodies, rotation about an axis, perpendicular components of angular momentum,
12	Theoretical	Principal axes of inertia, calculation of moments of inertia, Euler's angles,
13	Theoretical	Lagrange mechanics, generalized co-ordinates, holonomic systems, Lagrange's equations,
14	Theoretical	Small oscillations and normal modes, coupled oscillators, oscillations of particles on a string, normal modes of the stretched string,
15	Theoretical	Hamilton's equations, general motion of the symmetric top,
16	Final Exam	Final Exam

Workload Calculation				
Activity	Quantity	Preparation	Duration	Total Workload
Lecture - Theory	14	4	4	112
Assignment	4	4	1	20
Quiz	4	4	1	20

Midterm Examination	1	16	1.5	17.5
Final Examination	1	35	2	37
			Total Workload (Hours)	206
			[Total Workload (Hours) / 25*] = **ECTS**	8
**25 hour workload is accepted as 1 ECTS*				

Learning Outcomes	
1	To learn motion
2	To learn Force, Energy, Momentum and moments
3	To learn conservation laws
4	To solve problems of oscillators
5	To learn the inverse square laws and orbits,
6	To solve scattering problems
7	To learn rotating motions, coriolis force and Larmor effect,
8	To learn expansion of potential at large distances and understanding the shape of the Earth and the tides
9	To learn center-of-mass and use this on the many body system problems
10	To understand motion of rockets and the Earth-Moon system,
11	To learn moments of inertia,
12	To learn Euler’s angles
13	To learn Lagrange’s equations and use to solutions of problems
14	To learn Hamilton’s equations and use to solutions of problems
15	To learn symmetries and conservation laws.

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	L5	L6	L7	L8	L9	L10	L11	L12	L13	L14
P1		5	5											
P2	5			5										
P3													5	
P4														5

P9	4													
P14					5	5	5	5	5					
P16										5				
P17										3	4			
P18												4		