



## AYDIN ADNAN MENDERES UNIVERSITY COURSE INFORMATION FORM

Course Title		Introduction to Particle Physics							
Course Code		FİZ421		Course Level		First Cycle (Bachelor's Degree)			
ECTS Credit	7	Workload	175 ( <i>Hours</i> )	Theory	3	Practice	0	Laboratory	0
Objectives of the Course		Introducing the basic phenomena of particle physics. Classification of particles and introducing the experimental detection.Understanding the basic properties and interactions of elementary particles.							
Course Content		Historical evolution of elementary particle physics, elementary particles and their properties and basic interactions.							
Work Placement		N/A							
Planned Learning Activities and Teaching Methods				Explanation (Presentation), Discussion					
Name of Lecturer(s)		Assoc. Prof. Melis 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	An Introduction to Nuclear Physics, W.N. Cottingham, D.A. Greenwood, 2001.
2	Particle Physics, B.R. Martin, G. Shaw, 2008.

Week	Weekly Detailed Course Contents	
1	Theoretical	History of elementary particles
2	Theoretical	Elementary particles and their properties
3	Theoretical	Classification of particles
4	Theoretical	Interaction and Feynman Diagrams
5	Theoretical	Leptons, Electromagnetic and weak interactions
6	Theoretical	Quark and Hadrons
7	Intermediate Exam	MIDTERM EXAM
8	Theoretical	Particle accelerators
9	Theoretical	Particle interactions with matter.
10	Theoretical	Particle detectors
11	Theoretical	Symmetry of time-space
12	Theoretical	Quark model
13	Theoretical	Weak Interaction: Quark and lepton
14	Theoretical	Weak Interaction: Electro-weak union
15	Theoretical	Violation of symmetry

### Workload Calculation

Activity	Quantity	Preparation	Duration	Total Workload
Lecture - Theory	14	4	3	98
Assignment	4	2	2	16
Quiz	4	1.5	0.5	8
Midterm Examination	1	24	2	26



Final Examination	1	25	2	27
Total Workload (Hours)				175
[Total Workload (Hours) / 25*] = ECTS				7
*25 hour workload is accepted as 1 ECTS				

### Learning Outcomes

1	Ability to understand the properties of elementary particles.
2	Ability to classifying the types of elementary particles.
3	Ability to learn the basic interactions.
4	Ability to comprehension the law of conservation, symmetry, parity and to solve problem.
5	Ability to comprehension the interaction of elementary particles with matter and detection.

### 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
P1					3
P6			3		
P8	5	4			
P14				5	
P18				4	

