AYDIN ADNAN MENDERES UNIVERSITY
COURSE INFORMATION FORM

Course Title	Electromagnetic Theory II								
Course Code	FİZ404		Couse Level	First Cycle (Bachelor's Degree)					
ECTS Credit	7	Workload	175 *(Hours)*	Theory	4	Practice	0	Laboratory	0
Objectives of the Course	The fundamental quantities of electromagnetic theory that are magnetism, electrodynamics, electromagnetic wave and dipole radiation will be investigated.								
Course Content	Magnetostatic, Magnetic Fields in Matter, Electrodynamics, Conservation laws, Electromagnetic waves, Potentials and fields								
Work Placement	N/A								
Planned Learning Activities and Teaching Methods	Explanation (Presentation), Discussion								
Name of Lecturer(s)	Prof. Hasan Hüseyin KART								

Assessment Methods and Criteria		
Method	Quantity	Percentage (%)
Midterm Examination	1	30
Final Examination	1	70
Assignment	4	10

Recommended or Required Reading	
1	Introduction to Electrodynamics, David J. Griffiths, 2003.
2	Classical Electrodynamics, John DAvid Jackson, 1998.

Week	Weekly Detailed Course Contents	
1	Theoretical	Magnetostatics, Lorentz’s force, Magnetic field and Force, Currents, Biot-Savart’s Law
2	Theoretical	The magnetic field of steady current and the divergence and Curl of magnetic field
3	Theoretical	Straight line currents, applications of Ampere’s law and comparison of magnetostatics
4	Theoretical	Magnetic vector potential, magnetic dipole moment, magnetostatics boundary conditions
5	Theoretical	Magnetic fields in matter, torques and forces on magnetic dipoles, effect of a magnetic field on atomic orbits.
6	Theoretical	The field of a magnetized object, physical interpretation of bound currents and the magnetic field inside matter
7	Theoretical	Auxiliary field H, Amper’s law in magnetized materials and linear and nonlinear media
8	Intermediate Exam	Midterm
9	Theoretical	Electrodynamics, Ohm’s law, electromotive forces, Faraday’s law, Inductance, Energy in magnetic fields
10	Theoretical	Maxwell’s equations, Maxwell’s equation in matter, The potential formulation of electromagnetic theory
11	Theoretical	Gauge transformation, energy and momentum in electrodynamics, conservation of momentum
12	Theoretical	Electromagnetic waves and electromagnetic wave in matter
13	Theoretical	Electromagnetic waves in conductors
14	Theoretical	Dispersion
15	Theoretical	Radiation, electric dipole radiation and the radiation of point charge

Workload Calculation				
Activity	Quantity	Preparation	Duration	Total Workload
Lecture - Theory	14	6	3	126
Midterm Examination	1	20	2	22
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	The difference between electric charges in motion and in rest should be distinguishable and the magnetic fields of moving charges can be calculated
2	Electromagnetic forces acting on moving charges can be defined
3	The concepts of the steady current can be understood and the magnetic field of steady current should be calculated
4	Biot-Savart law can be applied to many problems
5	The general properties of magnetic materials such as ferromagnetic, diamagnetic and paramagnetic should be known
6	Calculate the magnetic field from magnetized materials
7	Explain the concepts of electromotive forces and Faraday's law
8	Write down Maxwell equations and use these equations to apply many physical systems
9	The concepts of transverse, longitudinal and polarization can be understood
10	Many events which take place in nature can be investigated

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
P1		3		2	2				
P2		3						2	2
P4									3
P5	3	5	3	5	3	3	3	3	
P6	5	5	5	5	5	5	5	5	5
P7	3	3	3	3	3	3	3	3	
P8							2	2	
P9		3	2	2	5	3	3	3	3
P13	5	5	3	2	2	2	3	3	
P14	5	5	3	3	3	3	2		3
P15					2	2	5	5	
P16	5	5	5	5	5	5	2		5
P17					2	2			
P18	2	2	2	2					