PHYS 102 -Engineering Physics II

Course Code	Course Name	Semester	
PHYS 102	Engineering Physics II	Fall ☐ Spring ☒ Summer ☐	
Hours		**Credit**	**ECTS**
Theory	**Practice** / **Lab**	4	6
3	0 / 2		

Course Details	
Department	EE, ME, IE, AE
Course Language	English
Course Level	Undergraduate ☒ Graduate ☐
Mode of Delivery	Face to Face ☒ Online ☐ Hybrid ☐
Course Type	Compulsory ☒ Elective ☐
Lecturer(s)	
Course Objectives	The objective of this course is to provide a calculus-based physics course to help students pursuing advanced studies in engineering develop conceptual understanding of physical principles, the ability to reason, and gain skills for problem solving
Course Content	Electric Charge; Coulomb's law, Electric field; Gauss' law, Electric Potential; Capacitance, Dielectrics, and Electric Energy Storage; Electric Currents and Resistance; EMF, Terminal Voltage, DC Circuits, and Kirchhoff's Rules; Magnetism and Magnetic Fields; Sources of Magnetic Field, Ampere's Law, Biot-Savart Law; Electromagnetic Induction, Faraday's Law, Lenz's Law; Inductance, Electromagnetic Oscillations, and AC Circuits; Maxwell's Equations and Electromagnetic Waves
Course Method/ Techniques	Lecture ☒ Question & Answer ☒ Presentation ☐ Discussion ☒
Prerequisites/ Corequisites	
Work Placement(s)	
Textbook/References/Materials	

- Physics for Scientist Engineers 10th addition by John W. Jewett Jr. and Raymond Serway, Cancage.
- Physics for Scientists and Engineers with Modern Physics by Giancolli. Peaeson.
- Fundamentals of physics by Halliday and Resnick, 9th addition. John Wiley & Sons.

Course Category				
Mathematics and Basic Sciences	☒		Education	☐
Engineering	☒		Science	☒
Engineering Design	☐		Health	☐
Social Sciences	☐		Profession	☐

Weekly Schedule		
No	**Topics**	**Materials/Notes**
1	Electric Charge, Coulomb's law and Electric Field	Chapter 21
2	Electric Charge, Coulomb's law and Electric Field	Chapter 21
3	Gauss's Law	Chapter 22
4	Electrostatic Potential	Chapter 23
5	Capacitance, Dielectrics, and Electric Energy Storage	Chapter 24
6	Electric Currents and Resistance	Chapter 25
7	EMF, Terminal Voltage, DC Circuits, and Kirchhoff's Rules	Chapter 26
8	**Midterm Exam**	
9	Magnetism and Magnetic Fields	Chapter 27
10	Magnetism and Magnetic Fields	Chapter 27
11	Sources of Magnetic Field, Ampere's Law, Biot-Savart Law	Chapter 28
12	Electromagnetic Induction, Faraday's Law, Lenz's Law	Chapter 29
13	Inductance, Electromagnetic Oscillations, and AC Circuits	Chapter 30
14	Inductance, Electromagnetic Oscillations, and AC Circuits	Chapter 30
15	Maxwell's Equations and Electromagnetic Waves	Chapter 31
16	**Final Exam**	

Assessment Methods and Criteria		
In-term studies	**Quantity**	**Percentage**
Attendance		
Lab		15%
Practice		
Fieldwork		
Course-specific internship		
Quiz/Studio/Criticize		
Homework		
Presentation / Seminar		
Project		
Report		
Seminar		
Midterm Exam	1	35%
Final Exam	1	50%
	Total	**100%**
Contribution of Midterm Studies to Success Grade		
Contribution of End of Semester Studies to Success Grade		
	Total	**100%**

ECTS Allocated Based on Student Workload			
Activities	**Quantity**	**Duration (Hrs)**	**Total Workload**
Course Hours	14	3	42
Lab	14	2	28
Practice			
Fieldwork			
Course-specific Work Placement			
Out-of-class study time	14	2	28
Quiz/Studio/Criticize			
Homework			
Presentation / Seminar			
5Project			
Report	8	3	24
Midterm Exam and Preparation for Midterm	1	10	10
Final Exam and Preparation for Final Exam	1	20	20
Total Workload			**152**
Total Workload / 25			**6.08**
ECTS Credit			**6**

Course Learning Outcomes	
No	**Outcome**
L1	Demonstrate a conceptual understanding of the fundamental physical laws of electricity and magnetism
L2	Realize importance of physics and the scientific method for advancement of technology and human life.
L3	Analyze problems using the laws of electromagnetism
L4	Gain knowledge and skills for modeling and solving variety of physics and engineering problems
L5	Perform experiments, make measurements, analyze data and make calculations to reach meaningful results, present such activities as a scientific report.

Contribution of Course Learning Outcomes to Program Competencies/Outcomes

Contribution Level: 1: Very Slight, 2: Slight, 3: Moderate, 4: Significant, 5: Very Significant

	P1	**P2**	**P3**	**P4**	**P5**	**P6**	**P7**	**P8**	**P9**	**P10**	**P11**					**Total**
L1	x	x				x	x	x	x							-
L2	x	x				x	x	x	x							-
L3	x	x				x	x	x	x							-
L4	x	x		x	x	x	x	x	x							-
L5	x	x	x	x	x	x	x	x	x		x					-
															Total	-

i. Adequate knowledge in mathematics, science, and subjects specific to Computer Engineering; ability to use theoretical and applied knowledge in these areas to solve complex engineering problems.
ii. Ability to identify, formulate, and solve complex engineering problems; ability to select and apply appropriate analysis and modeling methods for this purpose.
iii. Ability to design a complex system, process, device, or product under realistic constraints and conditions to meet specific requirements; ability to apply modern design methods for this purpose.
iv. Ability to develop, select, and use modern techniques and tools required for the analysis and solution of complex problems encountered in engineering practice; ability to use information technologies effectively.
v. Ability to design and conduct experiments, collect data, analyze and interpret results in order to investigate complex engineering problems or research topics specific to the discipline of Computer Engineering.
vi. Ability to work effectively in disciplinary and multidisciplinary teams; ability to work individually.

vii. Ability to communicate effectively in oral and written Turkish; knowledge of at least one foreign language; ability to write effective reports and understand written reports, to prepare design and production reports, to make effective presentations, to give and receive clear and understandable instructions.

viii. Awareness of the necessity of lifelong learning; the ability to access information, to follow developments in science and technology and to continuously renew oneself.

ix. Acting in accordance with ethical principles, professional and ethical responsibility awareness; knowledge of standards used in engineering applications.

x. Knowledge about business life practices such as project management, risk management, and change management; awareness of entrepreneurship, innovation; knowledge about sustainable development.

xi. Knowledge about the effects of engineering applications on health, environment, and safety in universal and social aspects and the problems of the age reflected in the field of engineering; awareness of the legal implications of engineering solutions.