PHYS 101 –Engineering Physics I

Course Code	Course Name	Semester	
PHYS 101	Engineering Physics I	Fall ☒ Spring ☐ Summer ☐	
Hours		**Credit**	**ECTS**
Theory	**Practice** / **Lab**	4	6
3	0 / 2		

Course Details	
Department	Nanotechnology Engineering
Course Language	English
Course Level	Undergraduate ☒ Graduate ☐
Mode of Delivery	Face to Face ☒ Online ☐ Hybrid ☐
Course Type	Compulsory ☒ Elective ☐
Course Objectives	The goal of PHYS 101 course is to provide a calculus-based physics instruction to help students pursue advanced studies in engineering, to develop conceptual understanding of physical principles, gain skills and ability for problem solving.
Course Content	Physics and measurements, Vectors, kinematics and dynamics in one and two dimensions, work-energy and conservation of energy, linear momentum and collisions, rotational motion; angular momentum; equilibrium, gravitation, oscillating motion, 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	Physics and Measurement	Chapter 1
2	One-Dimensional Motion	Chapter 2
3	Vectors	Chapter 3
4	Two-Dimensional Motion	Chapter 4
5	The Laws of Motion	Chapter 5
6	Circular Motion and other Applications of Newton's Laws	Chapter 6
7	Work and Energy	Chapter 7
8	Midterm Exam	
9	Conservation and Energy	Chapter 8
10	Linear Momentum and Collisions	Chapter 9
11	Rotation of a Rigid Object about a Fixed Axis	Chapter 10
12	Angular Momentum	Chapter 11
13	Equilibrium, gravitation	Chapter 12
14	Oscillation and waves	Chapter 13
15	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			
Project			
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			**152/25**
ECTS Credit			**6.08**

Course Learning Outcomes	
No	**Outcome**
L1	Demonstrate conceptual understanding of the fundamental forces of nature and the laws of dynamics.
I2	Realize importance of physics and the scientific method for advancement of technology and human life.
L3	Analyze problems using the laws of mechanics and the conservation laws of nature.
L4	Gain knowledge and skills for modeling and solving variety of physics and engineering problems.
L5	Perform experiments, make measurements, analyse 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**	**P12**	**P13**	**P14**	**P15**	**Total**

L1	x	x			x	x	x	x	x		x					
L2	x	x			x	x	x	x	s		x					
L3	x	x			x	x	x	x	x		x					
L4	x	x			x	x	x	x	x		x					
L5	x	x			x	x	x	x	x		x					
															Total	

i. Adequate knowledge in mathematics, science and subjects specific to Electrical and Electronics Engineering; ability to use theoretical and applied knowledge in these areas in complex engineering problems.
ii. Ability to identify, formulate and solve complex engineering problems; ability to select and apply appropriate analysis and modelling 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, analyse and interpret results in order to investigate complex engineering problems or research topics specific to the discipline of Electrical and Electronics 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