TOROS ÜNİVERSİTESİ

Faculty Of Engıneerıng
Computer And Software Engıneerıng

Course Information

PHYSICS I					
Code	**Semester**	**Theoretical**	**Practice**	**National Credit**	**ECTS Credit**
		Hour / Week			
PHY101	Fall	3	2	4	7

Prerequisites and co-requisites	None
Language of instruction	English
Type	Required
Level of Course	Bachelor's
Lecturer	Asst. Prof. Çağdaş ALLAHVERDİ
Mode of Delivery	Face to Face
Suggested Subject	None
Professional practise (internship)	None
Objectives of the Course	The course’s objective is to introduce students to the fundamental concepts of physics and their practical applications, and to provide students with a foundation to build upon in their future studies. The course introduces to non-major students physical quantities and measurements, mechanical motion, force, work and energy, and oscillations and waves.
Contents of the Course	The topics covered in this course include: • quantitative approach, measurements, quantities, and units; • vectors and manipulations with vectors; • kinematics of mechanical motion and simplest motions; • dynamics of mechanical motion, Newton’s laws, forces, momentum, solving motion using forces; • rotational motion, torque and angular momentum, rotational and rolling motion of solid bodies; • conservation of energy, linear, and angular momentum, significance and application of conservation laws in physics; • simple harmonic oscillations, forced oscillations and resonance, simple wave motion, basic properties of waves.

Learning Outcomes of Course

#	Learning Outcomes
1	To be able to understand Newton's Laws
2	To be able to use Newton's Laws for solving physics and engineering problems
3	To be able to use Work, Energy and Momentum conservation laws.
4	Ability to devise, select, and use modern techniques and tools needed for engineering practice; ability to employ information technologies effectively.
5	Ability to design and conduct experiments, gather data, analyze and interpret results for investigating engineering problems.
6	Ability to work efficiently in intra-disciplinary and multi-disciplinary teams; ability to work individually.

Course Syllabus

#	Subjects	Teaching Methods and Technics
1	Introduction to Quantitative approach, Physical quantities and Vectors.	Lecturing
2	Fundamental vector operations. Vector representation in component and unit-vector form. Scalar and vectoral product of vectors.	Lecturing

3	Mechanical motion and its description; position, speed, and acceleration. Average and instantaneous quantities and their calculations.	Lecturing
4	Fundamental mechanical motions; equations of motion, constant accelerated motion, free fall, projectile motion, circular motion.	Lecturing
5	Causes of mechanical motion. Inertial motion and inertial reference frames. Newton’s laws, mechanical forces, momentum, gravity, weight, normal force, and friction. Homestudy: Relativity.	Lecturing
6	Properties of the force of friction; static, kinetic, and rolling friction. Properties of elastic deformation forces; tension: longitudinal, transversal, and shear deformations, elastic modules. Properties of non-inertial forces; linear, centrifugal, and Coriolis forces.	Lecturing
7	Midterm Exam	Exam
8	Solving motion of bodies using forces; free-body diagrams. For example, motion of box on inclined surface, motion of two stacked boxes, etc. Motion of celestial bodies; Newton's law of universal gravitation. Kepler's laws.	Lecturing
9	Force and work, work-energy theorem, kinetic energy. For example, work of friction force etc. Conservative forces. Conservation laws in mechanics; conservation of mechanical energy, conservation of mechanical momentum.	Lecturing
10	Applications of work and energy. For example, metal ball falling onto a spring, two-body collisions in 2D. Rotational motion; axis of rotation, angular position, radian measure, angular speed, and angular acceleration. Relation between linear and angular quantities; tangential and normal speed, tangential and normal acceleration.	Lecturing
11	Reasons for change of rotational motion, forces and torque. 2nd Newton’s law for rotation, moment of inertia of a body. Example, rotating disk under torque. Parallel axis theorem. Kinetic energy of rotation. Angular momentum and conservation of angular momentum.	Lecturing
12	Rolling motion; rolling with slipping and without slipping, role of the friction force in rolling. Example, rolling of a ball down inclined plane. Method of fixed axis; example for rolling of a ball. Energy of a rolling object and energy conservation. Linear and rotational energy in rolling.	Lecturing
13	Simple oscillatory motion; amplitude, frequency, period, and phase. Example motion of physical pendulum. Forced oscillations and resonance. Example forced oscillations of a pendulum.	Lecturing
14	Simple wave motion; transversal and longitudinal waves, sinusoidal waves, amplitude, frequency, period, wave-number, wave-length, and phase of sinusoidal waves. Wave-front and wave-front propagation, speed of wave. Superposition principle and interference of waves; constructive and destructive interference. Interference from two spherical sources and interference pattern.	Lecturing
15	Review	Lecturing
16	Final Exam	Exam

Course Syllabus

#	Material / Resources	Information About Resources	Reference / Recommended Resources
1	H.D. Young, R.A. Freedman and A.L. Ford, Sears and Zemansk's University Physics with Modern Physics Technology Update, 13th Edition, ISBN 10: 0-321-89470-7, 2014		
2	Raymond A. Serway, Physics for Scientists and Engineers, 4th edition, Saunders College Pub, 1996		
3	D. Halliday, R. Resnick, J. Walker, Fundamentals of Physics Extended, 9th Edition, Wiley, 2009 ISBN-10: 0-321-64363-1, 2010.		

Method of Assessment

#	Weight	Work Type	Work Title
1	40%	Mid-Term Exam	Mid-Term Exam
2	40%	Final Exam	Final Exam
3	20%	Laboratory	Laboratory

Relationship between Learning Outcomes of Course and Program Outcomes

#	Learning Outcomes	Program Outcomes	Method of Assessment
1	To be able to understand Newton's Laws	1	1,2

2	To be able to use Newton's Laws for solving physics and engineering problems	1	1,2
3	To be able to use Work, Energy and Momentum conservation laws.	1	1,2,3
4	Ability to devise, select, and use modern techniques and tools needed for engineering practice; ability to employ information technologies effectively.	1	1,2,3
5	Ability to design and conduct experiments, gather data, analyze and interpret results for investigating engineering problems.	1	1,2,3
6	Ability to work efficiently in intra-disciplinary and multi-disciplinary teams; ability to work individually.	1	1,2,3

PS. The numbers, which are shown in the column Method of Assessment, presents the methods shown in the previous table, titled as Method of Assessment.

Work Load Details

#	Type of Work	Quantity	Time (Hour)	Work Load
1	Course Duration	14	5	70
2	Course Duration Except Class (Preliminary Study, Enhancement)	14	4	56
3	Presentation and Seminar Preparation	0	0	0
4	Web Research, Library and Archival Work	0	0	0
5	Document/Information Listing	0	0	0
6	Workshop	0	0	0
7	Preparation for Midterm Exam	1	13	13
8	Midterm Exam	1	7	7
9	Quiz	0	0	0
10	Homework	3	3	9
11	Midterm Project	3	3	9
12	Midterm Exercise	0	0	0
13	Final Project	1	3	3
14	Final Exercise	0	0	0
15	Preparation for Final Exam	1	20	20
16	Final Exam	1	10	10
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