



UNIVERSITI TEKNOLOGI MARA

PHY094: FOUNDATION PHYSICS I

Course Name (English)	FOUNDATION PHYSICS I APPROVED
Course Code	PHY094
MQF Credit	5
Course Description	This is the first of the two-semester course in Foundation Physics for students at the Centre of Foundation Studies. This 5 credit course is focuses on the basic knowledge in areas of mechanics, solids and fluids, waves and sounds, and thermal physics. Applications in various areas will be discussed. The purpose of this course is to provide students with strong physics concepts, analytical and problem-solving skills and to expose students to the scientific analytical analysis in order to develop long-term retention of principles and practice needed in their future studies by thorough guidance methods, in-class exercises, group project and lab work. By the end of this course, students are expected to acquire and apply knowledge of physics to respective fields of medicine, health, environment, agriculture, industry and engineering.
Transferable Skills	Student demonstrate ability to identify and articulate self skills, knowledge and understanding confidently in a variety of contexts
Teaching Methodologies	Lectures, Lab Work, Tutorial, Peer Practice, Collaborative Learning
CLO	<p>CLO1 1. Explain, utilizing the algebraic approach, the behavior of matter interacting with energy in the fields of mechanics, thermal physics and wave mechanics.</p> <p>CLO2 2. Display basic scientific skills in the fields of mechanics, thermal physics and wave mechanics.</p> <p>CLO3 3. Demonstrate effective reporting of and taking alternate role as a leader and team member in scientific investigation in the fields of mechanics, thermal physics and wave mechanics.</p> <p>CLO4 4. Demonstrate entrepreneurial mindset in displaying basic scientific skills in the fields of mechanics, thermal physics and wave mechanics.</p>
Pre-Requisite Courses	No course recommendations
Topics	
1. Physical quantities and units 1.1) Basic quantities and SI units 1.2) Scalars and vectors	
2. Mechanics of Motion 2.1) Motion with constant acceleration 2.2) Projectiles: free falling bodies and projectile motion 2.3) Forces and moments 2.4) Newton's laws and applications 2.5) Momentum, Impulse and Collisions	
3. Force, Work, energy, power and momentum 3.1) Force 3.2) Work done 3.3) Kinetic energy 3.4) Potential energy: gravitational, elastic and force related potential energy 3.5) Conservation of energy 3.6) Power 3.7) Momentum	

4. Rotational Kinematics 4.1) Uniform circular motion 4.2) Centripetal acceleration and centripetal force 4.3) Angular position, velocity and acceleration 4.4) Rotational kinematics 4.5) Connection between linear and rotational quantities
5. Rotational Dynamics 5.1) Torque 5.2) Torque and angular acceleration 5.3) Zero torque and static equilibrium 5.4) Center of mass and balance 5.5) Dynamic application of torque 5.6) Angular momentum
6. Simple harmonic motion (SHM) 6.1) Equations of motion related to SHM 6.2) Frequency and period for SHM 6.3) Undamped SHM 6.4) Mechanical oscillators; simple pendulum, mass-spring system
7. Wave motion 7.1) Generation of mechanical waves and transmission of energy in the medium 7.2) Electromagnetic waves 7.3) Electromagnetic spectrum 7.4) Progressive waves; longitudinal and transverse waves 7.5) Superposition and interference of wave 7.6) Standing wave and resonance 7.7) Characteristic of sound 7.8) Intensity of sound 7.9) Superposition and interference of sound 7.10) The Doppler Effect
8. Properties of Matter 8.1) Bouyant forces and Archimedes's principle 8.2) the deformation of solid
9. Properties of Matter 9.1) Bouyant forces and Archimedes's principle 9.2) the deformation of solid
10. Laws of thermodynamics 10.1) The First law of thermodynamics 10.2) Thermodynamics processes 10.3) The Second law of thermodynamics 10.4) Heat engine
11. Temperature and heat 11.1) Temperature and thermal equilibrium 11.2) Thermometers and temperature scale 11.3) Thermal expansion of solids and liquids 11.4) Thermal Conductivity 11.5) Heat

Assessment Breakdown	%
Continuous Assessment	100.00%

Details of Continuous Assessment	Assessment Type	Assessment Description	% of Total Mark	CLO
	Assignment	Group proposal report of entrepreneurial project in displaying basic scientific skills in the fields of mechanics, thermal physics and wave mechanics to emphasize the attribute entrepreneur mindset (MQF 5).	10%	CLO4
	Final Test	ODL final test (50%) which covered from chapter 5-14 and require students use algebraic approach to solve the problems involved matter interacting with energy in the fields of mechanics, thermal physics and wave mechanics which emphasize the attribute of knowledge (MQF 1).	50%	CLO1
	Lab Exercise	Display basic scientific skills in the fields of mechanics, thermal physics and wave mechanics.	10%	CLO2
	Online Quiz	2 online quizzes. quiz 1 from chapter 1. quiz 2 from chapter 6 and 7.	5%	CLO1
	Test	Test from chapter 1-4.	15%	CLO1
	Written Report	Demonstrate effective reporting of and taking alternate role as a leader and team member in scientific investigation in the fields of mechanics, thermal physics and wave mechanics.	10%	CLO3

Reading List	Recommended Text	<ul style="list-style-type: none"> Raymond A. Serway, Chris Vuille 2018, <i>College Physics</i>, 11th Ed., Cengage Learning [ISBN: 9781337620338]
	Reference Book Resources	<ul style="list-style-type: none"> John D. Cutnell, Kenneth W. Johnson 2013, <i>Physics</i>, 9th Ed., Wiley [ISBN: 978047087952] Walker, J. S 2015, <i>Physics</i>, 5th Ed., Pearson [ISBN: 978032197644] Douglas C. Giancoli 2008, <i>Physics for Scientists & Engineers with Modern Physics</i>, Pearson Education [ISBN: 0131495089] Randall D. Knight 2012, <i>Physics for Scientist and Engineers: Strategic Approach</i>, 3rd Ed., Addison- Wesley [ISBN: 0321752910]
Article/Paper List	This Course does not have any article/paper resources	
Other References	This Course does not have any other resources	