



## UNIVERSITI TEKNOLOGI MARA

### PHY081: PHYSICS I

<b>Course Name (English)</b>	PHYSICS I <b>APPROVED</b>
<b>Course Code</b>	PHY081
<b>MQF Credit</b>	4
<b>Course Description</b>	no description provided
<b>Transferable Skills</b>	confident
<b>Teaching Methodologies</b>	Lectures, Lab Work, Tutorial
<b>CLO</b>	<p>CLO1 Explain the concepts, laws and theories in measurement, kinematics, dynamics, energy, matter, thermal physics, optics, waves, electricity and electromagnetism.</p> <p>CLO2 Respond to the observation and complete the laboratory datasheet in experiments involving selected areas from the topics in measurement, kinematics, dynamics, energy, matter, thermal physics, optics and electricity.</p> <p>CLO3 Study the concepts, laws and principles in measurement, kinematics, dynamics, energy, matter, thermal physics, optics, waves, electricity and electromagnetism to solve qualitative and quantitative problems.</p>
<b>Pre-Requisite Courses</b>	No course recommendations
<b>Topics</b>	
<b>1. 1.0 Measurement</b> 1.1) 1.1 Basic quantities 1.2) 1.1.1 Definition 1.3) 1.1.2 Five examples with base units (SI) 1.4) 1.2 Derived quantities 1.5) 1.2.1 Definition 1.6) 1.2.2 Examples 1.7) 1.3 Conversion of units 1.8) 1.3.1 Prefixes and scientific notation 1.9) 1.3.2 Techniques of unit conversion 1.10) (between prefixes in SI system and between SI and other systems where conversion factor is provided) 1.11) 1.4 Measurement of Length 1.12) 1.4.1 Instruments – Metre ruler, Vernier callipers, Micrometer screw gauge 1.13) 1.4.2 Zero error	
<b>2. 2.0 Kinematics</b> 2.1) 2.1 Vectors and Scalars 2.2) 2.1.1 Definitions 2.3) 2.1.2 Distance and displacement 2.4) 2.1.3 Speed and velocity 2.5) 2.1.4 Acceleration 2.6) 2.2 Graphs of linear motion 2.7) 2.2.1 Displacement – time graph 2.8) Velocity – time graph 2.9) Acceleration – time graph 2.10) 2.2.2 Gradient and area under the graph 2.11) 2.3 Equations of linear motion 2.12) 2.3.1 Motion with constant velocity 2.13) 2.3.2 Motion with constant acceleration 2.14) 2.3.3 Problem solving involving horizontal motion only	

**3. 3.0 Dynamics**

- 3.1) 3.1 Newton's First Law of Motion
- 3.2) 3.1.1 Formal statement and examples
- 3.3) 3.1.2 Concept of mass and inertia
- 3.4) 3.2 Newton's Second Law of Motion
- 3.5) 3.2.1 Formal statement and examples
- 3.6) 3.2.2 Concept of mass and weight
- 3.7) 3.2.3 Applications of force in compound system, one pulley system
- 3.8) (no inclined plane) and movement of lift
- 3.9) 3.2.4 Frictional force on a horizontal plane (excluding coefficient of friction).
- 3.10) 3.3 Newton's Third Law of Motion
- 3.11) 3.3.1 Formal statement and examples
- 3.12) 3.4 Linear Momentum
- 3.13) 3.4.1 Definition and concept
- 3.14) 3.5 Conservation of linear momentum
- 3.15) 3.5.1 Formal statement
- 3.16) 3.5.2 Elastic and inelastic collisions including explosion
- 3.17) 3.5.3 Problem solving not involving simultaneous equations

**4. 4.0 Energy**

- 4.1) 4.1 Work, energy and power
- 4.2) 4.1.1 Definitions and concepts
- 4.3) 4.1.2 Relationship among these three quantities
- 4.4) 4.1.3 Problem solving
- 4.5) 4.2 Kinetic energy and gravitational potential energy
- 4.6) 4.2.1 Work and energy theorem
- 4.7) 4.2.2 Principle of conservation of mechanical energy
- 4.8) 4.2.3 Problem solving involving conservation of mechanical energy

**5. 5.0 Matter**

- 5.1) 5.1 Solid, Liquid and Gas
- 5.2) 5.1.1 Arrangement of particles in solid, liquid and gas
- 5.3) 5.2 Density
- 5.4) 5.2.1 Definition
- 5.5) 5.2.2 Relative density
- 5.6) 5.2.3 Problem solving excluding mixture
- 5.7) 5.3 Pressure
- 5.8) 5.3.1 Definition and concept of pressure in liquid
- 5.9) 5.3.2 Application of  $P = h\rho g$  in liquid
- 5.10) 5.3.3 Pascal's principle (statement and application)
- 5.11) 5.3.4 Problem solving
- 5.12) 5.4 Gas Laws
- 5.13) 5.4.1 Boyle's Law, Charles Law and Pressure Law
- 5.14) 5.4.2 Statements, expressions and graphs
- 5.15) 5.4.3 Problem solving

**6. 6.0 Thermal Physics**

- 6.1) 6.1 Temperature
- 6.2) 6.1.1 Definition of temperature scales (Celsius, Fahrenheit and Kelvin)
- 6.3) 6.1.2 Relation between Celsius and Kelvin only
- 6.4) 6.2 Heat
- 6.5) 6.2.1 Definition and unit
- 6.6) 6.2.2 Specific Heat Capacity
- 6.7) 6.2.3 Specific Latent Heat of Fusion and Vaporization
- 6.8) 6.2.4 Applications in Calorimetry - problems include absorption and emission of heat in a mixture system, and heat by any electrical source
- 6.9) 6.2.5 Graphs of temperature versus time
- 6.10) Graphs of temperature versus energy

**7. 7.0 Optics and Waves**

- 7.1) 7.1 Optics
- 7.2) 7.1.1 Reflection
- 7.3) Laws of Reflection
- 7.4) 7.1.2 Refraction
- 7.5) Laws of Refraction (Snell's Law)
- 7.6) 7.1.3 Index of refraction, critical angle and total internal reflection.
- 7.7) 7.1.4 Problem solving involving two media only
- 7.8) 7.2 Waves
- 7.9) 7.2.1 Types of waves: longitudinal and transverse waves including examples
- 7.10) 7.2.2 Characteristics of wave: wavelength, frequency, period, velocity and amplitude
- 7.11) 7.2.3 Problem solving involving graphs of displacement versus time and displacement versus distance

**8. 8.0 Electricity**

- 8.1) 8.1 Charges
- 8.2) 8.1.1 Types of charges and unit
- 8.3) 8.1.2 Electric field pattern and direction of one point charge and between two point charges (like and unlike charges)
- 8.4) 8.2 Current
- 8.5) 8.2.1 Definition and unit
- 8.6) 8.2.2 Problem solving inclusive of  $Q = ne$
- 8.7) 8.3 Potential difference
- 8.8) 8.3.1 Definition, expression and unit
- 8.9) 8.3.2 Electromotive force (e.m.f) definition only
- 8.10) 8.4 Resistance and Ohm's law
- 8.11) 8.4.1 Definition of resistance
- 8.12) 8.4.2 Statement and expression of Ohm's law
- 8.13) 8.4.3 Resistor in series and parallel
- 8.14) 8.4.4 Problem solving of not more than five resistors

**9. 9.0 Electromagnetism**

- 9.1) 9.1 Magnetic Field
- 9.2) 9.1.1 Bar magnet and pattern of its magnetic field
- 9.3) 9.1.2 Pattern of magnetic field for a current-carrying conductor.
- 9.4) (straight wire, one circular loop and solenoid)
- 9.5) 9.1.3 Direction of magnetic field and polarity determination
- 9.6) 9.2 Magnetic force
- 9.7) 9.2.1 Direction of force on current carrying conductor in uniform magnetic
- 9.8) Field (Fleming's left hand rule or right hand palm rule)

Assessment Breakdown	%
Continuous Assessment	60.00%
Final Assessment	40.00%

Details of Continuous Assessment	Assessment Type	Assessment Description	% of Total Mark	CLO
	Assignment	Individual assignment	10%	CLO1 , CLO3
	Lab Exercise	Practical skills	10%	CLO2
	Quiz	5 Quizzes	10%	CLO1 , CLO3
	Test	Test 1	10%	CLO1 , CLO3
	Test	Test 2	10%	CLO1 , CLO3
	Written Report	5 Lab reports	10%	CLO2

Reading List	Recommended Text	<ul style="list-style-type: none"> <li>• Mohd Isa M. Y., Abu Hassan H., Aniszawati A., Ho B. H., Syawe I. S. L., Wan Kamariah W. A.R. 2006, <i>Basic Physics Pre-Science</i>, ACE Edition Ed., Mc Graw Hill</li> </ul>
	Reference Book Resources	<ul style="list-style-type: none"> <li>• Halliday, D., Resnick, R. and Walker, J 2001, <i>Fundamentals of Physics</i>, 6 Ed., , Singapore: John Wiley and Sons [ISBN: ]</li> <li>• Serway, R.A. and Faughn, J.S 2006, <i>College Physics</i>, 8 Ed., , New York: Saunders College Publishing [ISBN: ]</li> <li>• Giancoli, D.C., 2005, <i>Physics</i>, 6 Ed., , New Jersey: Prentice Hall. [ISBN: ]</li> <li>• , <i>FIZIK KBSM Form 4 and 5 textbooks</i>, Ed., , [ISBN: ]</li> </ul>
Article/Paper List	This Course does not have any article/paper resources	
Other References	This Course does not have any other resources	