UNIVERSITI TEKNOLOGI MARA

PHY130: FUNDAMENTAL PHYSICS I

Course Name (English)	FUNDAMENTAL PHYSICS I APPROVED
Course Code	PHY130
MQF Credit	3
Course Description	This course will interactively engage students cognitively and scientifically in areas of system of units, linear kinematics, dynamics of motion, mechanics of solid and fluid, rotational kinematics and heat and thermodynamics. Students will define concepts, state and write laws and theories, performs investigations via laboratory exercises, discuss the results and relationships with peers and facilitators. Lecture hours consist a mixture of lectures and active learning. The outcomes shall be assessed through a variety of tools which include the traditional paper examination and classroom engagement.
Transferable Skills	Reflective learner
Teaching Methodologies	Lectures, Lab Work, Tutorial
CLO	CLO1 Explain the concepts, laws and theories in system of units, linear kinematics, dynamics of motion, mechanics of solid and fluid, rotational kinematics, heat and thermodynamics. CLO2 Employ the concepts, laws and theories in system of units, linear kinematics, dynamics of motion, mechanics of solid and fluid, rotational kinematics, heat and thermodynamics to solve qualitative and quantitative problems. CLO3 Analyse the concepts, laws and theories in system of units, linear kinematics, dynamics of motion, mechanics of solid and fluid, rotational kinematics, heat and thermodynamics to solve qualitative and quantitative problems. CLO4 Construct the specific report in areas of linear kinematics, dynamics of motion, mechanics of solid and fluid, rotational kinematics, heat and thermodynamics.
Pre-Requisite Courses	No course recommendations

Topics
1. System of units 1.1) 1.1 Basic and derived units 1.2) 1.2 Dimensional analysis 1.3) 1.3 Unit conversion
2. Kinematics in one dimension 2.1) 2.1 Scalars and vectors 2.2) 2.2 Linear motion parameters 2.3) 2.2.1 Definition of linear motion parameters 2.4) 2.2.2 Average and instantaneous velocity 2.5) 2.2.3 Average and instantaneous acceleration 2.6) 2.3 Graph of linear motion 2.7) 2.3.1 Displacement – time graph 2.8) 2.3.2 Velocity – time graph 2.9) 2.4 Linear motion with constant acceleration 2.10) 2.5 Free fall motion
3. Kinematics in two dimension 3.1) 3.1 Addition and subtraction of vector – Graphical and Component Method 3.2) 3.2 Multiplication of a vector by scalar 3.3) 3.3 Projectile motion

4. Dynamics: Newton,s Law of Motion 4.1) 4.1 Definition of force 4.2) 4.2 Types of forces 4.3) 4.2.1 Gravitational force 4.4) 4.2.2 Normal force 4.5) 4.2.3 Frictional force 4.6) 4.2.4 Tensional force 4.7) 4.3 Newton's Law of Motion and its application 4.8) 4.3.1 Newton's First Law 4.9) 4.3.2 Newton's Second Law 4.10) 4.3.3 Newton's Third Law 4.11) 4.4 Static equilibrium under concurrent force
5. Work, Energy and Power 5.1) 5.1 Work done by constant force 5.2) 5.2 Kinetic Energy and Work Energy Principle 5.3) 5.3 Gravitational Potential Energy 5.4) 5.4 Mechanical Energy and Its Conservation 5.5) 5.5 Power
6. Linear Momentum 6.1) 6.1 Definition of linear momentum 6.2) 6.2 Conservation of linear momentum and its applications 6.3) 6.2.1 Elastic collision 6.4) 6.2.2 Inelastic collision 6.5) 6.3 Impulse
7. Rotational Motion 7.1) 7.1 Rotational motion parameters 7.2) 7.2 Rotational motion with constant angular acceleration 7.3) 7.3 Relationship between linear and rotational motion parameters
8. Matter 8.1) 8.1 Elasticity 8.2) 8.1.1 Stress – Strain graph 8.3) 8.1.2 Stress and Strain 8.4) 8.1.2.1 Tensile deformation 8.5) 8.1.2.2 Shear deformation 8.6) 8.1.2.3 Volume deformation 8.7) 8.2 Pressure in fluid 8.8) 8.3 Pascal Principle 8.9) 8.4 Buoyancy and Archimedes' Principle 8.10) 8.5 Fluid in Motion: Mass flow rate, volume flow rate and equation of continuity
9. Heat and Thermodynamics 9.1) 9.1 Temperature, thermal expansion and the Ideal Gas Law 9.2) 9.2 Heat: Specific heat capacity, calorimetry and latent heat 9.3) 9.3 The First Law of thermodynamics 9.4) 9.4 Thermodynamics Processes

Assessment Breakdown	%
Continuous Assessment	60.00%
Final Assessment	40.00%

Details of Continuous Assessment

Assessment Type	Assessment Description	% of Total Mark	CLO
Quiz	3 QUIZ	15%	CLO1
Test	2 TEST	30%	CLO2
Written Report	6 LAB	15%	CLO4

Reading List

Recommended Text

- **Giancoli 2005, *Physics (algebra based)*, 6 Ed., Pearson, Prentice Hall**

Reference Book Resources

- **Halliday, Resnick, Walker, *Fundamental of Physics*, 6 Ed., John Wiley &Sons, Inc**
- **Young, H.D and Freedman, R.A. 2000, *University Physics*, 11 Ed., Addition Wesley Longman**
- **Giancoli, D.C. 2000, *Physics for Scientist and Engineers*, 5 Ed., Singapore: Prentice Hall**

Article/Paper List: This Course does not have any article/paper resources

Other References: This Course does not have any other resources