# Applied Physics

|  |  |
| --- | --- |
| **Course title**  | **Course code**  |
| Applied Physics | MTH112 |

|  |
| --- |
| **Course Catalog Description**  |
| The purpose of this course is to give an understanding about Measurement, Vectors, Motion along a straight line. Force and motion. Kinetic energy and work. Potential energy and conservation of energy. Center of mass and linear momentum. Gravitation. Oscillations. Waves. First and second law of thermodynamics. Electric charge. Electric field. Gauss's law. Electric potential. Capacitance. Current and resistance. Circuits. Magnetic fields. Magnetic fields due to currents.  |

|  |
| --- |
| **Course detail**  |
| Credit Hours | 03 |
| Core  | BS(CS) & BS(SE) |
| Elective  |  |
| Pre Requisite  |  |

|  |
| --- |
| **Course offering Detail**  |
| Lecture Hall | No of lecture per week | Duration of lecture  | Lecture day | Semester  |
|  | 1 | 02 Hours |  |  |

|  |
| --- |
| **Instructor Detail**  |
| Name | Engr. M. Mujtaba Ihsan |
| Office  | Room no 13, First floor, EE department |
| Email  | mujtaba.ihsan@inu.edu.pk |
| Counseling hours  |  |
| Course assistant  |  |

|  |
| --- |
| **Recommended Books**  |
| **Text Book** |
| Title  | Edition  | Web link  | Others/tutorial  |
| Halliday, Resnick and Walker, "Fundamental of Physics", 10th Edition | 2015 |  |  |
| **Reference Books** |
| 1. Hugh. D. Young, Roger A. Freedman, A. Lewis Ford, “University Physics with Modern Physics”, 13th Edition.
 | Latest  |  |  |

|  |  |
| --- | --- |
| **Lecture No:** | **Contents**  |
|
| 1 | MeasurementThe International system of Units Changing Units Significant figures and Decimal places Vectors Vectors and Scalars Components of Vectors |
| 2 | Motion Along a Straight Line Position and Displacement Average Velocity and Average Speed AccelerationForce and Motion The Drag force and Terminal Speed Uniform Circular Motion |
| 3 | Introduction of Energy, Kinetic Energy and Potential Energy Work and Kinetic Energy Work Done by the Gravitational Force Work and Potential Energy |
| 4-5 | Oscillation Simple Harmonic Motion The force Law for Simple Harmonic Motion An Angular Simple Harmonic Motion Damped Simple Harmonic Motion Gravitation Newton’s Law of Gravitation Gravitation Near Earth surface Gravitation Potential Energy |
| 6 | WavesTransverse and Longitudinal Waves Wavelength and Frequency Speed of Travelling Wave  |
| 7 | Temperature and Heat The Law of Thermodynamics Absorption of Heat by Solids and Liquids The First Law of Thermodynamics The Second Law of Thermodynamics |
| 8 | Electric Charge and Electric Field Coulomb’s Law Electric Field and Electric Field LinesGauss LawElectric Flux A charged isolated conductor Applying Gauss’ law Cylindrical Symmetry |
| 9 | Electric PotentialEquipotential surfaces and the Electric Field Potential due to a charged particle |
| 10 | CapacitanceCalculating the Capacitance Capacitance in Parallel and in Series Energy stored in an electric Field Capacitance with a Dielectric |
| 11 | Current and ResistanceElectric Current Current Density Resistance and Resistivity Ohms Law Power, Semiconductor, Super Conductor |
| 12 | CircuitsSingle Loop Circuit Multi loop Circuit The Ammeter and the Voltmeter |
| 13 | Magnetic FieldMagnetic fields and Closed Field : the real effect |
| 14 | A circulating charge particle Magnetic force of current carrying wireTorque on a current loopAmpere’s lawA current carrying coil as magmatic dipole RL Circuits  |
| 15 | Induction and InductanceInduced Electric Fields Self-Induction  |
| 16 | Energy Stored in Magnetic Field Energy Density of magnetic Field Mutual InductionRC Circuits  |