SILVER OAK UNIVERSITY

Engineering and Technology (Diploma)

All Departments

Subject Name: Applied Physics-I

Semester: 1

Prerequisite: N/A

Objective:

Teaching and Examination Scheme:

Teaching Scheme			Credits	Evaluation Scheme				Total Marks
L	T	P	C	Internal		External		
				Th	Pr	Th	Pr	
3	0	2	4	40	50	60	--	150

Content:

Unit No.	Course Contents	Teaching Hours	Weightage %
1	**SI Units and Measurements** Need of measurement and unit in engineering and science, definition of unit , requirements of standard unit, systems of units-CGS,MKS and SI, fundamental and derived quantities and their units Scalar and Vector Qunataties, Law of Parallelogram Measurment of Length and Time (Scale,Vernier Calliper, Micrometer Screw Gauge, Time) Definition of accuracy, precision and error, estimation of errors - absolute error, relative error and percentage error	6	15
2	**Force and Motion** Newton's Ist law of motion, Force, basic forces in motion, gravitational force, electrostatic force, electromagnetic force, nuclear force, Inertia, types of inertia (inertia of rest, inertia of motion, inertia of direction), Momentum, Newton's IInd law of motion, measurement of force using second law, simple problems on F = ma and equations of motion, Impulse of force, Impulse as the product of force and time, impulse as the difference of momentum, examples of impulse, simple problems on impulse, Newtons IIIrd law of motion and its examples. Law of conservation of momentum, Statement, simple problems	6	20
3	**Work Power Energy** Concept and units, examples of zero work, positive work and negative work Friction: concept, types, laws of limiting friction, coefficient of friction, reducing friction and its engineering applications, Work done in moving an object on horizontal and inclined plane for rough and plane surfaces and related applications. Energy and its units, kinetic energy, gravitational potential energy with examples and derivations,	7	25

	mechanical energy, conservation of mechanical energy for freely falling bodies, transformation of energy (examples). Power and its units, power and work relationship, calculation of power (numerical problems).		
4	**Properties of Matter** Elasticity: definition of stress and strain, moduli of elasticity, Hooke's law, significance of stress-strain curve Pressure: definition, units, atmospheric pressure, gauge pressure, absolute pressure, Fortin's Barometer and its applications. Surface tension: concept, units, cohesive and adhesive forces, angle of contact, Ascent Formula (No derivation), applications of surface tension, effect of temperature and impurity on surface tension. Viscosity and coefficient of viscosity: Terminal velocity, Stoke's law and effect of temperature on viscosity, application in hydraulic systems.	10	25
5	**Heat Transfer** Concept of heat and temperature, modes of heat transfer (conduction, convection and radiation with examples), specific heats, scales of temperature and their relationship, Types of Thermometer (Mercury thermometer, Bimetallic thermometer, Platinum resistance thermometer, Pyrometer) and their uses. Celsius, Fahrenheit and Kelvin temperature scales and their conversion formulae Expansion of solids, liquids and gases, coefficient of linear, surface and cubical expansions and relation amongst them, Co-efficient of thermal conductivity, engineering applications.	7	15

Course Outcome:

Sr. No.	CO statement	Unit No
CO-1	The students will have the ability to understand the core concept of physics and its technical applications.	
CO-2	The students will have skill of problem solving by using appropriate mathematical techniques and basic concepts.	
CO-3	In courses involving laboratory, the student will demonstrate the ability to collect and analyze data and to prepare coherent reports of his or her findings.	
CO-4	In a design module project, the student will demonstrate the ability to perform a literature search, to make use of appropriate computational or laboratory skills, and to make an effective written or oral presentation of the results of the project.	

Reference Books:

1. Applied Physics, Vol. I and Vol. II, TTTI Publications, Tata McGraw Hill, Delhi.
2. Concepts in Physics by HC Verma, Vol. I & II, Bharti Bhawan Ltd. New Delhi
3. Engineering Physics by PV Naik, Pearson Education Pvt. Ltd, New Delhi
4. Practical Physics by C. L. Arora, S. Chand Publication.

Teaching & Learning Methodology:-

List of Experiments/Tutorials:

1. 1 Linear Measurement by Vernier calipers
2 1 Linear Measurement by Micrometer screw 3
3 Measurement of Surface tension
4 Measurement of Viscosity
5 Measurement of Young's Modulus
6 To determine Force constant with the help of periodic time of oscillations of spring
7 Measurement of specific gravity
8 To calculate refractive index of material of prism using spectrometer device.
9 Joule's mechanical equivalent of heat
10 Measurement of co-efficient of thermal conductivity
11 To study the relation between the length of a stretched string and the tension in it with the help of a sonometer.
12 To calculate SA/V ratio of simple objects to understand nanotechnology

Major Equipment:

Sr No	Name	Specification
1	Universal training kit – electronics	
2	Rectifier Kit (Half wave, full wave, bridge)	Consisting of 0-30 V variable power supply, Diodes (IN 4007), Module of 10k resistors, Included Filter Circuit.
3	Diode Characterstics	0-30 V regulated tunnable power supply, milliammeter (0-50mA), Microammeter (0-100μA), Digital multimeter, Resistances module 10K, Facility of Silicon Diode (IN4001), Germanium Diode (DR 25) and Zener Diode with reverse bias voltage Max. up to 8-9 V
4	Semiconductor energy gap set up	
5	Young's Modulus set up	Stand, weight box (up to 1kg), Samples (iron, Al, Cu etc), DC adapter, Spherometer stand with buzzer, weight holder
6	solar energy trainer	Fundamental of photovoltaic cell should be studied, application and Characteristics features should be measured by a kit
7	Ultrasonic measurement kit	
8	Fiber Optic Kit	LED source 950 nm/660 nm compatible APV or Photo diode Detector with Numerical Aperture Measurement Facility
9	Laser Source	He- Ne Laser and 1350 nm I-R Laser
10	CRO (20MHz)-(5MHz) dual channel	Dual channel,0-200V, four probe, with power probe
11	Digital Multimeters	
12	Wires	
13	Capacitors, Resistors	
14	Diodes	
15	LEDs, LDRs	
16	Function Generator (5MHz)	Generation of sine, Square, Saw tooth waves required, +/- pulses frequency range up to 20 MHz, Peak to peak voltage around 20 V

List of Open Source Software/learning website:

- The Flying Circus of Physics 2nd edition by Jearl Walker, Wiley India ¬
- Six Ideas that shaped physics by Thomas A Moore, McGraw Hill education ¬
- http://www.howstuffworks.com/ -- Tech stuff ¬
- How things works by Louis A Bloomfeild, Wiley Publications ¬
- Physics of Everyday Phenomena by W. Thomas Griffith, Juliet Brosing, McGraw Hill Education ¬
- Latest journals like BBC Knowledge, How things work-everyday technology explained by National Geographics. ¬ http://www.sciencefairadventure.com/