SYLLABUS FOR FIRST SEMESTER OF F.Y. DIPLOMA IN INFORMATION TECHNOLOGY.

Applied Physics

(To be implemented from 2005-2006)

Unit	Topic	Hours
1.	**Units and Dimensions** Quantities and units, Fundamental and derived units, System of units Concept of dimension, Classification of physical quantities, Verification of physical quantities, Determination of conversion factor between units of same quantity in different system, Relation between different physical quantities, Errors in measurement – instrumental error, systematic error, random error. Estimation of error, Error in addition, subtraction, multiplication and division.	3
2.	**Static electricity** Electric field Electric charge, Conductors, Insulator, Coulomb's inverse square law, Electric field, Intensity of Electric field, Electric lines of Force, Electric Flux, Flux Density. Electric potential Potential due to a point charge, Potential Difference between two points, Expression for potential difference and absolute potential. Capacitance Capacitance, Principle of a condenser, Capacitance of a parallel plate capacitor, Capacitance of sphere, Capacitors in series and parallel.	6
3.	**Current electricity and magnetism** Electric Circuits, Current, Electromotive force, Ohm's law, Resistance and Specific Resistance, Resistance in series and parallel, effect of temperature on resistance, Platinum Resistance Thermometer, Principle of Wheatstone network, Wheatstone Bridge, Fall of potential along the length of a wire, Comparison of emfs using potentiometer. Heating effect of Electric Current Joule's law, J by electric method, Electrical Power and energy, Electrical Energy Consumed in KWh, Seeback effect, Peltier effect, Measurement of high temperature by thermocouple. Electromagnetism Magnetic field due to a current, thumb and corkscrew rule, Magnetic force, Magnetic field strength and magnetizing force, Magnetic induction, force on electric charge, Biot – Savart Law Magnetic Induction at the center of a circular coil, Fleming's right hand rule, electromagnetic induction, Faraday's law, Lenz's law	8
4.	**Elementary electronics** Energy levels in solids, Valence band, Conduction band, forbidden band, Intrinsic and Extrinsic Semiconductors, PN diode, Characteristics of a diode.	3
5.	**Light** Laws of reflection, Spherical mirrors – Concave mirror, Definitions: Center of Curvature, Radius of Curvature, Pole, Principal Focus, Focal Length, Aperture, Relation between R and f for a concave mirror, Relation between u, v and f for a concave mirror, Laws of refraction, Total Internal Reflection, Real and apparent depth, Refraction of light through prism, Prism formula, Refraction through Convex Lens, Relation between u, v and f for convex lens.	5
6.	**Photometry** Definition of Solid Angle, Luminous flux, Illuminating Power, Intensity of Illumination, Inverse square law of Photometry, Rumford's Shadow Photometer, Bunsen's grease spot photometer.	3
7	**Gravitation** Newton's law of gravitation, Gravitational field, Gravitational potential, Acceleration due to gravity, Variation of the gravitational acceleration Escape velocity, Kepler's laws of planetary motion, Satellite.	4

8	**Properties of Liquids, Surface tension and viscosity** Thrust and Pressure, Density and Specific gravity, Laws of liquid pressure, Upthrust on a solid immersed in a liquid, Principle of Archimedes and Law of floatation, Determination of Specific gravity. Molecular forces and Molecular theory of surface tension, Angle of contact, Surface tension by rise of liquid in a capillary tube Applications of surface tension. Coefficient of Viscosity (ç), Stokes' law, Determination of çby Stokes' method, Streamline and turbulent flow, Reynold's number, Applications	8
9	**Heat** Specific Heat, Heat gained or heat lost by a body, Transfer of Heat - Conduction, Convection and Radiation, Coefficient of Thermal Conductivity, Searle's Method Change of State, Three states of Matter, Latent heat of Ice, Experimental determination of Latent heat of Ice, Latent heat of Vaopourization, Experiment to determine Latent heat of Vapourization Gas Laws and Specific heat of gases Absolute zero (Kelvin temperature)Gas laws – Boyle's, Charles' law, Gay lussac's law, General gas equation, Work done in expansion at constant pressure, Specific heat of a gas at constant pressure and at constant volume, Relation between C_P and C_V	7
10.	**Sound waves and Ultrasonics** Wave motion, Definition of Wavelength, Frequency & Velocity of wave Transverse and longitudinal waves, Relation between V, ë and f. Equation for a plane progressive wave, Velocity of sound, Laplace's correction, Effect of pressure, humidity and temperature on velocity of sound, Stationary vibrations, Difference between progressive and stationary waves, Free and forced vibrations, Resonance, Ultrasonic waves: Generation and applications	6
11	**Modern physics** Black body radiation, Planck's hypothesis and concept of quantum radiation Lasers:- Spontaneous emission and stimulated emission, Population inversion, Applications of lasers. Photoelectric effect:- Einstein Equation, Application of photoelectric cell. X – rays:- Production of X – rays, Properties and application of X – rays.	3

Laboratory exercises

1. Use of vernier calipers
2. Use of micrometer screw
3. Measurement of acceleration due to gravity
4. Surface tension measurement
5. Viscosity measurement by Stokes Law
6. Velocity of Sound by Resonance tube
7. Frequency of vibration/A.C. Supply
8. Specific gravity of Solid.
9. Experiment on Photoelectric effect
10. Ohm's Law
11. Wheatstone bridge (Measurement of resistance)
12. Determine Joule's constant by electric method
13. Tangent Galvanometer
14. Voltage current characteristics of a P-N Jn. diode
15. Series parallel connection of Resistors.
16. 'F' of Convex Lens
17. 'F' of Concave mirror
18. Magnetic moment of a bar magnet
19. Ratio of magnetic moments
20. Vibration magnetometer.

Minimum 10 experiments are to be done by student.

Text Books

1. Applied physics by Prof. P.G. Bhandarkar, Nirali Publication.
2. Principles of Physics by TTTI, Bhopal
3. Science I Published by TTTI, Bhopal
4. Engg. Physics by R.K. Gaur and S.I. Gupta Published by Dhanpat Rai & Sons, Delhi.