Physics (2nd Semester)

Smt.Sudesh Sharma, HOD & Sh. Abhimanyu Lecturer (Applied Physics-II)

Week	Theory		Practical	
	Lecture Day	Topic(Including Assignments)	Practical Day	Topic
Ist	1	**Unit1:- Wave Motion and its Applications 1.1 Waves**: Definition ,types(mechanical and electromagnetic wave) **1.2 Wave Motion**-transverse and longitudinal with examples, terms used in wave motion like displacement,amplitude,time period,frequency,wave length,wave velocity,relationship among wave velocity,frequency and wave length	1	1) Familiarization with apparatus (resistor, rheostat, key ammeter, voltmeter, telescope, microscope etc. (Group-1)
	2	**1.3 Simple Harmonic Motion(SHM):**Definitions , Examples **1.4 Cantilever :** Definitions , Formula of Time Period(Without Derivation)	2	1) Familiarization with apparatus (resistor, rheostat, key ammeter, voltmeter, telescope, microscope etc. (Group-2)
2nd	1	**1.5** Free, forced and resonant vibrations with examples. **1.6 Sound waves:** Types (infrasonic, audible, ultrasonic) on the basis of frequency, noise, coefficient of absorption of sound, echo	1	2) To find the time period of a simple pendulum. (Group-1)
	2	**Unit2:- Optics:-** 2.1 Reflection and refraction of light with laws, refractive index 2.2 Lens: Introduction, lens formulae (no derivation), power of lens and simple numerical problems	2	2) To find the time period of a simple pendulum. (Group-2)
3rd	1	**2.3** Total internal reflection and its applications, critical angle and conditions for total internal reflection	1	3) To study variation of time period of simple pendulum with change in length of

				pendulum.(Group-1)
	2	**2.4** Superposition of waves (concept only), definition of interference, diffraction and polarization of waves	**2**	3) To study variation of time period of simple pendulum with change in length of pendulum. (Group-2)
4th	**1**	**2.5** Introduction of Microscope, Telescope and their applications	**1**	4) To determine and verify the time period of Cantilever (Group-1)
	2	Revision of above topics	**2**	4) To determine and verify the time period of Cantilever.(Group-2)
5th	**1**	First Sessional Test(Tentative)	**1**	Revision and Viva-voce (Group-1)
	2	First Sessional Test(Tentative)	**2**	Revision and Viva-voce (Group-2)
6th	**1**	**UNIT3:- Electrostatics and Electricity** **3.1** Electric charge, unit of charge, conservation of charge	**1**	5) To verify Ohm's laws by plotting a graph between voltage and current (Group-1)
	2	**3.2** Coulomb's law of electrostatics Assignment 1	**2**	5) To verify Ohm's laws by plotting a graph between voltage and current (Group-2)
7th	**1**	**3.3** Electric field, electric lines of force (definition and properties), electric field intensity due to a point charge **3.4** Definition of electric flux, Gauss law (statement and formula)	**1**	6) To study colour coding scheme of resistance. (Group-1)
	2	**3.5** Capacitor and capacitance (with formula and unit) **3.6** Electric current and its SI Unit, direct and alternating current	**2**	6) To study colour coding scheme of resistance. (Group-2)
8th	**1**	**3.7** Resistance, conductance (definition and unit) **3.8** Series and parallel combination of	**1**	7) To verify laws of resistances in series combination (Group-

		resistances		1)
	2	**3.9** Ohm's law (Statement and formula) Assignment 2	**2**	7) To verify laws of resistances in series combination (Group-2)
9th	**1**	Second Sessional Test(Tentative)	**1**	Revision and Viva-voce (Group-1)
	2	Second Sessional Test(Tentative)	**2**	Revision and Viva-voce (Group-2)
10th	**1**	**Unit 4 Classification of Materials and their Properties** **4.1** Definition of energy level, energy bands **4.2** Types of materials (conductor, semiconductors (introduction only)	**1**	8) To verify laws of resistance in parallel combination .(Group-1)
	2	**4.3 Introduction to magnetism, type of magnetic materials:** Diamagnetic, paramagnetic and ferromagnetic materials with examples **4.4** Magnetic field, magnetic lines of force, magnetic flux **4.5** Electromagnetic induction (definition)	**2**	8) To verify laws of resistance in parallel combination.(Group-2)
11th	**1**	**Unit5 Modern Physics** **5.1 Laser:** Introduction, principle, absorption, spontaneous emission, stimulated emission population inversion **5.2** Engineering and medical applications of laser	**1**	9) To find resistance of galvanometer by half deflection method (Group-1)
	2	**5.3** Fibrelti optics: Introduction to optical fibers (definition, principle and parts), light propagation, fiber types (mono-mode, multi-mode), applications in medical, telecommunication and sensors.	**2**	9) To find resistance of galvanometer by half deflection method (Group-2)
12th	**1**	**5.4 Nanotechnology:** Introduction, definition of nonmaterial's with examples, properties at nano scale, applications of nanotechnology (brief)	**1**	10) To verify laws of reflection of light using mirror (Group-1)
	2	Assignment 3 and Revision of above topics	**2**	10) To verify laws of

				reflection of light using mirror (Group-2)
13th	**1**	Third Sessional Test(Tentative)	**1**	Revision and Viva-voce (Group-1)
	2	Third Sessional Test(Tentative)	**2**	Revision and Viva-voce (Group-2)
14th	**1**	Revision of above topics	**1**	11) To verify laws of refraction using glass slab.(Group-1)
	2	Revision of above topics	**2**	11) To verify laws of refraction using glass slab.(Group-2)
15th	**1**	Revision of above topics	**1**	12) To find the focal length of a concave lens, using a convex lens.(Group-1)
	2	Revision of above topics	**2**	12) To find the focal length of a concave lens, using a convex lens.(Group-2)
16th	**1**	Revision of above topics	**1**	13) Practice
	2	Revision of above topics	**2**	13) Practice
17th	**1**	Revision of above topics	**1**	14) Practice
	2	Revision of above topics	**2**	14) Practice

Lesson Plan
Applied Chemistry-II

Week	Lecture Day	Theory	Practical	
		Topic(Including Assignments)	Practical Day	Topic
1st	1st	**Unit1:- Atomic Structure,Periodic Table and Chemical Bonding** Bohr's model of atom (qualitative treatment only),	1st	1.)To prepare standard solution of oxalic acid.(Group-1)
	2nd	Dual character of matter: derivation of de-Broglie's equation, Heisenberg's Principle of Uncertainty,		
	3rd	Modern concept of atomic structure: definition of orbitals , shapes of s, p and d-orbitals,	2nd	1)To prepare standard solution of oxalic acid.(Group-2)
2nd	4th	Quantum numbers and their Significance.	1st	2)To dilute the given KMnO4 solution(Group-1)
	5th	Electronic configuration: Aufbau and Pauli's exclusion principles		
	6th	Hund's rule, electronic configuration of elements up to atomic number 30.	2nd	2)To dilute the given KMnO4 solution(Group-2)
3rd	7th	Modern Periodic law and Periodic table	1st	3)To find out the strength in grams per litre of an unknown solution of sodium hydroxide using a standard (N/10) oxalic acid solution.(Group-1)
	8th	Classification of elements into s, p, d and f-blocks, metals, non-metals and metalloids		
	9th	Chemical bonding: cause of bonding	2nd	3)To find out the strength in grams per litre of an unknown solution of sodium hydroxide using a standard (N/10) oxalic acid solution.(Group-2)
4th	10th	Ionic bond, covalent bond, and metallic bond (electron sea or gas model)	1st	Revision/viva
	11th	Physical properties of ionic, covalent and metallic substances.		
	12th	**Unit2:- Metals and Alloys** Metals: mechanical properties of metals such as conductivity, elasticity, strength and stiffness, luster, hardness, toughness, ductility, malleability, brittleness, and impact	2nd	Revision/viva

		resistance and their uses.		
5th	13th	Definition of a mineral, ore, gangue, flux and slag Metallurgy of iron from haematite using a blast furnace	1st	4)To find out the total alkalinity in parts per million (ppm) of a water sample with the help of a standard sulphuric acid solution(Group-1)
	14th	Commercial varieties of iron. Definition,necessity of making alloys		
	15th	Composition, properties and uses of duralumin and steel. Heat treatment of steel- normalizing, annealing, quenching, tempering	2nd	4)To find out the total alkalinity in parts per million (ppm) of a water sample with the help of a standard sulphuric acid solution(Group-2)
6th	16th	First Sessional Test(Tentative)	1st	First Sessional Test(Tentative)
	17th	First Sessional Test(Tentative)		First Sessional Test(Tentative)
	18th	First Sessional Test(Tentative	2nd	First Sessional Test(Tentative)
7th	19th	**Unit3:- Water ,Solutions,Acids and Bases** Solutions: definition, expression of the concentration of a solution in percentage (w/w, w/v and v/v),	1st	5)To determine the total hardness of given water sample by EDTA method(Group-1)
	20th	Normality, molarity and molality and ppm.		
	21th	Simple problems on solution preparation.	2nd	5)To determine the total hardness of given water sample by EDTA method(Group-2)
8th	22th	Arrhenius concept of acids and bases, strong and weak acids and bases	1st	6)To determine the amount of total dissolved solids(TDS) in ppm in a given sample of water Gravimetrically(Group-1)
	23th	pH value of a solution and its significance		
	24th	pH scale. Simple numerical problems on pH of acids and bases.	2nd	6)To determine the amount of total dissolved solids(TDS) in ppm in a given sample of water Gravimetrically(Group-2)
9th	25th	Hard and soft water, causes of hardness of water, types of hardness – temporary and permanent hardness	1st	Revision/viva(Group-1)
	26th	Expression of hardness of water, ppm unit of hardness disadvantages of hard water;		

	27th	Removal of hardness: removal of temporary hardness by boiling and Clark's method; removal of permanent hardness of water by Ion-Exchange method	2nd	Revision/viva(Group-2)
10th	28th	Boiler problems caused by hard water: scale and sludge formation, priming and foaming, caustic embrittlement	1st	7)To determine the pH of different solutions using a digital pH meter.(Group-1)
	29th	Water sterilization by chlorine, UV radiation and RO		
	30th	**Unit4:- Fuels and Lubricants** Fuels: definition and classification of higher and lower calorific values, units of calorific value, characteristics of an ideal fuel	2nd	7)To determine the pH of different solutions using a digital pH meter.(Group-2)
11th	31st	Second Sessional Test (Tentative)	1st	Second Sessional Test (Tentative)
	32nd	Second Sessional Test (Tentative)		
	33rd	Second Sessional Test (Tentative)	2nd	Second Sessional Test (Tentative)
12th	34th	Petroleum: composition and refining of petroleum; gaseous fuels: composition, properties and uses of CNG, PNG, LNG, LPG	1st	8)To determine the calorific value of a solid/liquid fuel using a Bomb calorimeter(Group-1)
	35th	Relative advantages of liquid and gaseous fuels over solid fuels. Scope of hydrogen as future fuel		
	36th	Lubricants- Functions and qualities of a good lubricant,	2nd	8)To determine the calorific value of a solid/liquid fuel using a Bomb calorimeter(Group-2)
13th	37th	Classification of lubricants with examples; lubrication mechanism	1st	9)To determine the viscosity of a lubricating oil using a Redwood viscometer(Group-1)
	38th	Physical properties (brief idea only) of a lubricant: oiliness, viscosity, viscosity index, flash and fire point, ignition temperature, pour point		
	39th	**Unit5:-- Polymers and Electrochemistry** Polymers and Plastics: definition of polymer, classification, addition and condensation polymerization	2nd	9)To determine the viscosity of a lubricating oil using a Redwood viscometer(Group-2)
14th	40th	Preparation properties and uses of polythene, PVC, Nylon-66, Bakelite; definition of plastic	1st	10)To prepare a sample of Phenol-formaldehyde resin (Bakelite)/Nylon-66 in the lab(Group-1)
	41th	Thermoplastics and thermosetting polymers; natural rubber and neoprene, other synthetic rubbers (names only)		

	42nd	Corrosion: definition, dry and wet corrosion, factors affecting rate of corrosion, methods of prevention of corrosion	2nd	10)To prepare a sample of Phenol-formaldehyde resin (Bakelite)/Nylon-66 in the lab(Group-2)
15th	43th	Third Sessional Test(Tentative)	1st	Third Sessional Test(Tentative)
	44th	Third Sessional Test(Tentative)		
	45th	Third Sessional Test(Tentative)	2nd	Third Sessional Test(Tentative)
16th	46th	Hot dipping, metal cladding, cementation, quenching, cathodic protection methods	1st	Revision/Viva(Group-1)
	47th	Introduction and application of nanotechnology: nano-materials and their classification, applications of nanotechnology in various engineering applications		
	48th	Revision	2nd	Revision/Viva(Group-2)
17th	49th	Revision	1st	Revision/Viva(Group-1)
	50th	Revision		
	51th	Revision	2nd	Revision/Viva(Group-2)

Lesson Plan (2nd Semester)

Applied Mathematics-II

Dr. Namrata, Lecturer (Applied Mathematic-II)

Week	Theory/Practical	
	Lecture Day	**Topic Including(assignment/Test)**
Ist	**1**	Introduction to syllabus and evaluation scheme **Unit1:- Differential Calculus** **1.1 Definition of function:** Concept of limits (Introduction only) and problems related to four standard limits only.
	2	**1.1 Definition of function:** Concept of limits (Introduction only) and problems related to four standard limits only.
	3	**1.1 Definition of function:** Concept of limits (Introduction only) and problems related to four standard limits only.
	4	**1.2** Differentiation of x^n , Sin x, Cos x, e^x by first principle.
IInd	**1**	**1.3** Differentiation of sum, product and quotient of functions.
	2	**1.3** Differentiation of sum, product and quotient of functions.
	3	**1.3** Differentiation of sum, product and quotient of functions.
	4	**Unit 2 Differential Calculus and Its Application** **2.1** Differentiation of trigonometric functions, inverse trigonometric function, Logarithmic differentiation, successive differentiation (upto 2^{nd} order)
IIIrd	**1**	**2.1** Differentiation of trigonometric functions, inverse trigonometric function, Logarithmic differentiation, successive differentiation (upto 2^{nd} order)
	2	**2.1** Differentiation of trigonometric functions, inverse trigonometric function, Logarithmic differentiation, successive differentiation (upto 2^{nd} order)
	3	**2.1** Differentiation of trigonometric functions, inverse trigonometric function, Logarithmic differentiation, successive differentiation (upto 2^{nd} order)
	4	**2.2** Application of differential calculus in: (a) Rate measure (b) Maxima and minima
IVth	**1**	**2.2** Application of differential calculus in: (a) Rate measure (b) Maxima and minima
	2	**2.2** Application of differential calculus in: (a) Rate measure (b) Maxima and minima
	3	Revision
	4	**Unit 3 Integral Calculus** **3.1** Integration as inverse operation of differentiation with simple examples.
Vth	**1**	First Sessional Test(Tentative)
	2	First Sessional Test(Tentative)
	3	First Sessional Test(Tentative)
	4	**3.1** Integration as inverse operation of differentiation with simple examples.
VIth	**1**	**3.1** Integration as inverse operation of differentiation with simple examples.
	2	**3.2** Simple standard integrals and related problems, Integration by Substitution

		method and integration by parts.
	3	**3.2** Simple standard integrals and related problems, Integration by Substitution method and integration by parts.
	4	**3.3** Evaluation of definite integrals with given limits. Evaluation of $\int_0^{\pi/2} sin^n x.\, dx$, $\int_0^{\pi/2} cos^n x\, dx$, $\int_0^{\pi/2} sin^m x\, cos^n .\, dx$, Using formula without proof (m and n being positive integers only) using pre-existing mathematical models.
VIIth	**1**	**3.3** Evaluation of definite integrals with given limits. Evaluation of $\int_0^{\pi/2} sin^n x.\, dx$, $\int_0^{\pi/2} cos^n x\, dx$, $\int_0^{\pi/2} sin^m x\, cos^n .\, dx$, Using formula without proof (m and n being positive integers only) using pre-existing mathematical models.
	2	**Unit4:- Application of Integration, Numerical Integration and Differential Equations** **4.1** Application of integration for evaluation of area under a curve and axes (Simple problems).
	3	**4.1** Application of integration for evaluation of area under a curve and axes (Simple problems).
	4	**4.2** Numerical of integration by Trapezoidal rule and Simpson's 1/3rd Rule using pre-existing mathematical models.
VIIIth	**1**	**4.2** Numerical of integration by Trapezoidal rule and Simpson's 1/3rd Rule using pre
	2	**Deferential, Equations** **4.3** Definition, order, degree, Type of differential Equation, Linearity, Formulation of ordinary differential equation (up to 1st order), solution of ODE (Ist order) by variable separation method.
	3	**4.3** Definition, order, degree, Type of differential Equation, Linearity, Formulation of ordinary differential equation (up to 1st order), solution of ODE (Ist order) by variable separation method.
	4	Revision
IXth	**1**	Second Sessional Test(Tentative)
	2	Second Sessional Test(Tentative)
	3	Second Sessional Test(Tentative).,
	4	**4.3** Definition, order, degree, Type of differential Equation, Linearity, Formulation of ordinary differential equation (up to 1st order), solution of ODE (Ist order) by variable separation method.
Xth	**1**	**Unit 5 Statistics and Software:- Statistics** **5.1 Measures of Central Tendency:** Mean, Median, Mode
	2	**5.1 Measures of Central Tendency:** Mean, Median, Mode
	3	**5.2 Measures of Dispersion:** Mean deviation, Standard deviation
	4	**5.2 Measures of Dispersion:** Mean deviation,Standard Deviation
XIth	**1**	**5.2 Measures of Dispersion:** Mean deviation,Standard Deviation
	2	**Software** **5.3 Sci lab Software**- Theoretical Introduction.
	3	**5.3 Sci lab Software**- Theoretical Introduction.
	4	**5.4** Basic difference between MATLAB and Sci Lab Software,

XIIth	**1**	**5.4** Basic difference between MATLAB and Sci Lab Software,
	2	**5.5 Calculations with MATLAB or Sci Lab –** (a) Representation of matrix (2*2 order), (b) Additional , Subtraction of matrices (2*2 order) in MATLAB or Sci Lab
	3	**5.5 Calculations with MATLAB or Sci Lab –** (a) Representation of matrix (2*2 order), (b) Additional , Subtraction of matrices (2*2 order) in MATLAB or Sci Lab
	4	Revision
XIIIth	**1**	Third Sessional Test (Tentative).
	2	Third Sessional Test (Tentative).
	3	Third Sessional Test (Tentative).
	4	Revision
XIVth	**1**	Revision
	2	Revision
	3	Revision
	4	Revision
XVth	**1**	Revision
	2	Revision
	3	Revision
	4	Revision
XVIth	**1**	Revision
	2	Revision
	3	Revision
	4	Revision
XVIIth	**1**	Revision
	2	Revision
	3	Revision
	4	Revision