

Name of the Faculty: Mr. Manmohan singh**Discipline:** Civil. Engg.**Semester:** 1st**Subject:** Applied Chemistry**Lesson Plan Duration:** 16 weeks**Work Load (Lecture/Practical) Per Week (In Hours):** Lectures – 03, Practicals – 04

Week	Theory		Practical	
	Lecture Day	Topic (Including assignment/Test)	Practical Day	Topic
1 st	1 st	<ul style="list-style-type: none"> Unit – 1 Atomic Structure, Periodic Table & Chemical Bonding - Introduction 	1 st	<ul style="list-style-type: none"> To prepare standard solution of oxalic acid – introduction (G-1).
	2 nd	<ul style="list-style-type: none"> Bohr's Model of an Atom 	2 nd	<ul style="list-style-type: none"> To prepare standard solution of oxalic acid – introduction (G-2).
	3 rd	<ul style="list-style-type: none"> Dual character of matter – derivation of de-Broglie's equation 		
2 nd	4 th	<ul style="list-style-type: none"> Heisenberg's Principle of Uncertainty 	3 rd	<ul style="list-style-type: none"> Perform the experiment & prepare a std. solution of oxalic acid (G-1).
	5 th	<ul style="list-style-type: none"> Modern concept of atomic structure: Definition & shape of orbitals (s, p & d orbitals) 	4 th	<ul style="list-style-type: none"> Perform the experiment & prepare a std. solution of oxalic acid (G-2).
	6 th	<ul style="list-style-type: none"> Quantum numbers & their significance 		
3 rd	7 th	<ul style="list-style-type: none"> Electronic configuration: Aufbau, Pauli Exclusion Principles & Hund's rule. Electronic configuration of elements up to Z = 30. 	5 th	<ul style="list-style-type: none"> To dilute the given KMnO₄ solution – introduction (G-1).
	8 th	<ul style="list-style-type: none"> Modern Periodic Law & Table, Classification of elements s, p, d, & f-blocks 	6 th	<ul style="list-style-type: none"> To dilute the given KMnO₄ solution – introduction (G-2).
	9 th	<ul style="list-style-type: none"> Metals, Non-metals & Metalloids 		
4 th	10 th	<ul style="list-style-type: none"> Chemical Bonding: cause & types of bonding 	7 th	<ul style="list-style-type: none"> Perform the experiment & dilute the given solution (G-1).
	11 th	<ul style="list-style-type: none"> Physical properties of ionic, covalent & metallic substances. Assignment-1 	8 th	<ul style="list-style-type: none"> Perform the experiment & dilute the given solution (G-2).
	12 th	<ul style="list-style-type: none"> Sessional test-1 Analysis of unit test 		
5 th	13 th	<ul style="list-style-type: none"> Unit - 2 Metals & Alloys – introduction. 	9 th	<ul style="list-style-type: none"> To find out the strength in g/l of an unknown solution of NaOH using a std. (N/10) oxalic acid solution – introduction (G-1)
	14 th	<ul style="list-style-type: none"> Metals: Mechanical properties, Impact resistance & their uses 	10 th	<ul style="list-style-type: none"> To find out the strength in g/l of an unknown solution of NaOH using a std. (N/10) oxalic acid solution – introduction (G-2).

	15 th	<ul style="list-style-type: none"> Def. of mineral, ore, gangue, flux & slag 		
6 th	16 th	<ul style="list-style-type: none"> Metallurgy of Fe from Hematite using Blast furnace, Commercial varieties of Fe 	11 th	<ul style="list-style-type: none"> Perform the experiment and find out the strength of given NaOH Solution (G-1).
	17 th	<ul style="list-style-type: none"> Alloy: Def., necessity, composition, properties & uses of Duralumin & steel 	12 th	<ul style="list-style-type: none"> Perform the experiment and find out the strength of given NaOH Solution (G-2).
	18 th	<ul style="list-style-type: none"> Heat treatment of steel -normalizing, annualizing, quenching, tempering 		
7 th	19 th	<ul style="list-style-type: none"> Unit – 3 Water, Solutions, Acids & Bases Solutions: Def., expression of the conc. of a solution in % (w/w, w/v, v/v), normality, molarity, molality & ppm 	13 th	<ul style="list-style-type: none"> To find out the total alkalinity in ppm of a water sample with the help of a std. sulphuric acid solution – introduction (G-1).
	20 th	<ul style="list-style-type: none"> Simple problems on solution preparation 	14 th	<ul style="list-style-type: none"> To find out the total alkalinity in ppm of a water sample with the help of a std. sulphuric acid solution – introduction (G-2).
	21 th	<ul style="list-style-type: none"> Arrhenius concept of Acids & Bases Strong and weak acids & bases 		
8 th	22 th	<ul style="list-style-type: none"> Ph value & its significance Ph scale Numerical problems on ph 	15 th	<ul style="list-style-type: none"> Perform the experiment and find out the total alkalinity (G-1).
	23 th	<ul style="list-style-type: none"> Types of water & causes of hardness of water Types of hardness 	16 th	<ul style="list-style-type: none"> Perform the experiment and find out the total alkalinity (G-2).
	24 th	<ul style="list-style-type: none"> Expression of hardness of water – ppm unit of hardness 		
9 th	25 th	<ul style="list-style-type: none"> Disadvantages of hard water 	17 th	<ul style="list-style-type: none"> To determine the total hardness of given water sample by EDTA method (G-1).
	26 th	<ul style="list-style-type: none"> Removal of Temporary hardness – boiling & Clark's method 	18 th	<ul style="list-style-type: none"> To determine the total hardness of given water sample by EDTA method (G-2).
	27 th	<ul style="list-style-type: none"> Removal of Permanent hardness – Ion-exchange method 		
10 th	28 th	<ul style="list-style-type: none"> Boiler problems caused by hard water – scale & sludge formation Priming & foaming 	19 th	<ul style="list-style-type: none"> To determine the TDS in ppm in a given sample of water gravimetrically (G-1).
	29 th	<ul style="list-style-type: none"> Caustic embrittlement Water sterilization by Cl, UV radiation and RO Assignment-2 	20 th	<ul style="list-style-type: none"> To determine the TDS in ppm in a given sample of water gravimetrically (G-2).
	30 th	<ul style="list-style-type: none"> Sessional test-2 Analysis of test 		
11 th	31 th	<ul style="list-style-type: none"> Unit – 4 Fuels & Lubricants Fuels: def., Calorific value – def., types & units Characteristics of an ideal fuel 	21 th	<ul style="list-style-type: none"> To determine the pH of different solutions using a digital pH meter (G-1).
	32 th	<ul style="list-style-type: none"> Petroleum: composition & refining Gaseous fuels: Composition, properties & uses of CNG, PNG, LNG, LPG 	22 th	<ul style="list-style-type: none"> To determine the pH of different solutions using a digital pH meter (G-2).
	33 th	<ul style="list-style-type: none"> Relative advantages of liquid & gaseous fuels over solid fuels 		

		<ul style="list-style-type: none"> • Scope of Hydrogen as future fuel 		
12 th	34 th	<ul style="list-style-type: none"> • Lubricants: classification, functions & Qualities of lubricants 	23 th	<ul style="list-style-type: none"> • To determine the calorific value of a solid/liquid fuel using a Bomb calorimeter (G-1).
	35 th	<ul style="list-style-type: none"> • Mechanism of Lubrication • Physical properties of Lubricant 	24 th	<ul style="list-style-type: none"> • To determine the calorific value of a solid/liquid fuel using a Bomb calorimeter (G-2).
	36 th	<ul style="list-style-type: none"> • Class test • Analysis of class test 		
13 th	37 th	<ul style="list-style-type: none"> • Unit - 5 Polymer & Electrochemistry - introduction • Polymers: Def, classification 	25 th	<ul style="list-style-type: none"> • To determine the viscosity of lubricating oil using a Redwood viscometer - introduction (G-1).
	38 th	<ul style="list-style-type: none"> • Preparation properties & uses of polythene, PVC, Nylon-66, Bakelite 	26 th	<ul style="list-style-type: none"> • To determine the viscosity of lubricating oil using a Redwood viscometer - introduction (G-2).
	39 th	<ul style="list-style-type: none"> • Plastic: Def. & types • Natural rubber, neoprene & other synthetic rubber 		
14 th	40 th	<ul style="list-style-type: none"> • Corrosion: Def, types & factors affecting rate of corrosion 	27 th	<ul style="list-style-type: none"> • Perform the experiment and find out the viscosity of given lubricant oil (G-1).
	41 th	<ul style="list-style-type: none"> • Methods of prevention of corrosion - Hot dipping, metal cladding, cementation 	28 th	<ul style="list-style-type: none"> • Perform the experiment and find out the viscosity of given lubricant oil (G-2).
	42 th	<ul style="list-style-type: none"> • Quenching & cathodic protection 		
15 th	43 th	<ul style="list-style-type: none"> • Nanotechnology: intro & applications 	29 th	<ul style="list-style-type: none"> • To prepare a sample of Phenol-formaldehyde resin (Bakelite)/Nylon-66 in the lab (G-1).
	44 th	<ul style="list-style-type: none"> • Nano-materials & their classification 	30 th	<ul style="list-style-type: none"> • To prepare a sample of Phenol-formaldehyde resin (Bakelite)/Nylon-66 in the lab (G-2).
	45 th	<ul style="list-style-type: none"> • Applications of nanotechnology in various engineering applications. • Assignment-3 		
16 th	46 th	<ul style="list-style-type: none"> • Sessional test-3 	31 th	<ul style="list-style-type: none"> • Revision
	47 th	<ul style="list-style-type: none"> • Analysis of test 	32 th	<ul style="list-style-type: none"> • Revision
	48 th	<ul style="list-style-type: none"> • Revision 		