

LESSON PLAN

Program Name	Civil Engineering
Subject Name	Applied Chemistry
Subject Code	BS105
Semester	First
Subject Teacher Name	Mr. Kailash Singh

Evaluation Scheme

Sr. No.	Subject Name	Study scheme (Hrs/Week)		Marks in Evaluation Scheme					
				Internal Assessment			External Assessment		
		Th	Pr	Th	Pr	Total	Th	Pr	Total
1.	Applied Chemistry	4	4	40	40	80	60	60	120
Reference Books		1. Jain & Jain, Engineering Chemistry, Dhanpat Rai and Sons; New Delhi, 2015. 2. Text Book of Chemistry for Class XI & XII (Part-I, Part-II); N.C.E.R.T., Delhi, 2017-18.							

Course Outcomes (COs)

CO - 1	Solve various engineering problems applying the basic knowledge of atomic structure and chemical bonding.
CO - 2	Use relevant water treatment method to solve domestic and industrial problems
CO - 3	Solve the engineering problems using knowledge of engineering materials and properties.
CO - 4	Use relevant fuel and lubricants for domestic and industrial applications
CO - 5	Solve the engineering problems using concept of Electrochemistry and corrosion

Teaching Plan

Unit No.	Name of Topic	Proposed Date	Actual Date	Remarks
1	Fundamental particles of atoms : Electron, proton, neutron(Definitions)	12-08-2024		
	Atomic Structure: Bohr's theory, successes and limitations(expression of energy and radius to be omitted)	16-08-2024		
	Hydrogen spectrum explanation based on Bohr's model of atom	17-08-2024		
	Heisenberg uncertainty principle, Quantum numbers - orbital concept, Shapes of s, p orbitals, difference between orbit and orbitals	19-08-2024		
	Pauli's exclusion principle, Hund's rule of maximum multiplicity Aufbau rule, electronic configuration(Z=1 to 30)	22-08-2024		
2	Concept of chemical bonding - cause of chemical bonding, types of bonds: ionic bonding (NaCl example)	23-08-2024		
	Lewis concept of covalent bond (H ₂ , F ₂ , HF).	24-08-2024		
	Electronegativity, Difference between sigma and pi bond,	29-08-2024		
	Electron sea model of metallic bond, Idea of solute, solvent and solution	30-08-2024		

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	Methods to express the concentration of solution	31-08-2024		
	Molarity (M = mole per liter), molality, mass percentage (Numerical excluded)	02-09-2024		
3	Electronic concept of oxidation, reduction and redox reactions	05-09-2024		
	Definition of terms: electrolytes, non-electrolytes with suitable examples,	06-09-2024		
	Faradays laws of electrolysis simple numerical problems.	07-09-2024		
	Industrial application of Electrolysis – Electrometallurgy, Electroplating, Electrolytic refining.	09-09-2024		
	Class Test-I	12-09-2024		
	Application of redox reactions in electrochemical cells: Primary cells, dry cell	13-09-2024		
	Secondary cell, commercially used lead acid storage battery	16-09-2024		
	Introduction to Corrosion of metals – definition, types of corrosion (electrochemical),	19-09-2024		
	H ₂ liberation and O ₂ absorption mechanism of electrochemical corrosion	20-09-2024		
	Internal corrosion preventive measures – Purification, alloying and heat treatment and External corrosion preventive measures: metal (anodic, cathodic) coatings	21-09-2024		
4	Natural occurrence of metals – minerals, ores of iron, aluminium and copper, gangue (matrix), flux, slag,	23-09-2024		
	metallurgy – brief account of general principles of metallurgy(a).Crushing and grinding.	26-09-2024		
	Concentration of ore (Levigation, Froth flotation, Magnetic separation),	27-09-2024		
	Extraction(Roasting and calcinations & smelting), Refining (Electro refining, zone refining)	28-09-2024		
	Extraction of - iron from haematite ore using blast furnace along with reactions.	30-09-2024		
	Alloys – definition, purposes of alloying,	03-10-2024		
	ferrous alloys (Invar steel) and non ferrous(Simple Brass & Bronze,	04-10-2024		
	Nichrome, Duralumin, Magnesium) with suitable examples, properties and applications	05-10-2024		
5	Classification of soft and hard water based on soap test, salts causing water hardness, units of hardness(mg/L and ppm)	07-10-2024		
	simple numerical on water hardness. Cause of poor lathering of soap in hard water.	10-10-2024		
	Problems caused by the use of hard water in boiler (scale and sludge, foaming and priming, corrosion)	11-10-2024		
	Water Softening techniques-Zeolite Process	14-10-2024		
	Municipal Water Treatment-Sedimentation, Coagulation, Filtration, Sterilization	18-10-2024		
	Properties of water used for human consumption	19-10-2024		

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	for drinking and cooking purposes from any water sources,.			
	Indian standard specification of drinking water	21-10-2024		
	Class Test-II	24-10-2024		
6	Definition of fuel and combustion of fuel, classification of fuels	25-10-2024		
	calorific values (HCV and LCV), calculation of HCV and LCV using Dulong's formula.	26-10-2024		
	Characteristics of good fuel	01-11-2024		
	Petrol and diesel - fuel rating (octane and cetane numbers), Chemical composition, calorific values	02-11-2024		
	Applications of LPG, CNG, water gas	04-11-2024		
	Applications of producer gas and biogas.	07-11-2024		
7	Function and characteristic properties of good lubricant, classification with examples	08-11-2024		
	House Test	11-11-2024		
	Lubrication mechanism – hydrodynamic and boundary lubrication	14-11-2024		
	Physical properties (viscosity and viscosity index, Oiliness, flash and fire point, cloud and pour point),	16-11-2024		
	chemical properties(coke number, total acid number)	18-11-2024		
	Saponification value of lubricants	21-11-2024		
		22-11-2024		
8	Monomer, homo and co polymers, simple reactions involved in preparation	23-11-2024		
	Coke number, total acid number, saponification value, degree of polymerization,	25-11-2024		
	application of thermoplastics and thermosetting plastics	28-11-2024		
		29-11-2024		
	Polythene, PVC, PS, PTFE, nylon-6,6 and Bakelite	30-11-2024		
	Vulcanization of rubber and properties of vulcanised rubber	02-12-2024		

Assignments

Assignment No	Contents of Syllabus Covered	Proposed Date	Actual Date	Remarks
A-1	Unit-1 and Unit-2	19-09-2024		
A-2	Unit-3 and Unit-4	23-10-2024		
A-3	Unit-5 and Unit-6	22-11-2024		

House Test/Class Test

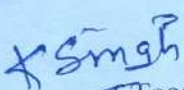
Name of test	Syllabus for Tests	Proposed Date	Actual Date	Remarks
Class Test -1	Unit-1 and Unit-2	As per HPTSBAcademic Schedule		
Class Test -2	Unit-3 and Unit-4			
House Test - 1	Unit-1, Unit-2, Unit-3 Unit-4 Unit-5 and Unit-6			

Lab Plan

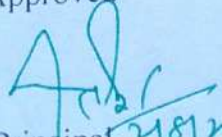
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Sr. No.	Name of Practical	Proposed Date		Actual Date		Remarks
		G1	G2	G1	G2	
1	Preparation of standard solution of oxalic acid	12-08-2024 & 19-08-2024	12-08-2024 & 19-08-2024			
2	To determine strength of given sodium hydroxide solution by titrating against standard oxalic acid solution using phenolphthalein indicator.	02-09-2024 & 09-09-2024	02-09-2024 & 09-09-2024			
3	Experimental verification of Faraday's first law of Electrolysis using Copper sulphate solution and Copper electrodes.	16-09-2024 & 23-09-2024	16-09-2024 & 23-09-2024			
4	Iodometric estimation of Copper in the given Copper ore using standard Hypo solution	30-09-2024 & 07-10-2024	30-09-2024 & 07-10-2024			
5	To estimate total alkalinity of given water sample by titrating it against standard Sulphuric acid solution.	14-10-2024 & 21-10-2024	14-10-2024 & 21-10-2024			
6	To estimate moisture in given coal sample gravimetrically	28-10-2024 & 04-11-2024	28-10-2024 & 04-11-2024			
7	To estimate ash in given coal sample gravimetrically	11-11-2024 & 18-11-2024	11-11-2024 & 18-11-2024			
8	To determine viscosity of given lubricating oil by Redwood viscometer	25-11-2024 & 02-12-2024	25-11-2024 & 02-12-2024			


(Signature of Teacher)


(Signature of HOD)

Approved

Principal
Govt. Polytechnic for Women Rehan