

LESSON PLAN

Program Name	ELECTRICAL ENGG
Course/Subject Name	Applied Chemistry
Course/Subject Code	BS-106
Course/Subject Coordinator Name	Dr. Vibha Sharma

Evaluation scheme

S.No.	Subject Name	Study scheme (Hrs/Week)	Marks in evaluation scheme			
			Internal Assessment		External Assessment	
			Theory	Practical	Theory	Practical
1.	Applied Chemistry & Applied Chemistry lab	3 (L: 3, T:0, P: 2)	50	50	100	100
Reference books		(i)	Text books of Chemistry for Class XI & XII (Part -1, Part- II) - NCERT Delhi			
		(ii)	Engineering Chemistry, Agarwal Shikha - Cambridge Press, New Delhi			
		(iii)	Understanding Chemistry, C.N.R. Rao, , University Press(India) Pvt. Ltd.			
		(iv)	Jain & Jain Engineering Chemistry - Dhanpat Rai and Sons, New Delhi			

Course Outcomes: After the completion of the course the student will be able to

CO1	Explain the concepts of atomic structure, electronic configuration, chemical bonding and the properties of engineering materials based on chemical principles.
CO2	Interpret the characteristics of solutions, water quality, hardness and buffer solution for domestic and industrial applications.
CO3	Apply the principles of electrochemistry and electrolysis to industrial processes, corrosion and metallic prevention methods used in engineering.
CO4	Analyze metallurgical processes, engineering materials, alloys and polymer to relate their properties with engineering applications.
CO5	Evaluate the suitability of fuels and lubricants based on their properties and performance for economical and eco-friendly industrial applications.

Teaching Plan:

Lecture No.	Name of topic	Proposed Date	Actual Date	Remarks
1	Unit-1 Atomic structure and Chemical bonding : Fundamental Particles of Atom Definition of atom, Electron, Proton, Neutron	10-08-2026		
2	Bohr's Model of Atom Postulates of Bohr's model, Successes, Limitations	11-08-2026		
3	Atomic number, atomic mass number, isotopes, isobars and isotones, Concept of orbitals, difference between orbit and orbitals, shapes of s and p orbitals	13-08-206		
4	Quantum Numbers (Significance only), Aufbau's principle, Pauli's exclusion principles, Hund's rule of maximum multiplicity, electronic configuration of elements with atomic number (Z) 1 to 30 only	17-08-2026		
5	Electronic configuration of elements with atomic number (Z) 1 to 30 ,	18-08-2026		
6	Chemical Bonding Chemical Bonding - cause of chemical bonding, Types of Bond: Ionic bond (NaCl), covalent bond (O ₂ , N ₂ , H ₂	20-08-2026		
7	Difference between sigma and pi (π) bond. o	24-08-2026		
8	Unit-2 Solutions and Water : Introduction to Solutions Definition of Solution, Solute and Solvent with examples, Methods to express the concentration of solutions - Molarity, Molality and Normality	25-08-2026		
9	Revision of concentration parameters, pH of solution, industrial applications of pH solution, Definition of buffer solution and industrial applications of buffer solution	27-08-2026		
10	Definition of Hard and soft water, Types of hardness, Units of hardness (mg/ltr and ppm), ,	31-08-2026		
11	Numerical based on hardness, Disadvantages caused by use of hard water in domestic and industrial use	1-09-2026		
12	Disadvantages caused by use of hard water industrial use Removal of hardness - permutit process Characteristics of drinking water. Revision	3-09-2026		
13	Class Test 1	7-09-2026		
14	Electronic concept of oxidation, reduction and Redox reaction Definition of Electrolyte and non-electrolyte with suitable examples	8-09-2026		
15	Faradays law of Electrolysis	10-09-2026		
16	Industrial application of electrolysis (Electrometallurgy, Electroplating Electro - refining)	14-09-2026		
17	Introduction to corrosion of metals - definition, Internal corrosion preventive measure (purification, alloying and heat treatment)	15-09-2026		
18	Introduction to corrosion of metals - definition, Internal corrosion preventive measure (purification, alloying and heat treatment)	17-09-2026		
19	External corrosion preventive measure: Metal coating (anodic and cathodic).	21-09-2026		
20	Engineering Materials and Polymers Natural occurrence of metals- minerals, ores; ores of iron, aluminum and copper, Definition of Gangue, Flux, Metallurgy, Pyrometallurgy Electrometallurgy & Hydrometallurgy,	22-09-2026		
21	General principles of metallurgy- Crushing, Grinding; Concentration o ore (Froth flotation process)	24-09-2026		

22	Extraction of metal (Roasting, Calcination & Smelting), Refining (Electrorefining)	28-09-2026		
23	Extraction of iron from their Haematite ore by using blast furnace	29-09-2026		
24	Alloys Definition, Ferrous and non-ferrous alloy, purpose of making alloy.	01-10-2026		
25	Definition of Polymer, Monomer, Degree of Polymerization, name of monomer	05-10-2026		
26	Simple reaction involved in preparation of Polythene, Simple reaction involved in preparation of PE, PVC	06-10-2026		
27	Simple reaction involved in preparation of, PTFE, PS and Nylon-6,6.	08-10-2026		
28	CLASS TEST 2	12-10-2026		
29	Definition of fuel, Classification of fuels, Characteristics of a good fuel	13-10-2026		
30	Calculation of HCV and LCV by using Dulong's formulas	15-10-2026		
31	Fuel rating (octane and cetane numbers)	19-10-2026		
32	Revision for House test	22-10-2026		
1833	Revision for House test	21-10-2026		
1934	Revision for House test	27-10-2026		
2035	HOUSE TEST	2-11-2026		
2136	HOUSE TEST	03-11-2026		
37	HOUSE TEST	05-11-2026		
38	Chemical composition, Calorific value application and diagram of water gas, producer gas and biogas	12-11-2026		
39	Definition of Lubricants, Function of good lubricant, Physical properties (Viscosity, viscosity index,	16-11-2026		
40	Physical properties flash and fire point and Chemical properties (TAN Saponification value) of lubricants.	17-11-2026		
41	Revision for END SEMESTER EXAMINATION	19-11-2026		
42	Revision for END SEMESTER EXAMINATION	23-11-2026		
43	Revision for END SEMESTER EXAMINATION	26-11-2026		

32Assignments:

Assignment serial	Contents of syllabus covered	Proposed date	Actual date	Remarks
A-1	Atomic Structure and Chemical Bonding Solutions and Water	03-09-2026		
A-2	Electrochemistry and Corrosion. Engineering Materials and Polymers	07-10-2026		
A-3	Chemistry of Fuels and Lubricants	16-11-2026		

House Test/Class Test:

House/Class Test	Contents of syllabus covered	Proposed date	Actual date	Remarks
CT-I	30% of the syllabus	2 nd week of September 2026		
CT-II	Next 30% of the syllabus	2 nd week of October 2026		
House Test	80% of the syllabus	1 st Week of November 2026		

Lab Plan:

Exp. No.	Name of experiment	Actual date		Remarks
		G-1	G-2	
1	Preparation of standard solution of oxalic acid.			
2	To determine the strength of given sodium hydroxide solution by titrating against standard oxalic acid solution by using phenolphthalein as indicator.			
3	To determine the strength of given sodium hydroxide solution by titrating against standard oxalic acid solution by using phenolphthalein as indicator.			
4	Determination of pH of given solution by using pH meter.			
5	To estimate the amount of moisture in the given coal sample gravimetrically.			
6	To estimate the amount of ash in the given coal sample gravimetrically			
7	To compare the viscosity of given lubricating oils by Redwood viscometer			
8	To estimate the total alkalinity of given water sample by titrating it against standard Sulphuric acid solution.			

(Signature of Teacher)

(Signature of HOD)

LESSON PLAN

Program Name	MECH. ENGG
Course/Subject Name	Applied Chemistry
Course/Subject Code	BS-106
Course/Subject Coordinator Name	Shareshtha Devi

Evaluation scheme

S.No.	Subject Name	Study scheme (Hrs/Week)	Marks in evaluation scheme			
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CO5	Evaluate the suitability of fuels and lubricants based on their properties and performance for economical and eco-friendly industrial applications.

Teaching Plan:

Lecture No.	Name of topic	Proposed Date	Actual Date	Remarks
1	Unit-1 Atomic structure and Chemical bonding : Fundamental Particles of Atom Definition of atom, Electron, Proton, Neutron (definitions only), α particles	10-08-2026		
2	Bohr's Model of Atom Postulates of Bohr's model, Successes, Limitations, Atomic Number (Z), Atomic Mass Number (A), Introduction to Isotopes, Isobars and Isotones	13-08-2026		
3-4	Concept of Orbitals, Difference between Orbit and Orbital, Shapes of s and p orbitals Introduction to Quantum Numbers, Significance of Principal (n), Azimuthal (l), Magnetic (m), and Spin (s) Quantum Numbers (Significance only)	14-08-2026 & 17-08-2026		
5	Electronic Configuration Aufbau Principle, Pauli's Exclusion Principle, Hund's Rule of Maximum Multiplicity	20-08-2026		
6-7	Electronic configuration of elements having Atomic Number 1-15 Electronic configuration of elements having Atomic Number 16-30, Exceptions (Cr and	21-08-2026 & 24-08-2026		
8	Chemical Bonding Cause of Chemical Bonding, Ionic Bond, Formation of NaCl, Properties of Ionic Bond	27-08-2026		
9	Covalent Bond, Formation of H_2 , O_2 , N_2 , Sigma (σ) and Pi (π) Bonds, Difference between Sigma and Pi Bonds, Revision and Practice Questions	28-08-2026		
10	Unit-2 Solutions and Water : Introduction to Solutions Definition of Solution, Solute and Solvent, Types of solutions, Examples of Properties of solutions	31-08-2026		
11-12	Methods of expressing concentration, Molarity (M), Molality (m), Normality (N), Difference between Molarity, Molality and Normality (Numericals excluded), Applications of concentration terms Definition of pH, pH scale (0-14), Acidic, Basic and Neutral solutions, Importance of pH, Industrial applications of pH (food industry, pharmaceuticals, textile, paper, water treatment, agriculture)	03-09-2026 & 04-09-2026		
13	Buffer Solutions Definition of Buffer Solution, Types of Buffer Solutions (Acidic and Basic), Mechanism of Buffer Action (concept only), Industrial applications of Buffer Solutions (pharmaceuticals, electroplating, food processing, biotechnology, chemical industries)	07-09-2026		
14	Hard and Soft Water Definition of Hard Water and Soft Water, Types of Hardness (Temporary and Permanent), Causes of hardness, Units of hardness (mg/L and ppm), Relationship between mg/L and ppm	10-09-2026		
15	Hardness of Water (Numericals) Calculation of hardness in mg/L and ppm, Simple numericals based on hardness, Practice problems and examples	11-09-2026		
16	Effects of Hard Water Disadvantages of hard water in domestic use (soap consumption, scaling, washing problems); Disadvantages in industries (boiler scale, corrosion, reduced heat transfer, pipe blockage).	14-09-2026		
17-18	Effects of hard water in domestic use and industrial use; Boiler scale formation, corrosion and other problems. Principle, construction, working, chemical reactions, regeneration advantages and limitations of the Permutit (Zeolite) process.	17-09-2026 & 18-09-2026		
19	Characteristics of Drinking Water Physical, chemical and biological characteristics of drinking water; BIS standards (brief); Revision and important questions.	21-09-2026		
20-21	Unit-3 Electrochemistry and Corrosion Electronic concept of oxidation and reduction; Definition of oxidation, reduction and redox reaction; Oxidizing and reducing agents with suitable examples. Definition of electrolyte and non-electrolyte; Types of electrolytes (strong and weak); Examples and applications.	24-09-2026 & 25-09-2026		
22	Faraday's Laws of Electrolysis First and Second Laws of Electrolysis; Statement of laws; Factors affecting electrolysis; Significance of Faraday's laws (Numericals excluded).	28-09-2026		

23	Introduction to electrolysis; Industrial applications – Electrometallurgy, Electroplating and Electro-refining; Advantages and examples.	01-10-2026		
24	Definition of corrosion; Causes and mechanism of corrosion; Types of corrosion (brief); Effects of corrosion on metals.	05-10-2026		
25	Prevention by purification of metals; Alloying; Heat treatment; Advantages and industrial importance.	08-10-2026		
26	Surface protection methods; Metal coating; Painting, greasing and other protective coatings (brief).	09-10-2026		
27-28	Definition of metal coating; Anodic coating and cathodic coating; Differences, examples and applications. Review of redox reactions, electrolysis and corrosion; Industrial applications; Important questions and summary.	12-10-2026 & 15-10-2026		
29-30	Unit-4 Engineering Materials and Polymers Natural occurrence of metals; Definition of minerals and ores; Important ores of Copper (Copper Pyrites); Definition of Gangue and Flux. Definition of Metallurgy and Electrometallurgy; General principles of metallurgy.	16-10-2026 & 19-10-2026		
31	Crushing and grinding of ores; Concentration of ores; Froth flotation process – Principle, working, advantages and applications.	22-10-2026		
32	Extraction of metals by Roasting, Calcination and Smelting; Refining of metals by Electrorefining; Industrial significance.	23-10-2026		
33-34	Blast furnace – Construction, working and chemical reactions (brief); Extraction of iron from Haematite ore; Neat labelled diagram of blast furnace. Definition of alloy; Ferrous and non-ferrous alloys; Examples (Steel, Stainless Steel, Brass, Bronze, Duralumin, Solder); Purpose and advantages of alloying.	26-10-2026 & 29-10-2026		
35-36	Definition of Polymer, Monomer and Degree of Polymerization; Classification of polymers (brief); Importance and applications of polymers. Monomers and simple polymerization reactions for Polythene (PE), Polyvinyl Chloride (PVC), Polytetrafluoroethylene (PTFE/Teflon), Polystyrene (PS) and Nylon-6,6; Uses of these polymers; Revision and important questions.	30-10-2026 & 02-11-2026		
37	Unit-5 Chemistry of Fuels and Lubricants Definition of fuel; Classification of fuels (Solid, Liquid and Gaseous); Characteristics of a good fuel; Higher Calorific Value (HCV) and Lower Calorific Value (LCV); Dulong's formula for HCV and LCV; Numerical examples based on Dulong's formula.	05-11-2026		
38-39	Higher Calorific Value (HCV) and Lower Calorific Value (LCV); Calculation of HCV and LCV using Dulong's formula; Fuel rating – Octane number and Cetane number. Chemical composition, calorific value, manufacture, applications and neat labelled diagrams of Water Gas, Producer Gas and Biogas.	06-11-2026 & 09-11-2026		
40	Definition of lubricants; Functions of a good lubricant; Types and applications of lubricants.	12-11-2026		
41-42	Viscosity, Viscosity Index, Flash Point and Fire Point; Significance and engineering applications. Total Acid Number (TAN) and Saponification Value; Importance in lubricant selection; Revision and important questions.	13-11-2026 & 16-11-2026		

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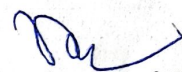
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