

Lesson Plan (2026-27)

Name : Ankita

Discipline: Civil Engg.

Sem. : 1st Sem.

Subject : Applied Chemistry

Code : 250014

Duration : 03/08/26 - 23/11/26

Load : 3 Lectures per week

Lecture No.	Theory Topic
1.	Derivation of de-Broglie's equation, Heisenberg's Principle of Uncertainty
2.	Bohr's model of atom (qualitative treatment only), dual character of matter
3.	Modern concept of atomic structure: definition of orbitals, shapes of s, p and d-orbitals
4.	Quantum numbers and their significance. Electronic configuration
5.	Aufbau, Pauli's exclusion principles and Hund's rule,
6.	Electronic configuration of elements upto atomic number 30.
7.	Metals, non-metals and metalloids (periodicity in properties excluded).
8.	Modern Periodic law and Periodic table, Classification of elements into s, p, d and f-blocks
9.	Chemical bonding: cause of bonding, Ionic bond, covalent bond, and metallic bond (electron sea or gas model),
10.	Physical properties of ionic, covalent and metallic substances
11.	Metals: mechanical properties of metals such as conductivity, elasticity, strength and stiffness, luster, hardness, toughness, ductility, malleability, brittleness, and impact resistance and their uses.
12.	Definition of a mineral, ore, gangue, flux and slag. Metallurgy of iron from hematite using a blast furnace. Commercial varieties of iron
13.	Alloys: definition, necessity of making alloys, composition, properties and uses of duralumin and steel.
14.	Heat treatment of steel-normalizing, annealing, quenching, tempering.
15.	Solutions: definition, expression of the concentration of a solution in percentage (w/w/w/v and v/v), normality, molarity and molality and ppm.
16.	Simple problems on solution preparation, Arrhenius concept of acids and bases, strong and weak acids and bases
17.	pH value of a solution and its significance, pH scale. Simple numerical problems on pH of acids and bases.
18.	Temporary and permanent hardness, expression of hardness of water, ppm unit of hardness.
19.	Hard and soft water, causes of hardness of water, types of hardness

Disadvantages of hard water; removal of hardness: removal of temporary hardness by boiling

21. Clark's method; removal of permanent hardness of water by Ion-Exchange method

22. Boiler problems caused by hard water: scale and sludge formation, priming and foaming,

23. Caustic emprittlement; water sterilization by chlorine, UV radiation and RO.

24. Characteristics of an ideal fuel. Petroleum: Composition and refining of petroleum;

25. Gaseous fuels: composition, properties and uses of CNG, PNG, LNG, LPG;

26. Fuels: definition and classification of higher and lower calorific values, units of calorific value

27. Relative advantages of liquid and gaseous fuels over solid fuels. Scope of Hydrogen as future fuel.

28. Lubricants- Functions and qualities of a good lubricant, classification of lubricants with examples;

29. Lubrication mechanism (brief idea only); physical properties (brief idea only) of a lubricant: oiliness, viscosity, viscosity index, flash and fire point, ignition temperature, pour point.

30. Polymers and Plastics: definition of polymer, classification, addition polymerization

31. Condensation polymerization; preparation properties and uses Of polythene, PVC, Nylon-66, Bakelite;

32. Definition of plastic, thermoplastics and thermo setting polymers; natural rubber and Neoprene, other synthetic rubbers (names only).

33. Corrosion: definition, dry and wet corrosion, factor affecting rate of corrosion

34. Methods of prevention of corrosion—hot dipping, metal cladding, cementation, quenching,

35. Cathodic protection methods Introduction and application of nanotechnology

36. Nano-materials and their classification,

37. Applications of Nano technology in various Engineering applications (brief) of Nano-materials

38. Revision

39. Previous year question paper discussion

Note: There will be Class Test, Assignment work and Sessional Exam., Quizzes etc. will be given as per Academic Calendar.

Smt. Ankita

Lecturer in Chemistry

PAC Member 1

(Sh. Narender Kumar)

PAC Member 2

(Smt. Sonia)

PAC Member 3

(Dr. Jyoti Gupta)

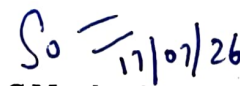
Practical Lesson Plan (2026-27)

Name : Ankita
Discipline: Civil Engg.
Sem. : 1st Sem.
Subject : Applied Chemistry
Code : 250014
Duration : 03/08/26 - 23/11/26
Load : 2 periods per week

Week	Topic
1.	Lab instructions and safety measures.
2.	Instructions regarding apparatus and instruments.
3.	To prepare standard solution of Oxalic Acid
4.	To dilute the given KMnO_4 solution
5.	To find out the strength in grams per litre of an unknown solution of sodium hydroxide using a standard (N/10) oxalic acid solution.
6.	To find out the total alkalinity in parts per million (ppm) of a water sample with the help of a standard sulphuric acid solution.
7.	To determine the total hardness of given water sample by EDTA method.
8.	To determine the amount of total dissolved solids(TDS) in ppm in a given sample of water gravimetrically.
9.	To determine the pH of different solutions using a digital pH meter.
10.	To determine the calorific value of a solid/liquid fuel using a Bomb calorimeter.
11.	To determine the viscosity of lubricating oil using a Redwood viscometer.
12.	To prepare a sample of Phenol-formaldehyde resin (Bakelite)/Nylon-66 in the lab.
13.	Viva & Checking of practical files


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