CHEMISTRY
BEG104 SH

Year: I **Semester: I**

Teaching Schedule Hours/week			Examination Scheme					
			Final				Internal Assessment	
			Theory		Practical		Theory Marks	Practical Marks
L	P	T	Duration	Marks	Duration	Marks		
3	2	1	3	80	-	-	20	25

Course Objective:
This course on Chemistry deals with some advanced topics that has practical Use in Civil Engineering. The course syllabus has been divided into three parts. First part deals with Physical chemistry. Second and third part respectively deals with inorganic and organic chemistry.

: By the end of this course, students will be able to……
- **.** Enhance their knowledge in physical, inorganic and organic chemistry
- **.** Acquire knowledge on Environmental Chemistry
- **.** Know the types of organic reactions
- **.** Understand polymers and Polymerization

Course Contents:

1.0 Atomic Structure **(7 Hrs)**
- 1.1 Diffraction Concept
- 1.2 Schrodinger's wave equation
- 1.3 Quantum Numbers
- 1.4 Aufbau's Principle
- 1.5 Pauli's Exclusion principle
- 1.6 Stability of Noble Gas

2.0 Chemical Bonding **(6 Hrs)**
- 2.1 Electrovalent Bond
- 2.2 Metallic Bond
- 2.3 Crystal Lattice

3.0 Electrochemistry **(6 Hrs)**
- 3.1 Ostwald's Dilution Law
- 3.2 PH and PH Scale
- 3.3 Buffer and its Functioning
- 3.4 Electrolytic and Galvanic Cells
- 3.5 Nernst equation
- 3.6 Corrosion of Metals

4.0 Coordination Complexes **(5 Hrs)**
- 4.1 Coordination Compounds
- 4.2 Werner's coordination theory
- 4.3 Nomenclature of coordination complexes
- 4.4 Electronic Interpretation of Coordination
- 4.5 Valence Bond theory

5.0 Transition Elements **(5 Hrs)**

5.1 Transition elements and periodic table
5.2 Characteristics and properties of Transition Metals
5.3 Complex Formation and Magnetic properties
5.4 Color Formation

6.0 Types of Organic Reaction **(6 Hrs)**

6.1 Substitution Reaction
6.2 Addition Reaction
6.3 Elimination Reaction
6.4 Rearrangement Reaction

7.0 Stereochemistry **(3 Hrs)**

7.1 Optical and Geometrical Isomerism
7.2 Racemic Modification

8.0 Organiometallic Compounds and Explosives **(3 Hrs)**

8.1 Preparation, properties and uses of Grignard Reagent
8.2 Preparation, properties and action of explosives

9.0 Polymers and Polymerization **(4 Hrs)**

9.1 Polymers and their type
9.2 Synthetic and Natural Polymers
9.3 Synthetic Fibers

Laboratory Works:

(i.) To determine the alkalinity of the given sample of water (Two Labs)
(ii.) To determine the total hardness of water sample.
(iii.) To determine the permanent hardness of water sample
(iv.) To determine the amount of free chlorine in the given sample of water.
(v.) To determine the condition in which corrosion takes place.
(vi.) To measure the quality of charge required t deposit one mole of copper
(vii.) To determine the iron from Mohr's copper.

Reference:

- Selected topics in Physical Chemistry-Motikaji Sthapit
- Principles of Physicals Chemistry- Marron & Prutto
- Essentials of Physical Chemsitry-Bahl & Tuli
- Advanced Inorganic Chemistry- Satyaprakash, R.D. Madan, G.D. Tuli
- Concise Chemistry- J.D. Lee
- Organic Chemistry-Morrison & Boyd
- Organic Chemistry- B.S. Bahl