

<b>B.Sc. IV SEMESTER</b>			
Part-A: Introduction			
Program: Diploma Course		Session- 2023-24	
1.	Course Code	<b>CHSC-4T</b>	
2.	Course Title	<b>Concept of Chemistry- 2</b>	
3.	Course Type	Discipline Specific Course	
4.	Pre-requisite (if any)	To study this course our students must have had the subject chemistry in Certificate Course	
5.	Course Learning Outcome(CLO)	At the end of this course, the students will be able to learn the following aspects of chemistry	
		<ul style="list-style-type: none"> <li>• Basic concept of Acid &amp; Base</li> <li>• Basic concept of Bioinorganic Chemistry</li> <li>• Understanding Phase Equilibrium</li> <li>• Understanding concept of Electrochemistry</li> <li>• Caboxyllic acids &amp; their derivatives</li> <li>• Organic compounds of Nitrogen</li> </ul>	
6.	Credit Value	3	
7.	Total Marks	Max. Marks:	100 (80+20 )

<b>Part-B: Content of Course</b>		
<b>Unit</b>	<b>Topic</b>	<b>No. Of Hours</b>
<b>I</b>	<p><b>INORGANIC CHEMISTRY</b></p> <p><b>(A) Acid and Bases:</b></p> <p>Arrhenius, Bronsted-Lowry, the Lux-Flood, solvent system and Lewis concept of acids and bases.</p> <p><b>Hard and Soft Acids and Bases (HSAB)</b></p> <p>Classification of acids and bases as hard and soft. Pearson's HSAB concept, acid-base strength and hardness and softness. Symbiosis</p> <p><b>(B) Bio-inorganic Chemistry</b></p> <p>Essential and trace elements biological processes, metalloporphyrins with special reference to haemoglobin and myoglobin. Biological role of alkali and alkaline earth metals with special reference to Ca. nitrogen fixation</p>	<b>10</b>

II	<p><b>PHYSICAL CHEMISTRY</b></p> <p><b>Phase Equilibrium-(A)</b>Gibbs phase rule, phase component and degree of freedom, limitation of phase rule Application of phase rule to one component system-water system and Sulphur systems Application of phase rule to two component systems: Pb-Ag systems, Zn-Mg system, water-ferric chloride, desilverisation of congruent and incongruent, melting point, eutectic point,</p> <p>(B) Nernst distribution law-thermodynamic derivation &amp; application, Henry law&amp; its application.</p>	11
III	<p><b>ORGANIC CHEMISTRY</b></p> <p><b>Aldehydes and Ketones</b></p> <p>Nomenclature and structure &amp; relative reactivity of the carbonyl group, synthesis of aldehydes and Ketones Mechanism of nucleophilic addition to carbonyl group benzoin, aldol, Perkin and Knoevenagel condensations. Condensation with ammonia and its derivatives. Wittig reaction, Mannich reaction. Oxidation of aldehydes, Baeyer-Villiger oxidation of ketones, Cannizzaro reaction,MPV, Clemmensen,Wolff-Kishner, <math>\text{LiAlH}_4</math> and <math>\text{NaBH}_4</math> reductions. Halogenation of enolizable ketons.</p> <p><b>(A)Carboxylic Acids</b></p> <p>Nomenclature, structure, physical properties, acidity of carboxylic acids, effect of substituent on acid strength, method of preparation and chemical reaction Hell-Volhard –Zeilinsky reaction, Reduction of carboxylic acids, Mechanism of decarboxylation .Di carboxylic acids:- Methods of formation and chemical reactions, effect of heat and Dehydrating agents.</p> <p><b>(B)Carboxylic Acid Derivatives</b>-Structure, method of preparation &amp; physical properties of acid chlorides, esters, amides(Urea) and acid anhydrides. Relative stability of acyl derivatives.</p>	12
IV	<p><b>(A) Active methylene compounds</b> :-Method of preparation and synthetic applications of diethyl malonate and ethyl acetoacetate.Claisen condensation. Keto-enol tautomerism of ethyl acetoacetate.</p> <p><b>(A)Organic Compounds of Nitrogen</b></p> <p>(i)Preparation of nitro alkanes and nitro arenes. Chemical reaction of nitroalkanes,Mechanism of nucleophilic substitution in nitroarenes and their reduction in acidic, neutral and alkaline medium.</p> <p>(ii) Structure and nomenclature, Relative basicity of aliphatic and aromatic amines, physical properties.. Separation of mixture of primary, secondary and tertiary amines. Preparation of alkyl and aryl amines (reduction of nitro compounds, nitriles), Gabriel-phthalimide reaction, Hofmann bromamide reaction. Reaction of amines, electrophilic aromatic substitution in aryl amines, Diazotization reaction , azo coupling</p>	12

**REFERENCE BOOKS:**

1. Basic inorganic chemistry; F.A. Cotton, G. Wilkinson and P. I. Gaus, J.wiley.
2. Concise inorganic chemistry; J. D. Lee, ELBS.
3. Concepts of Models of Inorganic Chemistry; B. Douglas, D. Medaniel and J. Alexander. J. Wley.
4. Inorganic Chemistry; D.E. Shriver, P. W. Atkins and C. H. Langford, oxford.
5. Inorganic chemistry ; W.W. Porterfield, Addison-wesley.
6. Inorganic chemistry ; A.G. Sharp, ELBS.
7. Advance inorganic chemistry ; Puri & Sharma , S. Naginchand.
8. Selected topics in inorganic chemistry ; Madan Malik & Tuli ,S. Chand
9. Physical Chemistry; G. M. Barrow, McGraw Hill.
10. University General Chemistry; C. N. Rao. Macmillan.
11. Physical Chemistry; R. A. Alberty, Wiley Estern.
12. The Element of Physical Chemistry; P. W. Atkin, Oxford
13. Physical chemistry through problems; Droga & Droga, Wiley Estern
14. Bhautik Rasayan ; P. L. Soni.
15. Physical Chemistry B.D. Khosla. Physical Chemistry ; Puri & Sharma
16. Organic Chemistry ; Morrison and Boyd, Prentice Hall.
17. Organic Chemistry; L. G. Wade , Prentice Hall.
18. Fundamental of Organic Chemistry; Solomons ,J. Wiley.
19. Organic Chemistry, Vol. I, II, & III; Mukharjee, Singh & Kapoor, Wiely Estern (New Age).
20. Organic Chemistry ; F.A. Carey, McGraw Hill.
21. Organic Chemistry ; P.L. Soni
22. Organic Chemistry; Bahal & Bahal.

**E-learning Resources:**

**Fundamental Chemistry related topics on SWAYAM platform and E-pathshala**

<b>Part - D: Assessment and Evaluation</b>		
<b>Suggested Continuous Evaluation Methods :</b>		
<b>Maximum Marks :</b>		<b>100 Marks</b>
<b>Continuous Comprehensive Evaluation(CCE) :</b>		<b>20 Marks</b>
<b>Semester End Examination(SEE) :</b>		<b>80 Marks</b>
<b>Internal Assessment: Continuous Comprehensive Evaluation (CCE)</b>	<b>Two Internal Test of 10 Marks each Assignment/Seminar –01 of 10 Marks</b>	Total of maximum obtained marks in test exam and Assignment
<b>Semester End Exam (SEE):</b>	<b>Paper – Two section – A &amp; B</b> <b>Section A: Objective &amp; Short answer type questions – 1 x 10 + 3 x 10 = 40</b> <b>Marks Section B: Descriptive answer type questions unit wise – 10 x 04 = 40</b> <b>Total Marks-80</b>	

**Chairman and Members of B.O.S.-**