B.Sc. VI SEMESTER			
Program: Diploma Course	Part-A: Introduction		
1.	Course Code	Session- 2024-25	
2.	Course Title	CHSC-6T	
3.	Course Type	Essentials of Chemistry	
4.	Pre-requisite (if any)	Discipline Specific Course	
5.	Course Learning Outcome(CLO)	To study this course our students must have had the subject chemistry in Certificate Course	
		At the end of this course, the students will be able to learn the following aspects of chemistry	
		• Oxidation and Reduction	
		• Crystal Field Theory	
		• Organometallic Compounds	
		• Heterocyclic Compounds	
		• Application of IR & UV spectroscopy for identification of simple organic molecules	
		• Electrochemical cell or Galvanic cells	
6.	Credit Value	3	
7.	Total Marks	Max. Marks:	100 (80+20)

Part-B: Content of Course		
Unit	Topic	No. Of Hours
I	**(A) Oxidation and Reduction:** Use of redox potential data-analysis of redox cycle, redox stability in water Frost, Latimer & Pourbaix diagrams, principles involved in the extraction of the elements. **(B) Crystal Field Theory:** Crystal field splitting in octahedral, tetrahedral and square planar complexes Crystal field stabilization energy (CFSE), Crystal field effects for weak and strong fields. Factors affecting the magnitude of D. Spectrochemical series. Comparison of CFSE for O_h and T_d complexes, Jahn-Teller distortion. Molecular Orbital theory, Octahedral, tetrahedral and square planer complexes, π bonding & Molecular orbital theory	10
II	**(A) Organometallic Compounds:** Formation, structure , Properties& Synthetic applications of Grignard reagents Organolithium compounds **(B) Heterocyclic Compounds :** Introduction: Molecular orbital picture and aromatic characteristics of pyrrole,furan, thiophene and pyridine.Methods of synthesis and chemical reactions withparticular emphasis on the mechanism of electrophilic substitution. Mechanismof	11

	nucleophilic substitution reaction in pyridine .Comparision of basicity of pyridine, piperidine and pyrrole. Preparation and reactions of quinoline and isoquinoline	
III	**Application of IR & UV spectroscopy for identification of simple organic molecules** **(A) UV- Visible spectroscopy** :Beers-Lamberts law, effect of conjugation λ max, Wood ward fieser rule for calculating λ max of conjugated polyenes and carbonyl Compounds **(B)Infra red spectroscopy**: IR absorption band & their position and intensity, types of Bending and stretching of molecules	12
IV	**(A) Electrochemical cell or Galvanic cells** :reversible and irreversible cells, conventional Representation of electrochemical cells. EMF of a cell, effect of tempreture on EMF of cell, Nernest equation calculation of ΔG, ΔH andΔ S for cell reaction, polarization, Over potential and hydrogen overvoltage **(B)** Concentration cell with and without transport, liquid junction potential, application of concentration - cells, valency of ions, solubility product and activity coefficient.. Determination of pH and pKa , using hydrogen and quinhydrone electrodes, potentiometric titrations Buffers- mechanism of buffer action, Handerson-Hazel equation , Hydrolysis of salts. Corrosion┐ types, theories and prevention	12

PART-C

LEARNING RESOURCES

***REFERENCE BOOKS*:**

1. Basic inorganic chemistry; F.A. Cotton, G. Willkinson and P. I. Gaus, J.wiley.
2. Concise inorganic che mistry; 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