C. U. SHAH UNIVERSITY, WADHWAN CITY.

Faculty of: **Sciences and Life Sciences**
Course: **Bachelor of Science (Chemistry)**
Semester**: I**
Subject Code**: CHM201-1C**
Subject Name: **Inorganic and Physical Chemistry-I**

Sr. No	Category	Subject Code	Subject Name	Teaching hours/ Week			Credit hours	Credit Points	Evaluation Scheme/ Semester								
									Theory				Tutorial / Practical				Total
									Continuous and Comprehensive Evaluation		End Semester Exams		Internal Assessment		End Semester Exams		
				Th	Tu	Pr			Marks		Marks	Duration	Marks	Duration	Marks	Duration	
1	MAJOR	CHM201-1C	Inorganic and Physical Chemistry-I	3	-	2	5	4	10 10 05	Assignment Quiz Attendance	50	2	25	1	-	-	100

AIM :

- Aware students of the history of chemistry and its scope.
- Acquaint the basic concept of Chemistry as a subject.
- Basic concepts related to Inorganic and physical chemistry.
- Learn laboratory skills for handling glassware and chemicals for safety purposes.
- To teach analysis of unknown inorganic compound

COURSE CONTENTS

Course Outline for Theory

UNIT	COURSE CONTENT	TEACHING HOURS
I	**A) Wave Mechanics** • Matter waves • The wave nature of the electron wave equation. • De-Broglie equation and uncertainty principle. • Fundamental postulates of wave mechanics. • Introduction of Schrodinger's wave equation and quantum numbers. • Examples based on De-Broglie equation and uncertainty principle **B) V.B. & M.O. Theory** • Valence bond theory of chemical bonding, • Explanation of formation of covalent bond by Lewis theory. • Limitations of Lewis theory, V.B.T. for formation of covalent bond. • Overlapping of s-s, s-p & p-p orbital. • Explanation of H_2, N_2, O_2 ,F_2, NH_3, H_2O & HF molecules by V.B.T. • Limitations of V.B.T, Formation of bonding and anti-bonding molecular orbitals and bond order. • Order of energy for molecular orbitals. • Molecular orbital diagram of homonuclear diatomic molecules • Molecular orbital diagram of ions such as H_2, H_2^+, He_2, He_2^+	**15**
II	**Chemical Thermodynamics**	**15**

	• Definition of thermodynamic terms: System, surrounding etc. • Types of systems. • Intensive & extensive properties, state of path functions, thermodynamic process, concept of heat & work. • First law of Thermodynamics.:- Statement, definition of internal energy & enthalpy, heat capacity, heat capacities of constant volume & pressure & their relationship. • Joule's law calculation of W, q, dU and dH for the expansions of ideal gases under isothermal & adiabatic conditions for reversible process. • Limitations of first law of Thermodynamics. • Second law of Thermodynamics. • Different statements of Second law of Thermodynamics. • Definition of entropy and free energy,Significance of entropy in a reaction. • Carnot theorem, Carnot cycle and its efficiency. • Thermodynamic scale of temperature. • Numerical based on first and second law of thermodynamics.	
III	**Metal & Metallurgy** • Introduction, occurrence, definition of Metallurgy • Principles of Metallurgy, basic Metallurgical operations and Metallurgy process • General method involved in extraction of metals • Extraction processes, chemical properties , important compounds an uses of Cr, Ni and Zn	**15**

Course Outline for Practical

SR. NO	COURSE CONTENT
1	**Demonstrative Practicals** Introduction to the laboratory, safety rules during practicals, and knowledge about different signs and symbols regarding hazardous materials. Calibration and use of apparatus/common glassware (burette and pipette), and their uses. Preparations of Standard solutions.
2	**Qualitative Analysis of Inorganic Salts** Inorganic salts containing two radicals **Anion:** Cl^-, Br^-, I^-, NO_2^-, SO_4^{-2}, CO_3^{-2},$CrO4^{-2}$, $Cr_2O_7^{-2}$ **Cation:** Group I to VI positive ions
	Total Hours = 30

TEACHING METHODOLOGY:

- Conventional method (classroom blackboard teaching)
- ICT Techniques
- Teaching through the classroom, laboratory work
- Variety of learning styles and tools (PowerPoint presentations, audio-visual resources, e-resources, seminars, workshops, models)
- Teaching through laboratory work

LEARNING OUTCOME:

- Expand the Chemistry knowledge using various fundamental aspects of different branches of chemical sciences.

- Procure knowledge of wave mechanics with different theories
- Obtain significant knowledge about metallurgy
- Understanding the importance of laboratory work and laboratory safety
- Acquire knowledge about types of glassware and their calibration
- Develop skills in the preparation of chemicals of various concentration
- Learn to analyze the positive and negative ions from unknown inorganic compounds

ARRANGEMENT OF LECTURE DURATION AND PRACTICAL SESSION AS PER DEFINED CREDIT NUMBERS

Units	Lecture Duration (In Hrs.)		Calculation of Credits (In Numbers)		Total Lecture Duration	Credit Calculation
	Theory	Practical	Theory	Practical	Theory+ Practical	Theory+ Practical
Unit – 1	15	30	3	1	45+30	4
Unit – 2	15					
Unit – 3	15					
TOTAL	**45**	**30**	**3**	**1**	**75**	**4**

EVALUATION

Theory Marks	Practical Marks	Total Marks
75	**25**	**100**

REFERENCE BOOKS

1	Basic Inorganic Chemistry	FA. Cotton and G. Wilkinson.
2	Principles of Inorganic Chemistry	B.R. Puri, L.R. Sharma & K.C Kalia,
3	Principles of Physical Chemistry	Puri, Sharma, Pathania.
4	A Textbook of Physical Chemistry	B.K. Sharma.
5	Vogel's Qualitative Inorganic Analysis	G. Svehla, B. Sivasankar
6	Practical Chemistry	Pandey, O. P., Bajpai, D. N., Giri, S.