INSTITUTE	**FACULTY OF SCIENCE**
PROGRAM	**BACHELOR OF SCIENCE (CHEMISTRY)**
SEMESTER	**1**
COURSE TITLE	**ELEMENTARY CHEMISTRY - I**
COURSE CODE	**02CY0104**
COURSE CREDITS	**4**

Course Outcomes: After completion of this course, student will be able to:

1. Study the concepts of hybridization to understand chemical bonds and covalent bond-containing compounds
2. Gain knowledge of catalyst and catalytic reaction application in the chemical reaction.
3. Become acquainted with Chemical Kinetics and its applications
4. Study the basics of Alcohol, Phenol and Ether containing compounds, their physiochemical properties and their importance in chemical industry processes

Pre-requisite of course: Before studying Elementary Chemistry I, all students must have apparent knowledge of organic chemistry at 12th standard level. It draws an attention towards the elementary understanding for the formation of bonding (e.g. oxidation state and octet rule). This part will also require unavoidable shallow knowledge of chemistry studied during the 12th level. It includes points which will be useful to understand the topics covered such as preparation and properties of organic compounds and study regarding catalysis and order of reaction, which is of important during the understanding/teaching process of this course.

Teaching and Examination Scheme

Theory Hours	Tutorial Hours	Practical Hours	ESE	IA	CSE	Viva	Term Work
4	0	0	50	30	20	0	0

Contents : Unit	Topics	Contact Hours
1	**Chemical bonding and covalent compounds** Introduction, Valence Bond Theory and its limitations, sigma and pi bonds, Hybridization, Stereochemistry of inorganic molecules, Sidgwick Powell Rule, VSEPR Theory, Molecular Orbital Theory, Difference between VBT and MOT, Bond order, Energy level diagram for molecular orbitals	15
2	**Catalysis** Introduction, Types of Catalyst, Characteristic of catalysis, Functions, Homogeneous and Heterogeneous catalysis, Acid base Catalyst, Enzyme Catalyst, Applications	10

Contents : Unit	Topics	Contact Hours
3	**Alcohol, Phenol and Ether** Introduction, IUPAC Nomenclature of alcohols, Phenols and Ethers, Physical properties of alcohol, phenol and ethers, Chemical properties of alcohols, Industrial production of phenol by dow process and cumene process, Chemical properties of phenol or electrophilic substitution reactions of phenol, Reimer-Tiemann reaction with mechanism, Kolbe-Schmitt reaction with mechanism with mechanism, Fries reaction with mechanism, Preparation of Ethers, Chemical reaction of ethers.	15
4	**Chemical Kinetics** Introduction, Order and molecularity of a reaction, Zero order reaction, First order reaction & it's characteristics, Second order reaction & it's characteristics, Third order reaction & it's characteristics, Pseudo unimolecular reaction, Method for determining the order of reaction. Graphical method, Ostwald's isolation method, Method of half-life period, Integration method. Theories of reaction rates. Collision theory, The transition state theory, Influence of temperature on reaction rates, Energy of activation	20
Total Hours		**60**

References:

1. Concise Inorganic Chemistry 5th Edition, Concise Inorganic Chemistry 5th Edition, E. J. D. Lee, Wiley, 2008
2. Principles of Inorganic Chemistry, Principles of Inorganic Chemistry, B. R. Puri, L. R. Sharma, Kalia, , Milestone Publishers, 2020
3. Inorganic Chemistry 3rd edition, Inorganic Chemistry 3rd edition, D. F. Shriver and P. W. Atkins, Oxford University Press, 2009
4. A Textbook of Physical Chemistry, 3rd Edition, A Textbook of Physical Chemistry, 3rd Edition, K L Kapoor, Macmillan India Ltd, 2000
5. Atkin's Physical Chemistry 8th Ed, Atkin's Physical Chemistry 8th Ed, P. W. Atkins &J. de Paula, Oxford University Press, 2006
6. An Introduction to Chemical Thermodynamics 6th Edition, An Introduction to Chemical Thermodynamics 6th Edition, R. P. Rastogi, R. R. Misra, Vikas Pub. Pvt. Ltd. , 2003
7. Physical Chemistry, Multicolour edition, , Physical Chemistry, Multicolour edition, , 7. Arun Bahl & J.D Tuli, S. Chand Publishing, 2008

Suggested Theory Distribution:

The suggested theory distribution as per Bloom's taxonomy is as follows. This distribution serves as guidelines for teachers and students to achieve effective teaching-learning process

Distribution of Theory for course delivery and evaluation

Remember / Knowledge	Understand	Apply	Analyze	Evaluate	Higher order Thinking
20.00	30.00	25.00	15.00	10.00	0.00

Instructional Method:

1. The course delivery method will depend upon the requirement of content and need of students. The teacher in addition to conventional teaching method by white board, may also use any of tools such as demonstration, role play, Quiz, brainstorming, MOOCs etc.
2. The internal evaluation will be done on the basis of continuous evaluation of students in the laboratory and class-room.
3. Students will use supplementary resources such as online videos, NPTEL videos, e-courses, Virtual Laboratory.

Supplementary Resources:

1. http://ocw.mit.edu/courses/chemistry/
2. https://www.youtube.com/watch?v=OvjkMqGzgiY
3. https://www.youtube.com/watch?v=iUIzpEEpW_Q
4. http://vlab.amrita.edu/index.php?sub=2
5. https://www.youtube.com/watch?v=oh4L2gcI5ds