INSTITUTE	**FACULTY OF SCIENCE**
PROGRAM	**BACHELOR OF SCIENCE (MICROBIOLOGY)**
SEMESTER	**3**
COURSE TITLE	**GENERAL CHEMISTRY-III**
COURSE CODE	**02CY0203**
COURSE CREDITS	**4**

Objective:

1. To understand the principles governing the properties, reactivity, and applications of the s & p block elements.
2. To study the structural features, properties and synthesis of cycloalkanes, including their ring strain and stability.
3. To study the acid-base chemistry and fundamental concept of ionic equilibrium.
4. To understand the principles of crystal structures and properties of ionic solids, including their applications.

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

1. Obtain the information regarding ‘s’ and ‘p’ block elements and their applications.
2. Students will be able to effectively examine the cycloalkanes' structural characteristics and chemical reactivity, which will enable them to be used in organic synthesis and help comprehend the behaviour of cyclic compounds.
3. Understand and predict chemical behaviour in aqueous solutions by showcasing their knowledge of evaluating and modifying acid-base equilibria.
4. Gain an extensive knowledge of the concepts guiding the composition, characteristics, and uses of ionic solids.

Pre-requisite of course: Students must have knowledge of periodic table and elements. Also require knowledge of the term “hydrolysis” and “ionic solids”. Prime knowledge of organic chemistry is important (mainly 12th standard level).

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	**Chemistry of s & p block elements** Introduction, characteristics of s and p block elements, metal character, polarizing power, hydration energy, inert pair effect, relative stability of different oxidation state, anomalous behavior, formation of complex, biological importance of some s-block elements.	15

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Contents : Unit	Topics	Contact Hours
2	**Cycloalkanes** Nomenclature, methods of preparation, physical properties, chemical properties, stability of cycloalkanes, Baeyer Strain theory, Sache-Mohr theory.	10
3	**Acids, bases and ionic equilibrium** Introduction, degree of ionization and factors affecting degree of ionization. ionization constants of weak acids and bases. solubility, solubility products of sparingly soluble salts, ionic product, applications of solubility product. hydrolysis of salts, relation among Kh, Ka, or Kb and Kw. degree of hydrolysis and pH of the solution of salts of weak acids and strong bases, salts of weak bases and strong acids and salts of weak bases and weak acids. buffer solutions, definition and types of buffer solutions, buffer action, derivation of Henderson-Hasselbalch equation. numerical.	20
4	**Ionic solids** Introduction, characteristics of ionic solids, lattice energy, Born-Haber cycle, Max-Born equation for the calculation of lattice energy, radius ratio effect and coordination number, derivation of radius ratio, Bravais lattice, close packed structures, classification of ionic structures, lattice defects, stoichiometric defects, non-stoichiometric defects, semiconductor.	15
Total Hours		**60**

Textbook :

1 A Textbook of Physical Chemistry, Arthur W. Adamson, Academic Press, 1973

2 A Textbook of Physical Chemistry, S. C. Anand and A. S. Negi, New Age International (P) Ltd Publishers, 1985

3 A Textbook of Organic Chemistry, Bahl, S Chand Publishing, 2005

References:

1 Solid State Physics Lattice Dynamics of Ionic Solids: Lattice Dynamics of Ionics Solids, Solid State Physics Lattice Dynamics of Ionic Solids: Lattice Dynamics of Ionics Solids, G.K. Upadhyaya, Laxmi Publications, 2008

2 Principles of Physical Chemistry, Principles of Physical Chemistry, Madan Pathania, Puri and Sharma, Vishal Publishing Co. , 2020

3 Organic Chemistry, Organic Chemistry, Morrison, Boyd and Bhattacharjee, Pearson Education India, 2010

4 Essentials of Physical Chemistry, Essentials of Physical Chemistry, Arun Bahl, B.S. Bahl and G.D. Tuli, S Chand Publishing, 2022

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

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Distribution of Theory for course delivery and evaluation					
Remember / Knowledge	**Understand**	**Apply**	**Analyze**	**Evaluate**	**Higher order Thinking / Creative**
20.00	30.00	25.00	25.00	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 black 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://nptel.ac.in/course.php?disciplineId=104
2. http://ocw.mit.edu/courses/chemistry/
3. http://vlab.amrita.edu/index.php?sub=2
4. http://www.vlab.co.in/ba_labs_all.php?id=9
5. https://www.youtube.com/user/TMPChem
6. https://www.youtube.com/playlist?list=PL166048DD75B05C0D
7. https://www.youtube.com/channel/UCqk-dmk3AOFtikaFDpsZorg
8. https://www.youtube.com/user/PradeepKshetrapal

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