

<b>INSTITUTE</b>	<b>FACULTY OF SCIENCE</b>
<b>PROGRAM</b>	<b>BACHELOR OF SCIENCE (CHEMISTRY)</b>
<b>SEMESTER</b>	<b>3</b>
<b>COURSE TITLE</b>	<b>CHEMISTRY-III</b>
<b>COURSE CODE</b>	<b>02CY0201</b>
<b>COURSE CREDITS</b>	<b>6</b>

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

- 1 Understand the behavior and the involvement of the elements from periodic table while knowing the general chemistry
- 2 Be aware of the basics of cycloalkanes; their methods of preparation, properties and stability.
- 3 Obtain the information regarding 's' and 'p' block elements and their applications.
- 4 Understand the basic of hydrolysis, Ionic solids, and their various studies.

**Pre-requisite of course:** Students must have knowledge of periodic table studied in 12th standard level. This unit also require slight knowledge of term "Hydrolysis". 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
5	0	2	50	30	20	25	25

Contents : Unit	Topics	Contact Hours
1	<b>Chemistry of s &amp; p block elements:</b> 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
2	<b>Cycloalkanes</b> Nomenclature, methods of preparation, physical properties, chemical properties, stability of cycloalkanes, Baeyer Strain Theory, Sache-mohr theory.	12

<b>Contents : Unit</b>	<b>Topics</b>	<b>Contact Hours</b>
3	<b>Acids, Bases and Ionic equilibrium</b> 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 $K_h$ , $K_a$ , or $K_b$ and $K_w$ . 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. Numericals.	15
4	<b>Ionic Solids</b> 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	18
<b>Total Hours</b>		<b>60</b>

#### Suggested List of Experiments:

<b>Contents : Unit</b>	<b>Topics</b>	<b>Contact Hours</b>
1	<b>Experiments</b> Experiment-1, Experiment-2, Experiment-3, Experiment-4, Experiment-5, Experiment-6, Experiment-7, Experiment-8	
<b>Total Hours</b>		

#### References:

- 1 A Textbook of Physical Chemistry, A Textbook of Physical Chemistry, K L Kapoor, Macmillan, 2004
- 2 Organic Chemistry, Organic Chemistry, R. T. Morrison and R. N. Boyd, Prentice Hall of India, 2007
- 3 Essetials of Physical Chemistry, Essetials of Physical Chemistry, Arun Bahl and B.S.Bahl, G.D.Tuli, S.Chand & Co, 2012
- 4 Basic Inorganic Chemistry, Basic Inorganic Chemistry, F. Albert Cotton, Geoffrey Wilkinson, Paul L. Gaus , Wiley, 2007
- 5 Principles of Inorganic Chemistry, Principles of Inorganic Chemistry, B.R. Puri, L.R. Sharma, Vishal Pub. Co, 2020

#### 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
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<b>Remember / Knowledge</b>	<b>Understand</b>	<b>Apply</b>	<b>Analyze</b>	<b>Evaluate</b>	<b>Higher order Thinking</b>
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 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 Practical examination will be conducted at the end of semester for evaluation of performance of students in laboratory.
- 4 Students will use supplementary resources such as online videos, NPTEL videos, e-courses, Virtual Laboratory
- 5 Use of hazardous/toxic chemicals should be avoided as far as possible in laboratory.
- 6 All students in the laboratory must wear safety goggles and lab coats during lab session.

**Supplementary Resources:**

- 1 <http://nptel.ac.in/course.php?disciplineId=104>
- 2 <http://nptel.ac.in/course.php?disciplineId=104>
- 3 <http://ocw.mit.edu/courses/chemistry/>
- 4 <http://vlab.amrita.edu/index.php?sub=2>
- 5 [http://www.vlab.co.in/ba\\_labs\\_all.php?id=9](http://www.vlab.co.in/ba_labs_all.php?id=9)
- 6 <https://www.youtube.com/user/TMPChem>
- 7 <https://www.youtube.com/playlist?list=PL166048DD75B05C0D>
- 8 <https://www.youtube.com/channel/UCqk-dmk3AOFtikaFDpsZorg>
- 9 <https://www.youtube.com/user/PradeepKshetrapal>