

**KOLHAN UNIVERSITY, CHAIBASA  
JHARKHAND**



**Revised Curriculum and Credit Frame Work  
For SEM – I  
As per FYUGP, NEP- 2020  
(U.G. Chemistry – 2022 Onward)**

**University Department of Chemistry  
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## Index

Sem	Code	Papers	Credits (Th +P)
I	MJ-1	Major Paper-1 (Inorganic Chemistry)	3 + 1
	MN-1	Minor Paper-1 (Inorganic Chemistry)	3 + 1
	MDC/IRC-1	Multi-Disciplinary/Introductory Regular Course	3 + 0

- **For End Semester Examination (ESE 60 marks, 3Hrs Exam):**

There will be **two** group of question. **Group A is compulsory** which will **contain** three questions. **Question No. 1 will be very sort answer type** consisting of five questions of 1 mark each. **Question No. 2 & 3 will be short answer type** of 5 marks. **Group B will contain descriptive type** five question of fifteen marks each, out of which any three are to answer.

- **For End Semester Examination (ESE 75 marks, 3Hrs Exam):**

There will be **two** groups of questions. **Group A is compulsory** which will contain three questions. **Question No. 1 will be very short answer type** consisting of five questions of 1 mark each. **Question No. 2 & 3 will be short answer type** of 5 marks. **Group B will contain descriptive type** six questions of fifteen marks each, out of which any four are to answer.

## Semester-I

Course Title: Multi – Disciplinary/Introductory Regular Course-1 (MDC/IRC)

Credits - 03

FM–75 Marks

Time 3hrs

In Group B of question paper Two Question of equal marks shall be set from each Unit , Out of which Four are to be answered selecting at least one question from each Unit.

Content	Hours
<b>Unit 1 - Inorganic Chemistry</b>	
<ul style="list-style-type: none"><li>• <b>Atomic Structure and Periodic Properties:</b> Bohr's Model. Dual nature of matter; de Broglie concept. Heisenberg uncertainty principle; its significance. Atomic orbital's, Quantum numbers, shapes of s, p and d orbital's. Aufbau energy diagram, Pauli's exclusion principle. Hund's rule of maximum multiplicity. Electronic configuration of elements (s block, p block and first series of d-block elements).</li></ul>	15h
<ul style="list-style-type: none"><li>• <b>Periodic properties</b> The general idea of Modern periodic table, atomic and ionic radii, ionization potential, electron affinity, electro negativity-definition.</li></ul>	
<ul style="list-style-type: none"><li>• General Chemistry of Group IA, IIA, IB, IIB</li></ul>	
<ul style="list-style-type: none"><li>• <b>Ionic Bond:</b> Lattice energy, Born- Haber cycle, factor favoring Ionic bond, Variable valency, properties of Ionic compounds.</li></ul>	
<ul style="list-style-type: none"><li>• <b>Covalent bond</b> Formation of sigma and pi bond, Hybridization and directional bonding (VBT), Structure and shapes of BF<sub>3</sub>, PCl<sub>5</sub>, SF<sub>4</sub>, SnCl<sub>2</sub>, NH<sub>3</sub>, and CH<sub>4</sub>. Properties of covalent compounds</li></ul>	
<b>Unit 2 - Organic Chemistry</b>	
<ul style="list-style-type: none"><li>• Tetravalency of carbon, Hybridization (sp<sup>3</sup>, sp<sup>2</sup>, sp). Classification &amp; nomenclature of organic compounds.</li></ul>	15h
<ul style="list-style-type: none"><li>• Detection and estimation of element (N, S, P &amp; Halogen), determination of molecular weight of organic acid and organic bases.</li></ul>	
<ul style="list-style-type: none"><li>• Elementary idea of electron displacement effect (Inductive, electrometric, resonance, mesomeric, Hyperconjugation).</li></ul>	
<ul style="list-style-type: none"><li>• IUPAC nomenclature of branched and unbranched Alkanes, the alkyl group, classification of carbon atoms in Alkanes, Isomerism in Alkanes, sources, methods of formation (with special reference to Wurtz reaction, Kolbe reaction, Corey-House reaction and decarboxylation of carboxylic acids), physical properties and chemical reactions of Alkanes.</li></ul>	
<ul style="list-style-type: none"><li>• <b>Isomerism</b> Structural and stereoisomerism solution of racemem mixtures. Elements of symmetry.</li></ul>	
<ul style="list-style-type: none"><li>• Cycloalkanes-nomenclature, methods of formation, chemical reaction's Baeyer's strain theory and its limitations. Ring strain in small rings (cyclopropane and cyclobutane).</li></ul>	
<b>Unit 3 - Physical Chemistry</b>	
<ul style="list-style-type: none"><li>• <b>Gaseous State</b> Postulates of kinetic theory of gases, deviation from ideal behavior, van der Waal's equation of states, relationship between critical constants and van der Waals constants. Molecular velocities: Root mean square, average and most probable velocities, Numerical problems.</li></ul>	15h
<ul style="list-style-type: none"><li>• <b>Chemical Equilibrium:</b> Law of mass action and its Kinetic derivation, Equilibrium constant, Relation between K<sub>P</sub>, K<sub>C</sub> and equation. Le Chatelier's principle.</li></ul>	
<ul style="list-style-type: none"><li>• <b>Dilute solution:</b> Colligative properties, Osmosis &amp; Osmotic Pressure, Lowering of Vapour Pressure, Elevation of Boiling Point, Depression of Freezing Point.</li></ul>	
<ul style="list-style-type: none"><li>• <b>Thermo chemistry</b> Hess law, Kirchhoff law, bond energy and their calculation.</li></ul>	

\*Remarks -: No Internal Exam

**Books Recommended:**

- Principles of Inorganic Chemistry by Puri, Sharma and Kalia
- Organic Chemistry by Bahl and Bahl
- Text Book of Physical Chemistry by Puri Sharma and Pathania
- Text Book of Physical Chemistry by Bhal and Tuli
- Pradeep's Inorganic, Organic, Physical Chemistry, Vol.- I
- Dinesh Inorganic, Organic, Physical Chemistry, Vol.- I