



CHEMISTRY  
(Inter Disciplinary Course)  
**(2nd Semester)**  
Course No.: **CHM-IDC-151**

*Indian Chemistry Through the Ages*

**Contact Hours: 60; Credits: 03**

**Full Marks = 100** [End Semester Exam (70) Internal Assessment (30)]

**Pass Marks = 40** [End Semester Exam (28) Internal Assessment (12)]

**UNIT-I: Basic Concepts in Chemistry**

**Matter, elements, atoms**, and molecules. Metal and Non-Metals, The structure of the atom, Chemical Bonding (covalent, Ionic, co-ordinate) with examples, Lewis structural representation, Melting and boiling points, Scientific Notation. Chemical reactions in atmosphere: Acid rain, Greenhouse effect and global warming.

**UNIT-II: Chemistry in Ancient India**

Alchemy, Alchemy and Iatrochemistry in India, Rasasastra, Categorization of chemical substances: mahārasas, uparasas, navaratnas, dhātus. Special position of mercury in Indian alchemy, Noted alchemical texts from Acharya Nagarjuna, Govind Bhagwatpad, Vagbhatta, Siddha Nityanatha, Somadeva, and Yasodhara.

Contributions of Nagarjuna, General layout of the laboratory and apparatus used in ancient chemistry, the mūsa yantra or crucible, the koṣṭhi yantra, the pātana yantra (sublimation or distillation), the dhūpa yantra (for fumigation)

**UNIT-III: Chemical Arts and Crafts in Historic period**

Glass making, Soap, Dyeing, Cosmetics and Perfumes, Ink, Metallurgy: Iron, Steel, Copper, Bronze

**UNIT-IV: Modern Indian Chemistry**

Sir Acharya Prafulla Chandra Ray – Father of Indian Chemistry: His contributions in chemical research, and development of Indian chemical industry, Ray's classification of five stages in development of Chemistry in India.

**UNIT-V: Lives of Some Chemists from Modern India and Their Contributions in Chemistry**

Works and Contribution of Nobel laureate Professor Har Govind Khorana, Prof C N R Rao, Dr. Shanti Swarup Bhatnagar, Dr. Asima Chatterjee, Nobel laureate Venkatraman Ramakrishnan, Dr. Kamala Sohonie, Dr. Yellapragada Subba Rao, Dr. Darshan Ranganathan.

**Reference Books:**

1. Basic Chemistry, 5<sup>th</sup> Edn. K. Timberlake and W. Timberlake, Pearson
2. History of Chemistry in Ancient and Medieval India, P. C. Ray, Editor P. Ray and B.G. Guha.
3. Ancient Indian Metallurgy, Ashoka Kumar Mishra, 2009
4. Copper and its Alloys in Ancient India, D. K. Chakrabarti, N. Lahiri, 1996.
5. Chemical Research of Sir P. C. Ray, S. Goswami and S. Bhattacharya, Resonance, 2001.
6. Life and Experiences of a Bengali Chemist, Vol I and II, P. C. Ray.