Course Code	Course Name	Credits
26CH902	FUNDAMENTAL OF CHEMISTRY	04

Course Objectives

- Understand the history and development of chemistry.
- Learn the fundamental behavior, properties, and nature of matter.
- Study chemical bonding and molecular structure.
- Gain knowledge of nuclear reactions and atomic processes.

Learning Outcomes

Upon successful completion of this course it is intended that a student will be able to:

- Understand the development of chemical concepts and their problem-solving approaches.
- Learn basic principles of organic, inorganic, physical, analytical, and biochemistry.
- Apply valency concepts to predict formulas, Lewis structures, and understand dative bonding.
- Identify nuclear reactions such as fission, fusion, and decay, and distinguish them from chemical changes.

Unit 1 - History and Development of Chemistry (12 Hrs.)

Early chemical practices: fire, metals, and natural materials; Greek ideas of elements and atoms; alchemy and contributions from Arab and Indian traditions; transition to modern chemistry and discovery of major gases; everyday chemistry in ancient times (dyes, perfumes, metals); basic idea of atomic structure and evolution of atomic models.

Unit 2 – Basic Concept of Chemistry (12 Hrs.)

Importance and applications of chemistry in daily life; matter and its states and properties; basic measurement and units; laws of chemical combination; atoms, molecules, and mole concept (introductory); periodic table and basic trends (size, electronegativity, ionization energy).

Unit 3 - Chemical Bonding and Structure (12 Hrs.)

Why atoms combine; ionic and covalent bonds; bond parameters—bond length, bond angle, bond enthalpy and bond order; Lewis structures and octet rule; Kössel–Lewis approach to bonding; basic idea of molecular shapes (VSEPR); hydrogen bonding and its importance.

Unit 4 – Introduction to Nuclear Chemistry (12 Hrs.)

Structure and stability of nucleus; radioactivity (alpha, beta, gamma decay); basic concept of half-life; applications in medicine, energy, and dating.

Unit 5 - Chemistry in Archaeology (12 Hrs.)

Role of chemistry in archaeology; basic techniques (radiocarbon dating, spectroscopy, chromatography); identification of materials (metals, pigments, organic remains); preservation and conservation of artifacts.

Reference Books:

1. H.J Arnikar, H.J,Essentials of Nuclear Chemistry, Second Edition, 1987 Wiley Blackwell Publishers.
2. H.J Arnikar,N.S Rajurkar, Nuclear Chemistry through Problems, 2016 New Age International Pvt. Ltd.
3. D.A. Skoog, F.J. Holler T.A. Nieman Principles of Instrumental Analysis, 2005 Thomson Asia Pvt. Ltd.
4. Asimov, A Short History of Chemistry.1895 Science, Doubleday and Company, Inc.
5. J. D Lee 5th Edition, Concise Inorganic Chemistry.2006 Blackwell Science Ltd.
6. B. M. Deb, The Peacock in Splendour: Science, Literature and Art in Ancient and Medieval India. 2015 Visva-Bharati Publishing, Kolkata.
7. Moore,T. John Chemistry Essential for Dummies.2010 Wiley Publishing, Inc.
8. Puri, Sharma & Kalia, 33rd edition 2020 Principles of Inorganic Chemistry, Vishal Publications.
9. J. D Lee 5th Edition, Concise Inorganic Chemistry.2006 Blackwell Science Ltd.
10. B. M. Deb, The Peacock in Splendour: Science, Literature and Art in Ancient and Medieval India. 2015 Visva-Bharati Publishing, Kolkata.

Websites and eLearning Sources:

1. https://nptel.ac.in/courses/104101090
2. https://www.scribd.com/document/745490179/APPLICATION-OF-NUCLEAR-CHEMISTRY
3. https://youtu.be/guuo5P9p-XU?si=IlfzncdrkGlDNM11

COs and Bloom's Taxonomy Mapping – 26CH902		
Course Outcomes	**On completing U.G. program the students will be able to**	**BTL**
CO1	Remember key historical milestones and discoveries in chemistry and understand their contribution to the modern concept of atomic structure.	K1, K2
CO2	Apply critical thinking, problem-solving, and communication skills to demonstrate scientific literacy and connect chemistry with other scientific fields.	K3
CO3	Analyze molecular structures and chemical bonding concepts to develop critical thinking and solve real-world problems.	K4
CO4	Evaluate data on radioactive decay and nuclear reactions using critical thinking to assess applications in nuclear chemistry.	K5
CO5	Create solutions to archaeological problems by applying chemical principles and techniques through real-world case studies.	K6

BTL K1 and K2 – remembering and understanding, K3- Applying, K4 – Analyse, K5- Evaluate and K6- Create

Relationship Matrix – 26CH902													
Course Outcomes	**Programme Outcomes (POs)**						**Programme Specific Outcomes (PSOs)**						**Mean Score of Cos**
	PO1	**PO2**	**PO3**	**PO4**	**PO5**	**PO6**	**PSO1**	**PSO2**	**PSO3**	**PSO4**	**PSO5**	**PSO6**	
CO1	2	2	1	2	1	1	2	2	2	1	1	2	1.58
CO2	3	3	2	3	3	1	3	3	3	2	1	1	2.33
CO3	3	3	3	3	2	2	3	3	3	3	1	2	2.58
CO4	3	3	3	2	1	2	3	3	3	3	2	2	2.50
CO5	3	3	3	1	2	2	3	3	3	3	1	3	2.50
												Total	2.29

Mean Score: 3- High, 2- Medium/Moderate, 1-Low

FULLY HUMAN
Fully Alive