



## FACULTY OF ENGINEERING & TECHNOLOGY

Effective from Academic Batch: 2025-26

Programme: Bachelor of Technology( FPT & DT )

Semester: 1

Course Code: 102000112

Title: General Chemistry

Course Group: Basic Science Course

Course Objectives: To empower students with basic principles of Chemical Sciences.

### Teaching & Examination Scheme:

Contact hours per week			Course Credits	Examination Marks (Maximum / Passing)				Total
Lecture	Tutorial	Practical		Theory		J/V/P*		
				Internal	External	Internal	External	
3	0	2	4	50/18	50/18	25/9	25/9	150/54

\* J: Jury; V: Viva; P: Practical

### Detailed Syllabus:

Sr.	Contents	Hours
1	<b>Introduction to Basic Concepts:</b> Periodic properties, ionization energies, electron affinity and electronegativity, polarizability, oxidation states, acids and bases, Lewis representations of simple molecules and ions & types of bonds	5
2	<b>Water Technology:</b> Sources of water, impurities in water, hardness of water, and its types, drawbacks of hard water- boiler problems, softening of water (external & internal treatments), waste water treatments, drinking water and requirements, desalination of brackish water.	8
3	<b>Metals, Alloys and Corrosion:</b> Definition and purpose of alloying, classification of alloys and their industrial applications, introduction to corrosion, mechanism and types of corrosion, corrosion prevention methodologies – protective coatings, inhibitors, cathodic protection.	5
4	<b>Polymers:</b> Definition & classification of polymers , polymerization and its mechanism, thermoplastics and thermosetting polymers, definition of rubber & its types , application of rubber, biodegradable polymers, commercially important polymers- PE, PP, PS, PVC, ABS, PMMA, and their uses.	8
5	<b>Fuels and Combustion:</b> Definition, types of fuel , calorific value, characteristics of good fuel, CNG, PNG , LPG & Biogas.	5



6	<b>Nanomaterials:</b> Introduction and application of nano materials, metal based nanoparticles, carbon nanotubes , synthesis: top down and bottom-up approaches , applications of nano-product in Food & Dairy Industry .	5
7	<b>Introduction to Analytical Techniques:</b> Measurement and understanding of pH, conductance, and potential, principles of IR, UV-visible and NMR spectroscopy techniques and their applications, introduction to chromatography techniques.	6

### List of Practicals/Tutorials:

1	Determination of acidity of water / beverages .
2	Estimation of Water Hardness.
3	Gravimetric Analysis of decomposition of $\text{Na}_2\text{CO}_3$ & $\text{NaHCO}_3$ .
4	Determination of Concentration of Unknown Solution using pH meter
5	To determine Alkalinity of a given Water Sample.
6	Determination of Saponification Value of Oil.
7	Determination of chloride content of water (titrimetric analysis).
8	To determine the moisture content in coal / food / dairy products.
9	To study Wet corrosion loss of steel by weight loss method by using electrochemical theory .
10	To understand the concept of heat sealability of polymer films : PP , HDPE etc
11	To understand the safety & regulatory aspects of nanotechnology in food packaging

### Reference Books:

1	Engineering Chemistry by Jain and Jain, Dhanpat Rai Publishing Co.
2	Essential of Physical Chemistry by Bahl and Tuli., S Chand & Co. Ltd, New Delhi.
3	Engineering Chemistry by Marry Jane & Shultz, Cengage Learning Publisher
4	Engineering Chemistry by N. Krishnamurthy, P. Vallinaygam and D. Madhavan, Prentice Hall of India Pvt. Ltd.
5	Engineering Chemistry by K. Sessa Maheswaramma and Mridula Chugh, Pearson India Education Pvt. Ltd.
6	Engineering Chemistry by B K. Sharma, Krishna Prakashan Media (P) Ltd.
7	A textbook of Engineering Chemistry by Shashi Chawla, Dhanpatrai Publishing Co. Ltd.
8	Fundamentals of Biotechnology by B D Singh, Kalyani Publisher. New Delhi.



## Supplementary learning Material:

1	Vogel's textbook of Quantitative Chemical Analysis, by Arthur I Vogel, Revised by Jeffery et al, Publisher: Addison Wesley, Longman Ltd, England
2	Laboratory Manual of Engineering Chemistry, by S K. Bhasin & Sudha Rani. Publisher: Dhanpat Rai Publishing Company Ltd.
3	Engineering Chemistry with Laboratory Experiments, by M S Kaurav. Publisher: PHI Learning Pvt. Ltd. New Delhi.
4	Engineering Chemistry with Laboratory Experiments, by R. P. Mani & Mishra. Publisher: Cen cage Publisher.

**Pedagogy: Following one or more points can be incorporated as relevant pedagogy methods.**

- Direct classroom teaching, Audio Visual presentations/demonstrations
- Assignments/Quiz, Continuous assessment, Interactive methods, Seminar/Poster Presentation, Industrial/ Field visits, Course Projects

## Internal Evaluation:

The internal evaluation comprised of written exam (40% weightage) along with combination of various components such as Certification courses, Assignments, Mini Project, Simulation, Model making, Case study, Group activity, Seminar, Poster Presentation, Unit test, Quiz, Class Participation, Attendance, Achievements etc. where individual component weightage should not exceed 20%.

### Suggested Specification table with Marks (Theory) (Revised Bloom's Taxonomy):

Distribution of Theory Marks in %						R: Remembering; U: Understanding; A: Applying; N: Analyzing; E: Evaluating; C: Creating
R	U	A	N	E	C	
10%	50%	20%	10%	10%	0%	

Note: This specification table shall be treated as a general guideline for students and teachers. The actual distribution of marks in the question paper may vary slightly from above table.

## Course Outcomes (CO):

Sr.	Course Outcome Statements	%weightage
CO-1	Relate periodic properties and analyze bonding & structure of molecules.	10
CO-2	Importance of basic requirements of water and nutrients	10
CO-3	Describe the importance and relevance of chemistry in food & dairy industry	10
CO-4	Selection of appropriate polymers & nanomaterials and its utilization in food & dairy industry.	50
CO-5	Exposure of basic analytical techniques for food & dairy industry	10
CO-6	Interpret scientific methods as a logical means of problem solving	10

## Curriculum Revision:

Version:	3
Drafted on (Month-Year):	April - 2025



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Last Reviewed on (Month-Year):	May - 2025
Next Review on (Month-Year):	April - 2028



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