



# FIRST YEAR B.TECH

ACADEMIC YEAR 2026–27

## Curriculum Structure and Courses Semester I & II



01

**Engineering Chemistry**

**3 Credits • Theory + Lab**



02

**Emerging Technologies  
in Energy Storage**

**1 Credit • Theory**



03

**Nanomaterials for  
Emerging Technologies**

**1 Credit • Theory**

# SEMESTER I & II • CURRICULUM STRUCTURE

## Teaching Scheme & Credit Snapshot

|    | Course                                  | Category | L | T | P | S | Cr | Mode         |
|----|-----------------------------------------|----------|---|---|---|---|----|--------------|
| 01 | Engineering Chemistry                   | BSC      | 2 | 0 | 2 | 1 | 3  | Theory + Lab |
| 02 | Emerging Technologies in Energy Storage | BSC      | 1 | 0 | 0 | 1 | 1  | Theory       |
| 03 | Nanomaterials for Emerging Technologies | BSC      | 1 | 0 | 0 | 1 | 1  | Theory       |

*L = Lecture • T = Tutorial • P = Practical • S = Self Study • Cr = Credits*



**3 COURSES • 5 CREDITS**

**Basic Science foundation courses spanning Materials, Energy, and Sustainability — built to connect with every engineering branch.**

**3**

Credits  
Core Course

**2**

Credits  
Elective

# SEMESTER I & II AS-I



## Engineering Chemistry

*Materials + Energy +  
Water + Sustainability*

3 Credits (2L + 2P + 1S)

L-T-P-S: 2-0-2-1

CIE-TA 20 + MSE 30 • ESE 50

### Key Learnings

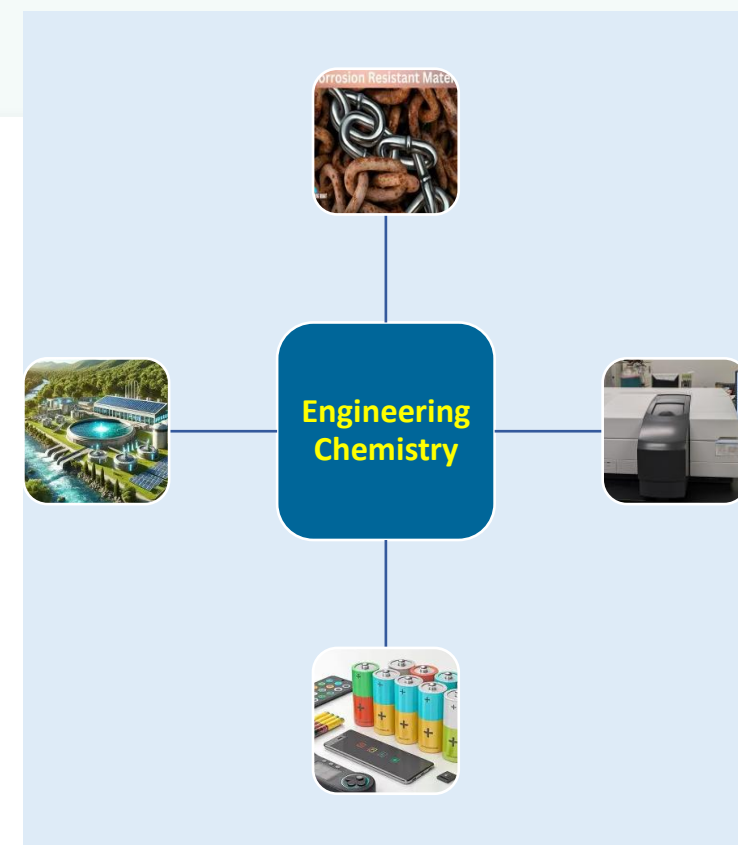
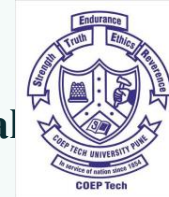
- Analytical techniques: UV/VIS, IR, XRD, SEM, TEM, chromatography & thermogravimetry.
- Corrosion mechanisms, forms, factors affecting the rate, and prevention.
- Electrochemical energy systems, batteries, water technology
- Laboratory: chemical analysis, pH meter, colorimetry, water hardness, chloride, corrosion studies.

### Relevance To Engineering Branches

- Apply materials selection, corrosion control and process-water principles in **Mechanical / Manufacturing Engineering**.
- Analyze material characterization, corrosion, electrochemistry and advanced materials in **Metallurgy & Materials Technology**.
- Apply electrochemical principles to batteries, corrosion protection and energy systems in **Electrical / E&TC / Instrumentation Engineering**.
- Evaluate water quality, infrastructure corrosion and sustainable materials in **Civil Engineering**.
- Integrate AI-assisted materials discovery, environmental monitoring and sustainable technologies in **CSE / AI Engineering**.

### Importance

- Connects chemistry with material energy, corrosion, and water.
- Builds hands-on skills in experiments, instrumental analysis, and data interpretation.



# SEMESTER I & II AS-II



## Emerging Technologies in Energy Storage

*Advanced Batteries +  
Recycling + Hydrogen →  
Clean Energy*

1 Credit (1L + 1S)

L-T-P-S: 1-0-0-1

CIE-TA 20 • ESE 30

### Key Learnings

- Next-generation batteries: solid-state, lithium–sulphur, lithium–air & sodium-ion.
- Battery recycling and recovery of valuable materials.
- Hydrogen production, storage, and safety.

### Relevance To Engineering Branches

- Apply battery thermal management and hydrogen transport principles in **Mechanical / Manufacturing / Production Engineering**.
- Analyze solid electrolytes, electrodes and material recovery in **Metallurgical & Materials Engineering**.
- Apply battery, EV and grid-storage concepts in **Electrical Engineering**.
- Apply sensors, compact batteries and energy-efficient systems in **EnTC / Instrumentation Engineering**.
- Apply renewable energy and battery-waste management concepts in **Civil Engineering**.
- Analyze BMS, smart grids, energy data and energy optimization in **Computer / AI Engineering**.

### Importance

- Understand advanced energy storage for EVs, portable electronics & grid-scale use.
- Connect battery recycling and hydrogen technologies with sustainable energy systems.



# SEMESTER I & II AS-II



## Nanomaterials for Emerging Technologies

*Advanced Materials •  
Energy • Electronics •  
Environment*

1 Credit (1L + 1S)

L-T-P-S: 1-0-0-1

CIE-TA 20 • ESE 30

### Key Learnings

- Classification, properties, and synthesis techniques of nanomaterials.
- Structure–property relationships.
- Applications in emerging technologies across industries.
- Foundation for advanced electronic, semiconducting & composite materials.

### Relevance To Engineering Branches

- Apply nanocomposites and wear-resistant coatings in **Mechanical / Manufacturing Engineering**.
- Analyze nanostructures, surface engineering and material characterization in **Metallurgy & Materials Engineering**.
- Apply nanoelectronics, semiconductors, sensors and battery concepts in **Electrical / E&TC Engineering**.
- Analyze nanosensors and biosensors in **Instrumentation Engineering**.
- Apply nano-modified concrete and nanomaterials for water purification in **Civil Engineering**.
- Analyze nanoelectronics and emerging computing technologies in **CSE / AI Engineering**.

### Importance

- Develop the ability to understand and select advanced nanomaterials.
- Build a foundation in sustainable technologies and real-world engineering applications.

