



COEP TECHNOLOGICAL UNIVERSITY, PUNE
A Unitary Public University of Government of Maharashtra
(formerly College of Engineering Pune)
School of Transdisciplinary Sciences & Management
Wellesley Road, Chhatrapati Shivajinagar, Pune - 411005.



Course Title: Engineering Chemistry

Course Code: AS-23002

Course Code	AS23002	Scheme of Evaluation	MSE & ESE
Teaching Plan (L-T-P-S)=TC	2-0-0-1= 2	TA + MID Semester	20+30
Credits	2	END Semester	50

Syllabus: Engineering Chemistry Theory

Unit	Contents	L
01.	Analytical Techniques for Engineers <ul style="list-style-type: none">• Role of materials in engineering field.• Qualitative and quantitative analysis• Emerging trends and applications of analytical techniques for engineering.• Overview of instrumental methods of analysis: spectroscopy (UV and IR), chromatography (GLC and HPLC), Microscopy: SEM, Thermogravimetry: TGA.• One analytical technique in detail.	7
02.	Corrosion and material protection <ul style="list-style-type: none">• Introduction to corrosion and its impact on engineering materials• Mechanisms of corrosion phenomena.• Types/forms of corrosion,• Factors responsible to enhance rate of corrosion• Various corrosion prevention techniques.	7
03.	Electrochemical energy systems <ul style="list-style-type: none">• Significance of energy storage systems.• High energy electrochemical energy storage systems and battery characteristics.• New emerging battery - principle, construction, working, advantages and applications.• New emerging Fuel cell- principle, construction, working, advantages and applications.• Hydrogen technology.	7
04.	Nanomaterials for electronics <ul style="list-style-type: none">• Introduction of Nanomaterials.• Classification of nanomaterials.• Nanoscale phenomena and quantum effects.• Top-down and bottom-up approach.• Various methods for synthesis of nanoparticles.• Applications of nanomaterials in electronics. <p>OR</p>	7

	Water Technology <ul style="list-style-type: none"> Sources of water and impurities present in it. Characteristics of hard water - hardness in water and its determination by EDTA method and numericals. Effects of hard water for industrial use. Various water softening techniques for industrial use. Water softening techniques for potable water. 	
	Self study - Green Chemistry (12 principles and industrial case studies)	

Course outcomes:

Students will be able to:

CO1: Appreciate the role of engineering materials and apply analytical techniques for the analysis of materials.

CO2: Analyze and solve problems related to corrosion using recent techniques.

CO3: Appraise the current developments in energy conversion and storage systems, green chemistry for sustainable development.

CO4: Appraise the ability to choose the nanomaterials for various applications.

OR

CO4: Appreciate the role of water quality, analyze, and solve water-related industrial problems.

Course Title: Engineering Chemistry Laboratory

Course Code	AS23002	Scheme of Evaluation	CE & ESE
Teaching Plan (L-T-P-S)=TC	0-0-2-0 = 2	CE	50
Credits	1	ESE- Oral+ Experiment	50

List of Experiments:

- Preparation and standardization of analytical reagents.
- pH-metric analysis of a sample solution using pH-meter.
- Analysis of inorganic solution by spectroscopic method (colorimetry).
- Estimation of copper from brass by iodometry.
- Determination of hardness of water sample by EDTA method.
- Determination of total alkalinity of water sample.
- Synthesis of nano-materials by green route (co-precipitation method).
- Determination of chloride content in water sample

Course Outcome:

Students will be able to:

CO1: Apply theoretical knowledge for practical use and solve engineering problems.

CO2: Design and carry out scientific experiments, accurately record and analyze the results of experiments.

Suggested learning resources:

1. Instrumental Methods of Chemical analysis: Willard Dean, Merritte, Tata MacGrow Hill Limited.
2. Instrumental Methods of Chemical analysis: Gurdeep R. Chatwal, Himalaya Publishing house.
3. A textbook of Engineering Chemistry: Jain and Jain, Dhanpatrai Publication.
4. A textbook of Engineering Chemistry: S. S. Dara, S. Chand Publication 2010 edn.
5. A textbook of Engineering Chemistry: Shashi Chawla, Dhanpatrai Publication.
6. Battery Technologies: Materials and Components: Prof. Jianmin Ma, Wiley
7. Introduction to Nanotechnology: Charles P. Poole, Frank J. Owens.
8. Fuel Cells- Shripad Revankar, Pradeep Majumdar.
9. Fuel Cell Fundamentals-Ryan O'Hayre, Suk-Won Cha
10. Waste Water Treatment: Rao M.N.
11. Water and Wastewater Technology: Mark J. Hammer
