

# **Semester I**

CY25C01	Applied Chemistry – I	L	T	P	C
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<p><b>Course Objectives:</b></p> <ul style="list-style-type: none"> <li>To provide students with a solid understanding of the chemical principles for engineering applications.</li> <li>To introduce the chemical properties of materials and how these properties influence the selection and use of materials in engineering systems.</li> <li>To impart practical applications of chemistry in commonly used engineering devices</li> </ul>					
<p><b>Water Technology:</b> Water quality parameters and standards. Industrial feed water, Remediation. Municipal water treatment. Desalination.</p> <p><b>Practical:</b> Analysis of alkalinity, hardness and dissolved oxygen.</p> <p>Activity: Coagulation of water sample using Alum</p>					
<p><b>Nano-chemistry:</b> Classification, Size, dependent properties. Preparation of nanomaterials, Top-down and Bottom-Up approaches, Applications (Flipped classroom).</p> <p><b>Practical:</b> Preparation of nanoparticles by Sol-Gel method.</p>					
<p><b>Electrochemistry:</b> Electrochemical cell, Electrode potential., Redox reaction. Conductivity of electrolytes, Factors.</p> <p><b>Practical:</b> Conductometric titrations</p> <p><b>Activity:</b> Electrochemical cell demonstration</p>					
<p><b>Corrosion &amp; Control:</b> Chemical and electrochemical corrosions, galvanic series, factors influencing corrosion, Electrochemical protection. Organic and Inorganic coating.</p> <p><b>Practical:</b></p> <ul style="list-style-type: none"> <li>Corrosion study by weight loss and salt spray method.</li> <li>Potentiometry/UV-visible spectrophotometer.</li> </ul> <p><b>Activities:</b> Case Study on Corrosion in Pipelines and Electronics, Control measures for a corroded metal</p>					
<p><b>Batteries:</b> Conventional, Contemporary and Emerging battery storage technologies, Primary &amp; Secondary Batteries, Battery Pack, Battery Materials, Performance Parameters, Testing, Safety aspects.</p> <p><b>Practical:</b> Measurement of EMF, Internal Resistance, Charge and Discharge Characteristics.</p> <p><b>Activities:</b> Demonstration of battery pack in e-vehicles.</p>					
<p><b>Weightage:</b> Continuous Assessment: 50%, End Semester Examinations: 50%</p>					
<p><b>Assessment Methodology:</b> Quiz (5%), Assignments (20%), Flipped Class (5%), Practical (30%), Internal Examinations (40%)</p>					
<p><b>References:</b></p> <ol style="list-style-type: none"> <li>Jain, P. C., &amp; Jain, M. (2015). Engineering Chemistry (17th ed.). Dhanpat Rai Publishing Company (P) Ltd.</li> </ol>					

2. Dara, S. S. (2004). A Textbook of Engineering Chemistry. Chand Publications.
3. Sachdeva, M. V. (2011). Basics of Nano Chemistry. Anmol Publications Pvt Ltd.
4. Friedrich, E. (2014). Engineering Chemistry. Medtech.

**E-Resources:**

1. Water and Wastewater Engineering (Prof. Ligy Philip, IIT Madras) – <https://nptel.ac.in/courses/105106202>.
2. Electrochemical Energy Systems (Prof. S. Mitra, IIT Madras) – <https://nptel.ac.in/courses/113106028>.
3. Corrosion (Prof. Kallol Mondal, IIT Kanpur) – <https://nptel.ac.in/courses/112104088>
4. Chemistry of Battery Systems (Prof. V. R. Marathe, IIT Madras) – <https://nptel.ac.in/courses/115106130>
5. Resource on all battery types, testing, and safety – <https://batteryuniversity.com/articles>

	Description of CO	PO	PSO1	PSO2	PSO3
CO1	Understand the importance of chemistry applications with underlying mechanisms.	---			
CO2	Apply the chemistry concepts in widely used devices.	PO1(3)			
CO3	Analyse the effect of various chemical parameters on performance of engineering systems.	PO2(2)			
CO4	Perform experimentations as a group and interpret the results.	PO4(3) PO8(1)			
CO5	Communicate findings through case studies and reports	PO9(1)			