

Course Code	Course Name	Credits
26CH106	INDUSTRIAL CHEMISTRY	04

Course Objectives

- To understand the composition, properties, and industrial applications of ceramics, fuels, paints, and detergents.
- To explain the preparation, properties, and uses of explosives and fermentation-based products.
- To analyze the principles of drug design, synthesis, and applications of pharmaceuticals.

Learning Outcomes

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

- Understand the composition, properties, and manufacturing processes of ceramics, glass, fuels, and paints.
- Explain the chemistry and applications of cleansing agents, detergents, and industrial cleaning materials.
- Apply chemical principles in the preparation and properties of explosives and rocket propellants.
- Evaluate industrial processes including fermentation and pharmaceutical drug synthesis and development.

Unit 1 - Ceramics (12 Hrs.)

Important clays and feldspar; Glazing and vitrification; Glass; Types of glass; Composition of glass; Manufacture of optical glass, coloured glass, lead glass, and neutron absorbing glass; Fuels; Liquid fuels; Petroleum; Origin of petroleum; Refining; Cracking; Reforming; Flash point; Fire point; Knocking; Octane number; LPG; Synthetic petrol.

Unit 2 – Paints and Varnishes (12 Hrs.)

Primary constituents of paints; Dispersion medium (solvent); Binder; Pigments; Oil-based paints; Latex paints; Baked-on paints (alkyd resins); Formulation of paints and varnishes; Requirements of a good paint; Cleansing agents; Preparation of toilet and washing soaps; Synthetic detergents; Alkyl and aryl sulphonates; Fatty alcohol sulphates; Ethanolamines; Non-ionic detergents; Builders; Additives; Corrosion inhibitors.

Unit 3 - Chemical Explosive (12 Hrs.)

Origin of explosive properties in organic compounds; Preparation and explosive properties of lead azide; PETN; Cyclonite (RDX); Nitrocellulose; TNT; Picric acid; Gun powder; Cordite; Dynamite; Introduction to rocket propellants.

Unit 4 – Fermentation Industries (12 Hrs.)

Aerobic and anaerobic fermentation; Production of ethyl alcohol; Beer; Spirits; Wines; Vinegar; Citric acid; Antibiotics; Penicillin; Cephalosporin; Chloromycetin; Streptomycin; Lysine; Glutamic acid; Vitamin B₂; Vitamin B₁₂; Vitamin C.

Unit 5 - Drugs and Pharmaceuticals (12 Hrs.)

Drug discovery, design and development; Basic retrosynthetic approach; Synthesis of representative drugs of the following classes: Analgesic agents; Antipyretic agents; Anti-inflammatory agents (aspirin, paracetamol, ibuprofen); Antibiotics (chloramphenicol); Antibacterial and antifungal agents (sulphonamides, sulphamethoxazole, sulphacetamide, trimethoprim); Antiviral agents (acyclovir); Central nervous system agents (phenobarbital, diazepam); Cardiovascular agents (glyceryl trinitrate); Antileprosy drugs (dapsone); HIV–AIDS related drugs (AZT – zidovudine).

Reference Books:

- E. Stocchi, Industrial Chemistry, Vol -I, Ellis Horwood Ltd. UK.
- P.C. Jain, M. Jain, Engineering Chemistry, Dhanpat Rai & Sons, Delhi.
- B.K. Sharma, Industrial Chemistry, Goel Publishing House, Meerut.
- G.L. Patrick, Introduction to Medicinal Chemistry, Oxford University Press, UK.
- Hakishan, V.K. Kapoor, Medicinal and Pharmaceutical Chemistry, Vallabh Prakashan, Pitampura, New Delhi.
- William O. Foye, Thomas L., Lemke, David A. William, Principles of Medicinal Chemistry, B.I. Waverly Pvt Ltd. New Delhi.

Websites and eLearning Sources:

- <https://nptel.ac.in/courses/103107082>
- https://www.youtube.com/watch?v=mym1rRPX6F4&list=PLLnAFJxOjzZs8uuljB_7T4otrip_evaVz

COs and Bloom's Taxonomy Mapping – 26CH106		
Course Outcomes	On completing U.G. program the students will be able to	BTL
CO1	Understanding the basic of ceramics, glass and fuels and remembering their physical and chemical properties.	K1, K2
CO2	Categorized the paints and varnishes and utilization and synthesizing different cleansing agent.	K3
CO3	Utilization the different chemical component and synthesizing and preparation explosive and gunpowder.	K4
CO4	Production of different alcohol product using fermentation technique as well as antibiotics and streptomycin for medicinal purposes.	K5
CO5	Designing different drugs and their pathways for the effective treatment of various diseases.	K6

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

Relationship Matrix – 26CH106													
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	3	2	2	1	1	1	2	2	1	1	1	1	1.5
CO2	3	2	2	2	2	1	3	2	2	1	1	1	1.83
CO3	3	3	2	2	2	1	3	3	2	2	1	1	2.08
CO4	3	3	3	2	2	1	3	3	2	3	2	1	2.33
CO5	3	3	3	3	2	1	3	3	3	3	2	1	2.5
Total													2.04

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

