

INDUSTRIAL CHEMISTRY

Semester	Subject Code	Category	Lecture Hours		Theory hours		Practical hours		Credits
			Per week	Per sem.	Per week	Per sem.	Per week	Per sem.	
VI	21SCH6A	Skill based- IV	2	30	2	30	-	-	2

COURSE OBJECTIVES:

The students will be able to

- Impart knowledge about milk products, soil, fertilizers, insecticides, basics of nanochemistry, manufacture of cement, glass and petrochemicals.

COURSE OUTCOMES:

On the successful completion of the course, students will be able to

CO Number	CO Statement	Knowledge Level (K1-K4)
CO1	Learn about the composition of milk, processing of milk and milk products.	K3
CO2	Gain knowledge about the classification of soil and various properties of soil.	K2
CO3	Understand various types of fertilizers and insecticides and ill effects of application of fertilizers and insecticides in soil.	K2
CO4	Gain knowledge about nanochemistry, types of nanoparticles and their applications.	K2
CO5	Learn about manufacturing process of cement, glass and petrochemical products.	K3

*CO – Course Outcomes

Knowledge Level: K1 – Remember; K2 – Understand; K3 – Apply; K4 – Analyze.

MAPPING WITH PROGRAMME OUTCOMES:

COS	PO1	PO2	PO3	PO4	PO5	PO6
CO1	S	S	S	M	M	S
CO2	S	S	M	M	S	S
CO3	S	S	M	S	M	S
CO4	S	M	S	S	S	S
CO5	S	S	M	M	S	S

(S – Strong; M – Medium; L – Low)

UNIT-I: Milk**6 Hours**

- 1.1 Definition – General Composition – Physicochemical changes taking place in milk due to Boiling – Pasteurization, Sterilization and Homogenization, Toned and double toned milk, physical properties of milk.
- 1.2 Definition and composition of Creams, Butter, Ghee, cheese and Ice creams – Milk powder – Definition – Need for Making milk powder – Principles involved in drying process – Spray drying and Drum drying.

UNIT-II: Leather Chemistry**6 Hours**

- 2.1 Introduction –Elementary knowledge of the structure and composition of Hides, skin, leather – Chief process used in leather manufacture –Pre-tanning, tanning, dyeing, fixing – finishing Structure of hide and skin.
- 2.2 Leather processing – Process before tanning – Tanning process – Vegetable tanning – Chrome tanning and Mineral tanning – Chrome Dyeing and fat liquoring – Leather finishing – Oil tanning – By products

UNIT-III: Fertilizers and Insecticides**6 Hours**

- 3.1 Fertilizers – Definition – Classification – Primary nutrients – Requirements of a Good Fertilizer – Nitrogen Fertilizers – Urea – Preparation and Uses – Potash Fertilizers – KCl, K_2SO_4 and KNO_3 – Preparation and Uses – Phosphorous Fertilizers – Phosphatic Slag, Superphosphate of Lime and Triple Superphosphate – Preparation and Uses – NPK Fertilizer.
- 3.2 Secondary Nutrients – Advantages – Role of Micronutrients – Composting and Manures – Insecticides – Classification and Examples – Fluoride Compounds, Boron Compounds and Pyridine Compounds – Ill effects of continuous use of chemical Fertilizers and Insecticides.

UNIT-IV: Basics of Nanochemistry**6 Hours**

- 4.1 Introduction – Definition – Length Scales – Importance of nanoscale and its technology – Self assembly of materials – Self Assembly of Molecules – Porous solids.
- 4.2 Nanowires, Nanomachines and Quantum Dots – Types of Nanoparticles – Applications and toxic effects of Nanomaterials.

UNIT-V: Cement and Petrochemicals**6 Hours**

- 5.1 Composition and Setting of cement – Manufacturing of Cement – Examples for Pigments – Constituents of Paints and their functions – Types of Glasses – Manufacture of Glass.
- 5.2 Petrochemicals (Elementary study) – Definition - Chemicals from Natural Gas, Petroleum, Light Naphtha and Kerosene – Origin – Composition – Synthetic gasoline.

Demonstration experiments:

- Preparation of Paneer
- Determination of quality of the milk (Methylene blue reduction test)
- Detection of Adulteration in milk (starch and cane sugar)
- Preparation of composting and manure
- Preparation of simple metal oxide (CuO and ZnO) nanoparticles.

TEXT BOOKS:

S. No.	Authors	Title	Publishers	Year of publication
1.	Jayashree Ghosh	A Textbook of Applied Chemistry	Sultan Chand	2006
2.	P. N. Sudha	A Textbook of Applied Chemistry	Supra Associates	2007
3.	K. Bagavathi Sundari	Applied Chemistry	MJP publishers	2006
4.	S. Shanmugam	Nanotechnology	MJP Publishers, Chennai	2010

REFERENCE BOOKS:

S. No.	Authors	Title	Publishers	Year of publication
1.	B. K. Sharma	Industrial Chemistry	Goel Publications	1983
2.	R. K. Das	Industrial Chemistry	Kalyani Publications, New Delhi	1982
3.	P. L. Soni	Inorganic Chemistry	Sultan Chand	2006
4.	CNR Rao, A. Muller and A. K. Cheetham	The Chemistry of Nanomaterials: Synthesis, Properties and Applications, Vol. I and II,	Springer	2006
5.	G. B. Segreev	Nanochemistry	Elsevier, Science, New York,	2006

TEACHING METHODOLOGY:

- Power Point Presentations
- Assignments
- Animated videos
- Chalk and Board
- Group discussion

SYLLABUS DESIGNER:

- Dr. R. Arunadevi, Assistant Professor of Chemistry