



ARSD College, University of Delhi

Model Course Handout/Lesson Plan

Course Name : B.Sc. (APS) Industrial Chemistry						
Semester	CourseCode	Course Title	Lecture (L)	Tutorial(T)	Practical (P)	Credit (C)
IV	CORE COURSE INDUSTRIAL CHEMISTRY-4	Pharmaceuticals, Fermentation, Pesticides and Perfumes	04		02	06
Teacher/Instructor(s)		Neeraj Mishra				
Session		2021-2022				

Course Objective:

The objectives of this paper are to provide basic knowledge of chemistry of pharmaceuticals, cosmetics, perfumes and pesticides considering their importance for human beings. This paper is designed in a manner that it forms a cardinal part of the learning of industrial chemistry for the students. The paper has been designed to impart the theoretical and practical knowledge on the basic chemistry and uses of various pharmaceuticals, cosmetic products and pesticides.

Course Learning Outcomes:

By the end of this course, students will be able to:

- Have sound knowledge of pharmaceuticals, cosmetics, perfumes and pesticides.
- Become well equipped to design, carry out, record and analyze the industrial preparations
- Understand the ethical, historic, philosophical, and environmental dimensions of problems and issues facing industrial chemists.
- Become skilled in problem solving, critical thinking and analytical reasoning.
- Identify and solve chemical problems and explore new innovative areas of research.
- Know the proper procedures and regulations for safe handling and use of chemicals and can follow the proper procedure

Lesson Plan:

Unit No.	Learning Objective	Lecture No.	Topics to be covered
1.	Introduction	3	Drugs and Pharmaceuticals Drug discovery, design and development; Retrosynthetic approach (with any two examples).
		4	Synthesis of the representative drugs of the following classes: analgesics, antipyretics, anti-inflammatory agents (Aspirin, Paracetamol, Ibuprofen)
		4	Antibiotics (Penicillin, Cephalosporin, Chloromycetin, Streptomycin and Chloramphenicol)
		4	Antibacterial and antifungal agents (Sulphonamides, Sulphanethoxazol, Sulphacetamide, Trimethoprim)
		5	Antiviral agents (Acyclovir). Central Nervous System agents (Phenobarbital, Diazepam), Cardiovascular drugs (Glyceryltrinitrate), antileprosy drug (Dapsone), HIV-AIDS related drugs (AZT- Zidovudine).
2.	Cosmetics & Perfumes	1	Introduction to cosmetics and perfumes.
		4	Preparation and uses of the following: Hair dye, hair spray. Shampoo. Sun-tan lotions, face powder, lipsticks. talcum powder, nail enamel, creams (cold, vanishing and shaving creams)
		5	Antiperspirants and artificial flavors. Essential oils and their importance in cosmetic industries with reference to Eugenol. Geraniol, Sandalwood oil, Eucalyptus, Rose oil, Jasmone, Civetone, Muscone
		5	Antiperspirants and artificial flavours. Essential oils and their importance in cosmetic industries with reference to Eugenol. Geraniol, Sandalwood oil, Eucalyptus, Rose oil, Jasmone, Civetone, Muscone
3.	Pesticides	3	Introduction to pesticides (natural and synthetic), benefits and adverse effects, changing concepts of pesticides.
		12	Structure activity relationship, synthesis and technical manufacture, uses of representative pesticides in the following classes: Organochlorines (DDT, Gammexene), Organophosphates (Malathion, Parathion), Carbamates (Carbofuran and carbaryl), Quinones (Chloranil), Anilides (Alachlor and Butachlor).

4.		10	Aerobic and anaerobic fermentation. Production of (i) Ethyl alcohol and citric acid; (ii) Lysine, Glutamic acid, Vitamin B2, Vitamin B12, Vitamin C.
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Evaluation Scheme:

No.	Component	Duration	Marks
1.	Internal Assessment		25
	• Quiz		
	• Class Test		
	• Attendance		
	• Assignment		
2.	End Semester Examination	3 hr	75

Details of the Course

Unit 1

Drugs and Pharmaceuticals

Drug discovery, design and development; Retrosynthetic approach (with any two examples). Synthesis of the representative drugs of the following classes: analgesics, antipyretics, anti-inflammatory agents (Aspirin, Paracetamol, Ibuprofen), antibiotics (Penicillin, Cephalosporin, Chloromycetin, Streptomycin and Chloramphenicol); antibacterial and antifungal agents (Sulphonamides, Sulphanethoxazol, Sulphacetamide, Trimethoprim); antiviral agents (Acyclovir). Central Nervous System agents (Phenobarbital, Diazepam), Cardiovascular drugs (Glyceryl trinitrate), antileprosy drug (Dapsone), HIV-AIDS related drugs (AZT- Zidovudine).

(Lectures: 20)

Unit 2

Cosmetics and Perfumes

Introduction to cosmetics and perfumes, preparation and uses of the following: Hair dye, hair spray. Shampoo. Sun-tan lotions, face powder, lipsticks. talcum powder, nail enamel, creams (cold, vanishing and shaving creams), antiperspirants and artificial flavours. Essential oils and their importance in cosmetic industries with reference to Eugenol. Geraniol, Sandalwood oil, Eucalyptus, Rose oil, Jasmone, Civetone, Muscone

(Lectures: 15)

Unit 3

Pesticides

Introduction to pesticides (natural and synthetic), benefits and adverse effects, changing concepts of pesticides. Structure activity relationship, synthesis and technical manufacture, uses of representative pesticides in the following classes: Organochlorines (DDT, Gammexene), Organophosphates (Malathion, Parathion), Carbamates (Carbofuran and carbaryl), Quinones (Chloranil), Anilides (Alachlor and Butachlor).

(Lectures: 15)

Unit 4

Fermentation

Aerobic and anaerobic fermentation. Production of (i) Ethyl alcohol and citric acid; (ii) Lysine, Glutamic acid, Vitamin B2, Vitamin B12, Vitamin C

(Lectures: 10)

Suggested Books:		
Sl. No.	Name of Authors/Books/Publishers	Year of Publication/Reprint
1	Vermani, O. P.; Narula, A. K. Industrial Chemistry , Galgotia Publications Pvt. Ltd., New Delhi	(2004)
2	Bhatia, S. C. Chemical Process Industries , Vol. I&II, CBS Publishers, New Delhi.	(2004)
3	Barel, A.O.; Paye, M.; Maibach, H.I. Handbook of Cosmetic Science and Technology , CRC Press	(2014)
4	Gupta, P.K.; Gupta, S., Pharmaceutics and Cosmetics , Pragati Prakashan	(2011)
Mode of Evaluation:		Internal Assessment / End Semester Exam

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