

UNIVERSITY OF MADRAS
B.Sc. DEGREE PROGRAMME IN CHEMISTRY
 SYLLABUS WITH EFFECT FROM 2023-2024

Title of the Course	PESTICIDE CHEMISTRY						
Paper No.	Skill Enhancement Course V (Discipline specific) SEC-5						
Category	Skill Enhancement Course	Year II	Semester III	Credits	2	Course Code	224S3B
Instructional hours per week	Lecture	Tutorial	Lab Practice		Total		
	2	-	-		2		
Prerequisites	Fundamentals in chemistry						
Objectives of the course	This course aims to providing the students <ul style="list-style-type: none"> • Knowledge about the various types of pesticides and their toxicity. • to understand the accumulation of pesticides in in the form of residues and its analysis. • knowledge on choice of alternate and eco-friendly pesticides. 						
Course Outline	Unit I Introduction: History of pesticides. Chemistry of Pesticides: Brief introduction to classes of pesticides (Chemical class, targets), structures, chemical names, physical and chemical properties. Toxicity of pesticides: Acute and chronic toxicity in mammals, birds, aquatic species etc. Methods of analysis of pesticides. Insecticides: Classification and study of following insecticides with respect to structure, chemical name, physical properties, chemical properties, synthesis, degradation, metabolism, formulations, Mode of action, uses, toxicity. Organophosphates and Phosphothionates: Acephate, Chlorpyrifos, Monocrotophos, and parathion-methyl. Organochlorine – Endosulfan, heptachlor; Carbamate: Cartap hydrochloride, Methomyl, Propoxur.						

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	<p>Unit II Pesticides residues: Introduction- application of agrochemicals, dissemination pathways of pesticides, causes of pesticide residues, remedies. Pesticides residues in atmosphere- entry into atmosphere, action of pesticides, effects on environments. Pesticides residues in water - entry into water systems, action and effect in aquatic environment. Pesticides residues in soil. entry into soil, absorption, retention and transport in soil, effects on microorganism, soil condition and fertility, decomposition and degradation by climatic factors and microorganism.</p> <p>Pesticide Residues effect and analysis: Effects of pesticides residue on human life, birds and animals- routes for exposure to pesticides, action of pesticides on living system. Analysis of pesticides residues- sample preparation, extraction of pesticides residues (soil, water and vegetables/fruits) simple methods and schemes of analysis, multi-residue analysis.</p>
	<p>Unit III Biopesticides: Pheromones, attractants, repellents – Introduction, types and application (8- Dodecen-1-ol, 10-cis-12-hexadecadienoic, Trimedlure, Cue-lure, methyl eugenol, N,N- Diethyl-m-toluamide, Dimethyl phthalate, Icaridin). Baits- Metaldehyde, Iron (II)phosphate, Indoxacarb, Zinc Phosphide, Bromadiolone.</p>
Extended Professional Component (is a part of internal component only, not to be included in the external examination question paper)	Questions related to the above topics, from various competitive examinations UPSC/ JAM /TNPSC others to be solved (To be discussed during the Tutorial hours)
Skills acquired from this course	Knowledge, Problem solving, Analytical ability, Professional Competency, Professional Communication and Transferable skills.
Recommended Text	<ol style="list-style-type: none"> 1. Handa SK. Principles of pesticide chemistry. Agrobios (India);2012. 2. Matolcsy G, Nádasy M, Andriska V. Pesticide chemistry. Elsevier; 1989. 3. J. Miyamoto and P. C. Kearney Pesticide Chemistry Human Welfare and the Environment vol. IV Pesticide Residue and Formulation Chemistry, Pergamonpress,1985. 4. R. Cremlyn: Pesticides, John Wiley.

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Reference Books	1. Roy N. K., Chemistry of Pesticides. CBS Publisher & Distributors P Ltd; 1st Ed.(2010). 2. Nollet L.M., Rathore H.S., Handbook of pesticides: methods of pesticide residues analysis. CRC press;2016. 3. Ellerbrock R.H., Pesticide Residues: Significance, Management and Analysis,2005
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Course Learning Outcomes (for Mapping with POs and PSOs) On completion of the course the students should be able to

CO 1: teach about the pesticides and their toxicity with respect to structure and category.

CO 2: explain the preparation and property of pesticides

CO 3: investigate the pesticide residues, prevention and care

CO 4: demonstrate the extraction and analytical methods of pesticide residues

CO 5: make awareness to the public on bio-pesticides

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10
CO1	S	S	S	S	S	S	S	M	S	M
CO2	M	S	S	S	M	S	S	M	M	M
CO3	S	S	S	M	S	S	S	M	S	M
CO4	S	S	S	S	S	S	S	M	M	M
CO5	S	M	S	S	S	S	S	M	M	S

CO-PO Mapping (Course Articulation Matrix)

CO /PO	PO1	PO2	PO3	PO4	PO5
CO1	3	3	3	3	3
CO2	3	3	3	3	3
CO3	3	3	3	3	3
CO4	3	3	3	3	3
CO5	3	3	3	3	3
Weightage	15	15	15	15	15
Weighted percentage of Course Contribution to POs	3.0	3.0	3.0	3.0	3.0

Level of Correlation between PO's and CO's