

# Agrochemistry

Course	Details			
Code				
Title	Agrochemistry			
Degree	B.Sc.			
Branch	Chemistry			
Year/Semester	S5/S6			
Type	Extracurricular/Additional course			
Credits	Hrs/week		Total hours	30 h

## Objectives

- To introduce the various concepts of Agrochemistry and to impart knowledge about physical properties of soil and processes in relation to plant growth.
- To give awareness to the students about excess use, adverse effects and remedies of Pesticides, Insecticides etc.
- To provide knowledge about the major research areas in agricultural Chemistry

## Expected Course Outcome

Upon completion of the course the students will be able to:

- Understand the basics of Agricultural Chemistry
- Understand the role of manures and fertilizers in supplying nutrients to plants.
- Evaluate the importance of Instrumental techniques and analytical methods in the field of Agricultural Chemistry.
- Explain the Importance of Chemistry in Agricultural Science.
- Understand the major research areas in Agrochemistry and thus gives a real inspiration to the students to this area.

- **Agrochemistry – Course Overview**

<b>Sl No.</b>	<b>Topics</b>	<b>Hrs</b>
<b>1.</b>	<b>Introduction to Agricultural Chemistry</b>	<b>6</b>
	Introduction: Soil and Water Management, Composition, water pollution and soil pollution. Types of soil, Organic and Inorganic Constituents of Soil. Fertilizers and Manures. Essential elements, Role of Micro and macronutrients in plant growth.	
<b>2.</b>	<b>Branches of Agricultural Chemistry</b>	<b>6</b>
	Agricultural Production, Food Processing, Pesticides, Insecticides, Herbicides, Fungicides, Processing of raw products into foods and beverages, Chemurgy, Environment Restoration.	
<b>3.</b>	<b>Role of Chemistry in Agricultural Science</b>	<b>10</b>
	<b>Photosynthesis:</b> Basics of Photosynthesis, <b>Fertilizers:</b> Classification, <b>Natural and artificial</b> fertilizers. Examples for natural fertilizers, Artificial fertilizers: Nitrogenous, Phosphatic, Potash fertilizers. <b>Pesticides and Insecticides:</b> Classification (Based on use and chemical composition), Chemistry, composition and processing of agricultural Insecticides & Pesticides. Benefits of Pesticides, Potential hazards of Pesticides. <b>Pesticides-Safety measures.</b> <b>Insect Repellents:</b> Examples. <b>Chemistry in Other areas:</b> For improved irrigation, Storage and preservation of Agricultural products, Food processing, Chemicals from agricultural waste.	
<b>4.</b>	<b>Analytical techniques and Instrumental Methods in AgroChemistry</b>	<b>5</b>
	Applications of gas chromatography and liquid chromatography. Applications of Ultraviolet-visible spectroscopy, infrared spectroscopy, atomic absorption spectroscopy, mass spectrometry. X-ray diffractometry. Preparation of solutions for standard curves, analytical reagents, qualitative reagents, indicators and standard solutions for acid-base, oxidation reduction and complexometric titration.	
<b>5.</b>	<b>Major research Areas in Agrochemistry</b>	<b>3</b>
	Improvement and restoration of soil fertility, Use and Recycling of biomass, Biostimulants for Agriculture, Economic and policy studies related to production of agricultural raw materials (Food & Non-food), Tracking Impurities, Environmental, human and animal safety, Management of Rural areas and environmental resources.	

### Expectations

Students are expected to watch all online/offline lectures, complete the work at-home, submit weekly problem sets and worksheets, and take two in-semester assessment and an end-semester assessment.

## **BOOKS AND REFERENCES**

1. Jack R Plimmer, *Encyclopaedia of Agrochemicals* , Nil edition ,Wiley-Blac, New Jersey **(2003)**
2. R.J Cremlyn, *Agrochemicals: Preparation and mode of Action*, 2nd Edition, Wiley-Blackwell publishers, New Jersey **(1991)**.
3. S.M Khopkar, *Concepts in Analytical Chemistry*, 3<sup>rd</sup> Edition, New Academic Science, New York **(2008)**.
4. Willard, Meritte and Dean, *Instrumental methods of Analysis*, 5th Edition, Van Nostrand Publishers, Newyork **(1974)**.
5. John H Montgomery, *Agrochemicals Desk Reference*, 2nd Edition, CRC Press, Boca Raton **(1997)**.