

## 21ELCT334 AGROCHEMICALS

Hours Per Week :

L	T	P	C
2	-	2	3

Total Hours :

L	T	P
30	-	30

### COURSE DESCRIPTION AND OBJECTIVES:

Main objective is to familiarize the students about the different types of agrochemicals used in the form of insecticides, pesticides and fertilizers

### COURSE OUTCOMES:

Upon completion of the course, the student will be able to achieve the following outcomes:

COs	Course Outcomes
1	Students will understand the pesticides agrochemicals (insecticides, fungicides and herbicides), their type and role in agriculture
2	Students will learn different fertilizers and their importance

### SKILLS

- ✓ Identify different chemicals used in agricultural and horticultural crops
- ✓ Understand mode of action of pesticides
- ✓ Identify the different fertilizers used in crops
- ✓ Understand the labels description given along with pesticide containers
- ✓ Calculate the recommended dose of pesticides and fertilizers based on requirements



Source:

<https://images.app.goo.gl/2s1bTr4jUn3sv1LT9>

**ACTIVITIES:**

- o Practice different pesticide and fertilizer application methods under field conditions
- o Solve the problems related to recommended dose of pesticides and fertilizers
- o Practice precautionary methods during application of pesticides

**UNIT - 1**

**Introduction of Agrochemicals:** An introduction to agrochemicals, their type and role in agriculture, effect on environment, soil, human and animal health, merits and demerits of their uses in agriculture, management of agrochemicals for sustainable agriculture

**Herbicides** - Major classes, properties and important herbicides (include new chemistries) - Fate of herbicides

**Fungicides** - Classification – Inorganic fungicides - Characteristics, preparation and use of sulphur and copper - Mode of action - Bordeaux mixture and Copper Oxychloride. **Organic fungicides** - Mode of action - Dithiocarbamates - Characteristics, preparation and use of Zineb and Maneb. **Systemic fungicides** - Benomyl, Carboxin, Oxycarboxin, Metalaxyl, Carbendazim, characteristics and use (include new chemistries)

**UNIT - 2**

**Introduction and classification of insecticides:** Inorganic and organic insecticides - Organochlorine, Organophosphates, Carbamates, Synthetic pyrethroids, Neonicotinoids, Biorationals, Insecticide Act and rules, Insecticides banned, withdrawn and restricted use, fate of insecticides in soil & plant. IGRs Biopesticides, Reduced risk insecticides, Botanicals, plant and animal systemic insecticides their characteristics and uses (include new chemistries)

**UNIT - 3**

**Fertilizers and their importance:** Nitrogenous fertilizers - Feedstocks and Manufacturing of ammonium sulphate, ammonium nitrate, ammonium chloride, urea. Slow release N - fertilizers. Phosphatic fertilizers - feedstock and manufacturing of single superphosphate. Potassic fertilizers: Natural sources of potash, manufacturing of potassium chloride, potassium sulphate and potassium nitrate. Mixed and complex fertilizers - Sources and compatibility – preparation of major, secondary and micro nutrient mixtures. Complex fertilizers - Manufacturing of ammonium phosphates, nitrophosphates and NPK complexes. Fertilizer control order. Fertilizer logistics and marketing. Plant bio-pesticides for ecological agriculture, Bio-insect repellent, pheromones and new pheromone technologies

**UNIT - 4**

**Pesticide formulations:** new formulations and formulation technologies

**Pesticide application:** dusters and sprayers – knapsack, power, LV, ULV, electrodyne sprayers. Types of nozzles. Mode of application – manual, tractor-mounted, aerial sprays (drones)

Safety precautions while applying chemicals (incl. PPEs)

Pesticide monitoring, dissipation, decontamination, ADI, MRLs, phytosanitary certificate, CODEX Alimentarius Commission

**UNIT - 5**

**Introduction to the concept of HHPs (Highly hazardous pesticides):** classification. Resistance action committees – IRAC, FRAC, HRAC Mode of action (MoA) labelling. General resistance management guidelines and crop specific guidelines with examples

**LABORATORY EXPERIMENTS****LIST OF EXPERIMENTS**

1. AGRO Sampling of fertilizers and pesticides (Insecticides/fungicides/herbicides)
2. AGRO Study and identify various fertilizers & formulations of herbicides available in market and calculation of doses of fertilizers and herbicides

- 3 ENTO Study and identify various formulations of insecticides available in market
- 4 ENTO Calculation of doses of insecticides
- 5 ENTO Pesticides application technology to study about various pesticides appliances
- 6 PI PATH Study and identify various formulations of fungicides available in market
- 7 PI PATH Calculation of concentrations and doses of fungicides
- 8 SSAC Sampling of fertilizers and pesticides for chemical analysis
- 9 SSAC Quick tests for identification of common fertilizers
- 10 SSAC Identification of anions and cations in unknown fertilizer
- 11 SSAC Estimation of nitrogen in Urea
- 12 SSAC Estimation of water soluble P<sub>2</sub>O<sub>5</sub> and citrate soluble P<sub>2</sub>O<sub>5</sub> in Single Super Phosphate by Pemberton's method
- 13 SSAC Estimation of potassium in MOP/SOP by flame photometer method
- 14 SSAC Determination of copper content in Copper Oxychloride and Sulphur content in Sulphur fungicide (elemental sulphur)
- 15 SSAC Determination of purity of Thiram and Ziram Market Survey of Agrochemicals

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