

22ELCT301 PRECISION FARMING TECHNIQUES FOR PROTECTED CULTIVATION

Hours Per Week :

L	T	P	C
2	0	2	3

PREREQUISITE KNOWLEDGE: Protected Cultivation, Green-house, Root media preparation, Planting Techniques, Irrigation, fogging and Fertilization system of Green house, Insect and disease management, Economical Analysis of post-harvest techniques

COURSE DESCRIPTION AND OBJECTIVES:

The main objective of this course is to familiarize the students with the relevance and scope of precision farming and protected cultivation and to impart knowledge about the various modern precision farming techniques and their application in protected cultivation.

MODULE-1

UNIT-1

8L+0T+8P=16 Hours

Protected cultivation: Introduction, History, origin, development, National and International Scenario.

Green House: components, perspective, Types of green houses, poly-houses /shed nets, Cladding materials.

Plant environment interactions - principles of limiting factors, solar radiation and transpiration, greenhouse effect, light, temperature, relative humidity, carbon dioxide enrichment.

Design and construction of Greenhouses - site selection, orientation, design, construction, design for ventilation requirement using exhaust fan system, selection of equipment.

UNIT-1

8L+0T+8P=16 Hours

Greenhouse cooling system: Necessity, methods - ventilation with roof and side ventilators, evaporative cooling, different shading material fogging, combined fogging and fan-pad cooling system. Design of cooling system, maintenance of cooling and ventilation systems, pad care etc. Greenhouse heating – necessity, components, methods, design of heating system. Root media - types - soil and soil less media, composition, estimation, preparation and disinfection, bed preparation. Planting techniques in green house cultivation.

PRACTICES:

- Estimation of material requirement for construction of greenhouse.
- Determination of fertilization schedule and rate of application for various crops.
- Design of Active summer cooling system (Fan and Pad cooling system).
- Design of Active winter cooling system (Convection tube type cooling system).

MODULE-2

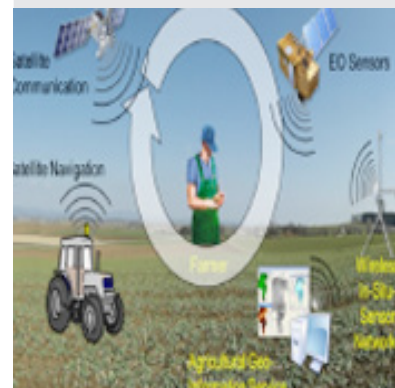
UNIT-1

8L+0T+8P=16 Hours

Irrigation in greenhouse and net house: Water quality, types of irrigation system, components, design, installation and material requirement.

Fogging system for greenhouses and net houses - introduction, benefits, design, installation and material requirement. Maintenance of irrigation and fogging systems.

Fertilization: Nutrient deficiency symptoms and functions of essential nutrient elements, principles of selection of proper application of fertilizers, fertilizer scheduling, rate of application of fertilizers, methods, automated fertilizer application.



Source : <https://electronicsforu.com/wp-content/uploads/2019/04/3-500x275.jpg>

SKILLS:

- ✓ Use GIS software for precision agriculture.
- ✓ Design variable rate sprayer.
- ✓ Apply electronic principles in the design of precision fertilizer applicator.
- ✓ Perform economic analysis of land preparation.

UNIT-2**08L+0T+08P=16 Hours**

Greenhouse climate measurement, control and management.

Insect and disease management: In greenhouse and net houses Selection of crops for greenhouse cultivation.

Major crops in green-house - irrigation requirement, fertilizer management, cultivation, harvesting and post-harvest techniques; Economic analysis.

PRACTICES:

- Study of different planting techniques.
- Design and installation of irrigation system.
- Design and installation of fogging system.
- Greenhouse heating.
- Study of different nutrient deficiency symptoms in plants.
- Study of functions of essential nutrient elements in plants.
- Study of operation maintenance and fault detection in fogging system.
- Economic analysis of greenhouses and net houses.
- Visit to greenhouses.

COURSE OUTCOMES:

Upon successful completion of this course, students will have the ability to:

CO No.	Course Outcomes	Blooms Level	Module No.	Mapping with POs
1	Apply the estimation of material requirement for construction of greenhouse	Apply	1	1, 3, 5, 7, 8
2	Apply to design and construct green houses, installation of irrigation and fogging system	Apply	2	3, 5, 6, 7, 8, 9, 11
3	Apply the determination of fertilization schedule and rate of application for various crops	Apply	2	3, 5, 7, 8, 9, 10, 12
4	Analyze economic of greenhouses and net houses	Analyze	1	1, 2, 4, 6, 7

TEXT BOOKS:

1. Peter, K. V and Sing D.K., "Protected Cultivation of Horticulture Crops", New India Publishing Company, 2013.
2. Sharma P. "Precision Farming. Daya Publishing House" 2017 New Delhi.
3. Singh Brahma and Balraj Singh. "Advances in protected cultivation", New India Publishing Company, 2014.

REFERENCE BOOKS:

1. Ernst van Heurn and Kees Van der Post. "Protected Cultivation". Digigrafi, Wageningen, The Netherlands, 2004.
2. Reddy P. P "Sustainable Crop Protection under Protected Cultivation". Springer Singapore, 2014.