

INSTITUTE	FACULTY OF AGRICULTURE
PROGRAM	BACHELOR OF SCIENCE (Hons.) AGRICULTURE
SEMESTER	5
COURSE TITLE	PROTECTED CULTIVATION AND SECONDARY AGRICULTURE
COURSE CODE	16AS0506
COURSE CREDITS	2

Objective:

- 1 To understanding of the principles, theoretical aspects and developing skills in protected cultivation.
- 2 To give knowledge about green house technology, planning, design of greenhouse, construction material with equipment.

Course Outcomes: After completion of this course, student will be able to:

- 1 Students will be able to identify constructive approaches towards protected cultivation.
- 2 Students will be able to describe management practices in protected cultivation and identify instruments and regulated quality standards in post-harvest operations.
- 3 Students will understand the greenhouse technology, planning, design of greenhouse, types of green houses and construction material with equipment.
- 4 Students will describe the greenhouse environment with irrigation systems & growing media used in greenhouse, hydroponics technology instruments and techniques to separate grains and post-harvest practices.
- 5 Student will get the concepts of cleaning and grading moisture measurement.
- 6 Students will be able to understand the material handling equipment, principle and working.

Pre-requisite of course: To aware the students about protected cultivation and secondary agriculture.

Teaching and Examination Scheme

Theory Hours	Tutorial Hours	Practical Hours	ESE	IA	CSE	Viva	Term Work
1	0	2	50	30	20	25	25

Contents : Unit	Topics	Contact Hours
1	1 Green house technology: Introduction, Types of Green Houses	2

Contents : Unit	Topics	Contact Hours
2	2 Plant response to Greenhouse environment, Planning and design of greenhouses, Design criteria of green house for cooling and heating purposes	1
3	3 Green house equipments, materials of construction for traditional and low cost green houses	2
4	4 Irrigation systems used in greenhouses, typical applications, passive solar green house, hot air greenhouse heating systems, green house drying	2
5	5 Cost estimation and economic analysis	2
6	6 Important Engineering properties such as physical, thermal and aero & hydrodynamic properties of cereals, pulses and oilseed, their application in PHT equipment design and operation	1
7	7 Drying and dehydration; moisture measurement	1
8	8 EMC, drying theory, various drying method	1
9	9 Commercial grain dryer (deep bed dryer, flat bed dryer, tray dryer, fluidized bed dryer, recirculatory dryer and solar dryer)	2
10	10 Material handling equipment	1
11	11 Conveyer and elevators, their principle, working and selection	1
Total Hours		16

Suggested List of Experiments:

Contents : Unit	Topics	Contact Hours
1	1 Study of different type of greenhouses based on shape	2
2	2 Determine the rate of air exchange in an active summer winter cooling system	2
3	3 Determination of drying rate of agricultural products inside greenhouse	2
4	4 Study of greenhouse equipment	2

Suggested List of Experiments:

Contents : Unit	Topics	Contact Hours
5	5 Visit to various Post Harvest Laboratories.	2
6	6 Determination of Moisture content of various grains by oven drying & infrared moisture methods	2
7	7 Determination of engineering properties (shape and size, bulk density and porosity of biomaterials)	2
8	8 Determination of Moisture content of various grains by moisture meter	2
9	9 Field visit to seed processing plant	2
10	10 Storage structure	2
Total Hours		20

Textbook :

- 1 NA, NA, NA, NA

References:

- 1 Protected cultivation and secondary agriculture, Protected cultivation and secondary agriculture, Amit Ashokrao Deogirikar, Vaishali Ramesh Rao Wankhade, Brillion Publishing, 2021
- 2 Protected cultivation technologies for climate smart agriculture, Protected cultivation technologies for climate smart agriculture, S. D> Gorantiwar, Prabhat Kumar, J. S. Pachpute, Pradip N. Dalvi, Satish Serial Publishing House, 2022
- 3 Precision farming & protected cultivation : concepts & applications, Precision farming & protected cultivation : concepts & applications, Sanjeev Kumar, S. N. Saravaiya, A. K. Pandey, Jaya Publishing House, 2021

Suggested Theory Distribution:

The suggested theory distribution as per Bloom's taxonomy is as follows. This distribution serves as guidelines for teachers and students to achieve effective teaching-learning process

Distribution of Theory for course delivery and evaluation					
Remember / Knowledge	Understand	Apply	Analyze	Evaluate	Higher order Thinking
25.00	25.00	20.00	10.00	10.00	10.00

Instructional Method:

- 1 The course delivery method will depend upon the requirement of content and need of students. The teacher in addition to conventional teaching method by black board may also use any of tools such as demonstration, role play, quiz, brainstorming, MOOCs etc.
- 2 The internal evaluation will be done on the basis of continuous evaluation of students in the class-room.
- 3 Practical examination will be conducted at the end of semester for evaluation of performance of students in laboratory.
- 4 Students will use supplementary resources such as online videos, NPTEL videos, e-courses, Virtual Laboratory.