

21AENG351 PROTECTED CULTIVATION AND POSTHARVEST TECHNOLOGIES

Hours Per Week :

L	T	P	C
1	-	2	2

Total Hours :

L	T	P
15	-	30



Source:

<https://images.app.goo.gl/zN42bdesasr7gP52A>

Course Description and Objectives:

Aim of this course is to gain knowledge about the importance and design of green house protected cultivation of crops and post-harvesting handling

Course Outcomes:

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

COs	Course Outcomes
1	To design the required greenhouse based on crop and environmental conditions
2	To suggest the material handling equipment, principle and Working under greenhouse conditions
3	To suggest the post-harvest equipment
4	To empower the clientele on protected cultivation technologies for the target oriented markets

SKILLS:

- ✓ *Assess the quality of fruits and vegetables*
- ✓ *Develop models for protected cultivation structures*
- ✓ *Calculate cost benefit ratios for protected cultivation*
- ✓ *Develop value added products by the application of processing concept*
- ✓ *Apply various concepts in fruits and vegetable processing*

ACTIVITIES:

- o *Determination of drying rate of agricultural products inside greenhouse*
- o *Determination of moisture content of various grains by oven drying & infrared moisture methods*
- o *Field visit of nurseries and flowers in protected green houses and shade nets*

UNIT - 1

Introduction: Greenhouse technology – Introduction - Types of greenhouses - Plant response to greenhouse environment - Planning and design of greenhouses - Design criteria of green house for cooling and heating purposes

UNIT - 2

Green house equipment: Green house equipment - Materials of construction for traditional and low cost green houses - Irrigation systems used in greenhouses - Typical applications - Passive solar greenhouse - Hot air greenhouse heating systems - Greenhouse drying - Cost estimation and economic analysis

UNIT - 3

Engineering properties: Important engineering properties such as physical - Thermal and aerodynamic properties of cereals - pulses and oilseeds - Their application in PHT equipment design and operation

UNIT - 4

Drying and dehydration: Drying and dehydration – Moisture measurement – EMC - Drying theory - Various drying methods - Commercial grain dryer (deep bed dryer, flat bed dryer, tray dryer, fluidized bed dryer, re-circulatory dryer and solar dryer)

UNIT - 5

Material handling: Material handling equipment - Screw conveyer and bucket elevator - Their principle - Working and Selection - Primary processing of cereals, pulses and oilseed, like cleaning, grading, packaging etc

LABORATORY EXPERIMENTS**LIST OF EXPERIMENTS**

1. Study of different types of green houses based on shape, etc
2. Computing the rate of air exchange in an active summer and winter cooling systems
3. Feasibility study on drying of agricultural products inside a greenhouse and its calculation
4. Visit to post harvest technology units and laboratories
5. Determination of moisture content of various grains by oven drying and infrared methods
6. Determination of size, space, porosity, bulk density, etc., of grains
7. Determination of aerodynamic properties of grains
8. Cleaning and grading of grains, pulses and oilseeds
9. Drying and dehydration of vegetables (cauliflower)
10. Visit to rice and dhal mill
11. Study of LSU dryer
12. Study of Bucket elevator and screw conveyer
13. Visit to oil seed processing plant
14. Visit to cold storage
15. Practical final examination

REFERENCES:

1. Radha Manohar, K and Igathinathane. C. *Greenhouse Technology and Management*, 2nd Edition, BS Publications
2. Tiwari, G.N. *Greenhouse Technology for Controlled Environment*. Narosa Publishing house Pvt. Ltd
3. Singh Brahma and Balraj Singh., 2014. *Advances in Protected Cultivation*, New India Publishing Company
4. Sahay, K.M. and Singh, K.K. 1994. *Unit operations of Agricultural Processing*. Vikas Publishing house Pvt. Ltd. New Delhi
5. Chakraverty, A. *Post Harvest Technology of cereals, pulses and oilseeds*. Oxford & IBH publishing Co. Ltd., New Delhi
6. Ojha, T.P and Michael, A.M. *Principles of Agricultural Engineering*, Vol. I, Jain Brothers, Karol Bag, New Delhi

