



TEACHING PLAN: PROTECTED CULTIVATION AND SECONDARY AGRICULTURE

Course Teacher: Mr. Mukesh Choudhary

SCHOOL: SOAS		ACADEMIC SESSION: 2023 – 2024		FOR STUDENT’S BATCH: 6 th SEM	
1	Course Code	AEN-302			
2	Course Title	PROTECTED CULTIVATION AND SECONDARY AGRICULTURE			
3	Credits	2 (1+1)			
4	Learning Hours		Contact Hours	48	
			Assessment	24	
			Guided Study	28	
			Total hours	100	
5	Course Objective	1. To Study the fundamental principles of crop cultivation under controlled conditions. 2. This course will help the students to know the design criteria and material for construction of greenhouse. 3. Demonstrate irrigation and fertigation, green house operations, care and maintenance of protected structure. 4. Demonstrate special horticultural practices in protected cultivation identify and control of insect-pes			
6	Course Outcomes	1. Students able to perform the various cultural practices under greenhouse such as drying and green house equipments. 2. To understand the response of plant to controlled conditions and irrigation system. 3. To understand the planning, design criteria cost and economic analysis of greenhouses. 4. Understanding the principle, theoretical aspects and developing skills in protected cultivation of horticultural crops.			
7	Outline Syllabus:				
7.01	Paper Code	Unit		Reference Number	Teaching Methods
7.02	AEN-302	UNIT-I GREENHOUSE	a) Green house technology: Introduction; Types of Green Houses b) Plant response to Green house environment; Planning and design of greenhouses c) Design criteria of green house for cooling and heating purposes	ICAR-ecourse. Pp: 5-32	Lecture , ppt
		UNIT-II MATERIAL USED FOR GREENHOUSE	a) Green house equipments; Materials of construction for traditional and low cost green houses b) Irrigation systems used in greenhouses, typical applications c) Passive solar green house and hot air green house heating systems	ICAR-ecourse. Pp :33-43.	Lecture and PPT

		UNIT-III DRYING IN GREENHOUSE	a) Green house drying; Cost estimation and economic analysis b) Important Engineering properties such as physical, thermal and aero & hydrodynamic properties of cereals, pulses and oilseed, their application in PHT equipment design and operation c) Drying and dehydration; drying theory; Various drying method	ICAR-ecourse. Pp :59-79.	Lecture and PPT
7.03		UNIT-IV: DRYING EQUIPMENTS	a) Moisture measurement, EMC b) Commercial grain dryer (deep bed dryer, flat bed dryer, tray dryer, fluidized bed dryer, recirculatory dryer and solar dryer) c) Material handling equipment; conveyer and elevators, their principle, working and selection	ICAR-ecourse. Pp :60-69.	Lecture and PPT
8	Course Evaluation				
8.1	COURSE ASSESEMENT: 50%				
8.1.1	Attendance	5 %			
8.1.2	Homework	5 %			
8.1.3	ClassTest	5 %			
8.1.5	Presentation	5%			
8.1.6	Any other	20%			
8.2	MTE	10%			
8.3	End-term examination: 50%				
9	Text Books & References				
9.1	Text book	1. ICAR-ecourse. 2. Handbook of horticulture by Kusum Lata Chadha. 3. Protected Cultivation of flowers by Tyagi and Sachin. 4. Greenhouse agriculture: Production and Agriculture by Sabir <i>et al.</i> 5. Singh, B. 2020. Protected Cultivation of vegetable crops. Kalyani publisher.			
9.2	Reference	1. Singh Brahma 2020.New Age Protected Cultivation, BSHF Delhi-p57. 2. Kumar P, Chauhan RS, Tanwar N, Grover RK, Kumar R. Doubling of farmer's income by vegetable crop production under poly house. Indian Journal of Economics and Development. 2017; 13(2a), pp: 295-300.			
9.3	Video References	1. https://youtu.be/DJ68AcpTKcA?list=PLvSukZ-l0KuPTze2Yr2juLifBYPB2SnPB 2. https://youtu.be/bMm-2jA_Gs0?list=PLvSukZ-l0KuPTze2Yr2juLifBYPB2SnPB 3. https://youtu.be/KpF7ruTiu4E?list=PLvSukZ-l0KuPTze2Yr2juLifBYPB2SnPB 4. https://youtu.be/ZX5_e5Gml-U?list=PLvSukZ-l0KuPTze2Yr2juLifBYPB2SnPB 5. https://youtu.be/LhtW8c7d5Xk?list=PLvSukZ-l0KuPTze2Yr2juLifBYPB2SnPB 6. https://youtu.be/qDazHrqMcAg?list=PLvSukZ-l0KuPTze2Yr2juLifBYPB2SnPB 7. https://youtu.be/8JvXYtsPXvI?list=PLvSukZ-l0KuPTze2Yr2juLifBYPB2SnPB			

Mapping of Outcomes v. Topics

Outcome no. → Syllabus topic↓	1	2	3	4
Paper Code. Unit I (a)	✓			✓
Paper Code. Unit I (b)	✓	✓		✓
Paper Code. Unit I (c)	✓	✓		✓
Paper Code. Unit II (a)			✓	✓
Paper Code. Unit II(b)		✓		✓
Paper Code. Unit II(c)		✓		✓
Paper Code. Unit III (a)	✓		✓	✓
Paper Code. Unit III(b)	✓			✓
Paper Code. Unit III(c)	✓			✓
Paper Code. Unit IV (a)	✓			✓
Paper Code. Unit IV(b)	✓			✓
Paper Code. Unit IV(c)				✓

QUESTION BANK

DESCRIPTIVE QUESTION

1. What is Protected cultivation? Write the importance of protected cultivation in agriculture?
2. What do you understand by greenhouse? Explain the design of greenhouses?
3. Explain the types of greenhouse based on shape?
4. Describe the types of greenhouse based on cost?
5. Write down the plant response to greenhouse environment?
6. Write the construction material for traditional green house?
7. Write the construction material for low cost green house?
8. Explain the irrigation system used in greenhouses?
9. What is drying? Explain the various methods of drying?
10. Explain the various commercial grain dryer?
11. Explain the planning and design of greenhouses?
12. Write down the design criteria of greenhouse for cooling purpose?
13. Write down the design criteria of greenhouse for heating purpose?
14. Explain the drying theory?
15. Explain the fan and pad cooling system of greenhouse?
16. What is cladding material? Write the types of cladding material?
17. What is boom watering? Write the advantage and disadvantage of boom watering?

18. What is drip irrigation? Explain the advantage and disadvantage of drip irrigation?
19. Write down the role of light in greenhouses?
20. What is green house effect? Explain the greenhouse gases?

PROJECTS (To be given to group of students)

1. Visit to greenhouse.
2. Field Visit
3. MOOC Courses
4. Attend webinar and seminars
5. Visit to seed processing unit