THE LIBRATION OF THE PARTY OF T	Pithapur Rajah's Government College(Autonomous)Kakinada	Program &Semester III B.Sc Semester -V						
CourseCode	TECHNIQUES IN NURSERY DEVELOPMENT							
Teaching	Hours Allocated: 60 (Theory)	L	Т	P	C			
Pre-requisites:		3	-	-	4			

Course Objectives:

This course aims to introduce fundamentals of Nursery development. The course will also give an insight in Various techniques used in nursery development and management practices

Outcomes:

OnCom	OnCompletionofthe course,thestudentswillbeableto-							
CO1	Understand different types of nurseries							
CO2	Identify various facilities required to set up of a nursery.							
CO3	Understood expertise related to various practices in a nursery.							
CO4	Acquire skills to get an employment or to become an entrepreneur.							

SkillDevelopment	Employability	E	Entrepreneurship
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Syllabus:

UNIT-I:

Introduction to Nursery:

- 1.1 Definition, objectives and importance.
- 1.2 Basic requirements for a nursery layout and components of a good nursery.
- 1.3 Types of nurseries.
- 1.4 Bureau of Indian standards (BIS 2008) related to nursery.

UNIT-II:

Nursery inputs

- 2.1 Tools, implements and containers.
- 2.2 Nursery media.
- 2.3 Electricity, equipment and machinery management.
- 2.4 Types of nursery beds and their preparations.
- 2.5 Precautions and maintenance of nursery beds.

UNIT-III:

Seeds and Propagules

- **1.1** Selection of seed and different sowing methods.
- **1.2** Use of different plant parts for vegetative propagation to raise nursery.
- **1.3** Different techniques of vegetative propagation.

UNIT-IV:

Management Practices

- 4.1 Routine seasonal operations in a nursery.
- **4.2** Supply of water, nutrients and removal of weeds.
- **4.3** Identification of pests and diseases, control and prevention methods.

UNIT - V

Grafting techniques

- **1.1** Introduction to grafting, definition, types and tools for grafting.
- **1.2** Steps involved in simple, splice graft, tongue graft, Whip graft, cleft graft and wedge graft.
- 1.3 Grafting of horticultural & floricultural crops and applications

Textbooks

- 1. Ratha Krishnan, M.,et al.(2014) Plant Nursery
- 2. P.K.Ray,(2020)Essentials of plant nursery management.
- **3.** P.K.Ray,(2012) How to start and operate a Plant Nursery.

Referencebooks:

- **4.** Management: Principles and Practices, Central Arid Zone Research Institute ICMR, Jodhpur, Rajasthan.
- **5.** Vikas Kumar, Anjali Tiwari, Practical manual of Nursery management, Agri biotech Press, New Delhi.

6.

CO-POMapping:

(1:Slight[Low]; 2:Moderate[Medium]; 3:Substantial[High],:No Correlation

		P01	P02	PO3	P04	P05	P06	P07	P08	P09	PO10	PSO1	PSO2	PSO3
CC	01	3	2	3	3	3	2	2	2	3	2	3	3	2
CC)2	3	3	2	2	3	3	3	2	2	1	1	1	2
CC	23	2	3	3	2	2	2	2	3	2	3	1	1	1
CO)4	3	2	3	3	3	2	2	2	3	2	3	3	2

P.R. GOVERNMENT COLLEGE (A): KAKINADA

Semester-V

PAPER 6A TECHNIQUES IN PLANT NURSERY DEVELOPMENT

MODEL PAPER

PART-I

Answer any THREE questions by attempting at least ONE question form each section.

SECTION – A

 $3 \times 10 = 30 \text{ Marks}$

- 1. Explain Bureau of Indian standards related to Nursery.
- 2. Write an essay on necessary precautions to be taken in the maintenance of nursery beds.
- 3. Explain the different techniques involved in asexual propagation

SECTION - B

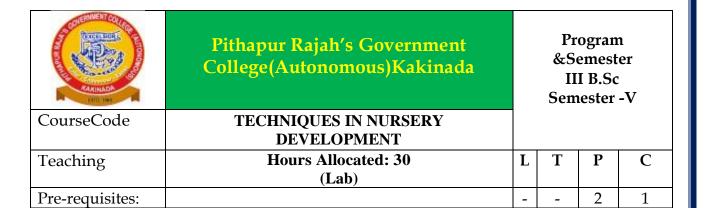
- 4. Write about the control and prevention of pests.
- 5. Describe the Grafting of horticultural and floricultural crops.
- 6. Write an essay on different tools for land preparation in a plant nursery.

PART - II

Answer any **SIX** Questions from the following

 $6 \times 5 = 30 \text{ Marks}$

- 7. Write a note on basic requirements of a nursery
- 8. Explain about any two types of nurseries
- 9. Describe the nursery media
- 10. Write a short note on selection of seed
- 11. Types in grafting
- 12. Tongue graft
- 13. Tools in nursery
- 14. sowing methods
- 15. different types in nursery beds
- 16. Seed selection.



Practical syllabus:

- 1. Demonstration of different types of nurseries.
- 2. Handling of nursery tools, equipment and types of containers.
- 3. Laying of nursery bed with soil and compost.
- 4. Seed collection, treatment and rising of seedlings on nursery bed.
- 5. Handling of grafting and layering techniques in the nursery.
- 6. Watering, weeding and management of nursery.
- 7. Maintaining of the seedlings / cuttings in the nursery.

CONFORMENT CONTROL OF THE PARTY	Pithapur Rajah's Government College(Autonomous)Kakinada	Program &Semester III B.Sc Semester -V						
CourseCode	TECHNIQUES IN NURSERY DEVELOPMENT							
Teaching	Hours Allocated: 30 (Lab)	L	Т	P	С			
Pre-requisites:		-	-	2	1			

Question Paper Model for Practical Examination

$\underline{Semester-V}$

<u>Biotechnology Course – 6 A (Skill EnhancementCourse) Techniques in Nursery Development</u>

Max. Time: 1 1/2 Hrs. Max. Marks: 35

16M

I a. Perform the pre-treatment method for given seed 'A'

b. Identify the graft and perform grafting 'B'

II. Scientific observation and data analysis $3 \times 3 = 9 \text{ M}$

A. Whip graft/photograph

B. Propagule / photograph

C. Nursery container/ photograph

III. Record + Viva-voce 6+4 = 10 M

THE RESIDENCE OF THE PARTY OF T	Pithapur Rajah's Government College(Autonomous)Kakinada	Program &Semester III B.Sc Semester -V					
CourseCode	HYDROPONICS CULTIVATION						
Teaching	Hours Allocated: 60 (Theory)	L	T	P	С		
Pre-requisites:	-	3	-	-	4		

Course Objectives:

This course aims to introduce fundamentals hydroponics. The course will also give an insight in Various techniques used in hydroponics cultivation system.

Outcomes:

On Completion of the course, the students will be able to-								
CO1	CO1 Understand the concept of hydroponics.							
CO2	Acquire the knowledge on soilless cultivation system.							
CO3	Prepare media for hydroponics cultivation.							
CO4	Learn the hydroponic cultivation technique.							

SkillDevelopment		Employability		Entrepreneurship	
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Syllabus:

UNIT-I:

Introduction to Soilless culture

- 1.1 Definition, History and origin of soilless culture.
- 1.2 Present status of hydroponics-contrasts with soil based culture.
- 1.3 Applications & future developments.

UNIT-II:

Macronutrients, micronutrients

- 2.1 Functions and effect on plants, deficiency symptoms of the following essential minerals N, P, Mg, Ca, K, S, Fe, Mn, Cu, Zn, B, Mo.
- 2.2 Physical factors, light (Quantity, energy, photoperiodism etc)
- 2.3 Temperature (Heating and cooling), Humidity, CO2, ppm, pH and TDS.

UNIT-III:

Cultural conditions

- **1.1** Plant nutrition. Inorganic salts (fertilizers) major and minor nutrients formulating, monitoring and analysing.
- **1.2** Selection of fertilizers, media used for hydroponics-expanded clay, rock wool, coir, perlite, pumice, vermiculite, sand gravel etc.
- **1.3** Weed management, diseases and pest control.

UNIT-IV:

Techniques in hydroponics

- 4.1 Static solution culture
- 4.2 Continuous-flow solution culture
- 4.3 Aeroponics

UNIT - V

Cultivation of crop plants by hydroponics

- **6.1** Passive sub-irrigation, Ebb and flow or flood and chain irrigation.
- **6.2** Deep water culture protocols for –Tomato cultivation through Dutch bucket method
- **6.3** Chilly cultivation through NFT system, Spinach through raft System and measurements of yield.

Textbooks

- **1.** Prasad S and Kumar U. Green House management for Horticultural crops. Agro-Bios India.
- 2. Dahama A.K. Organic Farming for Sustainable Agriculture. Agrobios, India
- **3.** Subba Rao N.S. (1995). Biofertilizers in Agriculture and Forestry. Oxford and IBH Publishing Company. Pvt. Ltd New Delhi.

Referencebooks:

- **4.** Keith Roberto, How to Hydroponics. The future Garden Press NewYork.4th Edition
- 5. Howard M. Resh. Hobby Hydoponics. CRC Press, USA.

CO-POMapping:

(1:Slight[Low]; 2:Moderate[Medium]; 3::Substantial[High],:No Correlation]

	P01	P02	P03	P04	P05	P06	P07	P08	P09	PO10	PSO1	PSO2	PSO3
CO1	3	2	3	3	3	2	2	2	3	2	3	3	2
CO2	3	3	2	2	3	3	3	2	2	1	1	1	2
CO3	3	2	3	3	3	2	2	2	3	2	3	3	2
CO4	2	3	3	2	2	2	2	3	2	3	1	1	1

P.R. GOVERNMENT COLLEGE (A): KAKINADA

Semester-V

HYDROPONICS CULTIVATION

MODEL PAPER

PART-I

Answer any THREE questions by attempting at least ONE question form each section.

SECTION - A

 $3 \times 10 = 30 \text{ Marks}$

- 1. Describe the applications and future developments of hydroponics.
- 2. Explain the deficiency symptoms of the Macro nutrients.
- 3. Explain in detail about the control of hydroponic pests

SECTION - B

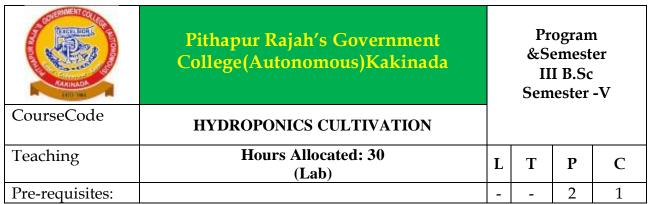
- 4. Discuss about the technique of static solution culture in hydroponics.
- 5. Explain the process of tomato cultivation through Dutch bucket method.
- 6. Explain in detail about the different types of media used for hydroponics.

PART - II

Answer any **SIX** Questions from the following

6 X 5 = 30 Marks

- 7. Application of Hydroponics
- 8. Role of micro nutrients
- 9. Weed management
- 10. Solid state culture
- 11. Raft hydroponics
- 12. Photoperiodism
- 13. Aeroponics
- 14. TDS
- 15. Dutch bucket method
- 16. vermiculture



Practical syllabus:

- 1. Handling of tools required for hydroponic set up.
- 2. Preparation of macronutrients and micronutrients solutions/stock cultures.
- 3. Preparation of different media for hydroponic system.
- 4. Evaluating the effect of bio fertilizers on hydroponic cultivation.
- 5. Weeding management techniques demonstration.
- 6. Demonstration of pests and diseases control and prevention methods.
- 7. Cultivation of tomato by hydroponic system.
- 8. Cultivation of chilli through hydroponic cultivation.

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CourseCode	HYDROPONICS CULTIVATION							
Teaching	Hours Allocated: 30 (Lab)	L	T	P	C			
Pre-requisites:		-	-	2	1			

Question Paper Model for Practical Examination

$\underline{Semester-V}$

<u>Biotechnology Course - 7 A (Skill EnhancementCourse) Hydroponics cultivation</u>

Max. Time: 1 1/2 Hrs. Max. Marks: 35

1. Prepare complete media for effective hydroponic cultivation

16 M

2. Scientific observation and data analysis

 $3 \times 3 = 9 M$

A. Chilli cultivation /photograph

B. Tomato cultivation / photograph

C. Zinc deficiency symptom / photograph

3. Record + Viva-voce 6+4 = 10 M