GOVERNMENT COLLEGE (AUTONOMOUS), RAJAMAHENDRAVARAM

Department of Botany – Course Code: BOTCC-1

Certificate Course-1: Plant Nursery Management and Propagation

Course objectives: This course is aimed to impart skills on plant nursery raising, maintenance and propagation.

Course outcomes: On successful completion of this course the learners will be able to:

1. Explain the basic infrastructure facilities to establish a plant nursery.
2. Demonstrate expertise related to various practices in a nursery.
4. Comprehend knowledge and perform skills on the propagation of economically valuable plants.

Syllabus:

Unit-1: Introduction to plant nursery **12 Hrs.**

1. Plant nursery: Definition, importance.
2. Different types of nurseries –on the basis of duration, plants produced, structure used.
3. Basic facilities for a nursery; layout and components of a good nursery.
4. Plant propagation structures in brief.
5. Bureau of Indian Standards (BIS-2008) related to nursery.

Unit- 2: Necessities for nursery **12 Hrs.**

1. Nursery beds – types and precautions to be taken during preparation.
2. Growing media, nursery tools and implements, and containers for plant nursery, in brief.
3. Seeds and other vegetative material used to raise nursery in brief.
4. Outlines of vegetative propagation techniques to produce planting material.
5. Sowing methods of seeds and planting material.

Unit-3: Management of nursery **12 Hrs.**

1. Seasonal activities and out line operations in a nursery.
2. Nursery management – watering, weeding and nutrients; pests and diseases.
3. Common possible errors in nursery activities.
4. Economics of nursery development, pricing and record maintenance.
5. Online nursery information and sales systems.

Unit-4: Basic concepts of plant propagation **12 Hrs.**

1. Propagation: Definition, need and potentialities for plant multiplication; asexual and sexual methods of propagation - advantages and disadvantages.
2. Propagation facilities: Mist chamber, humidifiers, greenhouses, glasshouses, cold frames, hot beds, poly-houses, phytotrons nursery - tools and implements.
3. Identification and propagation by division and separation: Bulbs, pseudobulbs, corms, tubers and rhizomes; runners, stolons, suckers and offsets.

Unit-5: Vegetative propagation techniques **12 Hrs.**

1. A brief account of plant propagation by cuttings.
2. A brief account of plant propagation by grafting.
3. A brief account of plant propagation by layering.

Reference books:

1. Ratha Krishnan, M., et.al. (2014) Plant nursery management: Principles and practices, Central Arid Zone Research Institute (ICAR), Jodhpur, Rjasthan
2. Kumar, N., (1997) Introduction to Horticulture, Rajalakshmi Publications, Nagercoil.

GOVERNMENT COLLEGE (AUTONOMOUS), RAJAMAHENDRAVARAM
Department of Botany – Course Code: BOTCC-1
Certificate Course-1: Plant Nursery Management and Propagation

Time: 2:30 Hrs . **Max Marks : 50Marks**

SECTION - A

Answer any **THREE** of the following questions. Draw the diagram wherever necessary.
3X10=30M

1. Write about basic facilities for a nursery; layout and components of a good nursery?
2. Write about Nursery beds – types and precautions to be taken during preparation?
3. Write about Nursery management – watering, weeding and nutrients; pests and diseases?
4. Discuss the propagation of plants through asexual methods?
5. Give a brief account of plant propagation by grafting techniques?
6. Give an account on nursery beds?

SECTION – B

Answer any **FIVE** of the following questions. **5X4=20M**

7. Definition and importance of plant nursery?
8. Nursery tools and implements?
9. Common possible errors in nursery activities?
10. Poly-house
11. Different steps in Layering?
12. Bureau of Indian Standards (BIS-2008) related to nursery
13. Online nursery information and sales systems?
14. Mist chamber.

Blue Print for Question paper setting
Certificate Course-1: Plant Nursery Management and Propagation (BOTCC-1)

Unit no. / Title	**SAQ**	**LAQ**	**Marks allotted to the Module**
Unit- 1 / Introduction to plant nursery	**1**	**2**	18
Unit- 2 / Necessities for nursery	**1**	**1**	14
Unit – 3/ Management of nursery	**1**	**2**	18
Unit- 4 / Basic concepts of plant propagation	**1**	**2**	18
Unit– 5 / Vegetative propagation techniques	**1**	**1**	14
From any Unit (Unit-1 to Unit-5)	**1**	-	10
Total questions and marks allotted	06	05	**92**

GOVERNMENT COLLEGE (AUTONOMOUS), RAJAMAHENDRAVARAM
Department of Botany – Course Code: BOTCC-2
Certificate Course-2: Bioinstrumentation

Course objectives: This course is aimed to inculcate required bio-instrumentation skills to students and hone them towards biological research.

Course outcomes: On successful completion of this course the learners will be able to:

1. Understand the biosafety issues in laboratories and handle the prime biological equipment.
2. Demonstrate skills of various microscopic techniques.
3. Perform experiments using chromatography, electrophoresis and spectroscopy techniques.

Syllabus:

Unit I: Basic laboratory techniques **12 Hrs.**

1. Biosafety measures in laboratories: General safety measures, personal protection, chemical and biological hazards, spillage and waste disposal, first aid.
2. Theory, principle, working and applications of: pH meter and Laminar Air Flow.
3. Centrifuge machine types and centrifugation: Differential, Rate zonal, Density gradient, Rotor types and Ultra centrifugation.

Unit II: Microscopic techniques

1. Bright field Microscopy: Objectives, eyepiece, condenser; characteristics of lenses-resolution, magnification, numerical aperture, focal length, working distance, depth of focus.
2. Theory, principle, apparatus, methods and applications of: Dark Field Microscopy, Phase Contrast, Fluorescence Microscopy, Electron Microscopy: TEM and SEM

Unit III: Chromatography techniques **12 Hrs.**

1. Theory, principle, apparatus, methods and applications of:
   Paper chromatography, Thin Layer Chromatography (TLC), Soxhlet extraction, Gas Chromatography (GC).

Unit IV: Electrophoretic techniques **12 Hrs.**

1. Theory, principle, apparatus, methods and applications of: Paper Electrophoresis, Poly Acrylamide Gel Electrophoresis (PAGE), Agarose Gel Electrophoresis.

Unit V: Spectroscopic techniques **12 Hrs.**

1. Principle, working, instrumentation and applications of:
   Colorimetry, Flame photometry, Visible spectrophotometry, UV/Vis spectrophotometry, Fourier Transform Infrared Spectroscopy (FTIR).

Reference books:

1.Veerakumari, L. (2015) Bioinstrumentation, MJP Publishers, Chennai
2. Avinash Mancharkar, Ashok Jadhavar and Ashok Jadhav (2020) Bioinstrumentation, Vision Publications, Pune

GOVERNMENT COLLEGE (AUTONOMOUS), RAJAMAHENDRAVARAM
Department of Botany – Course Code: BOTCC-2
Certificate Course-2: Bioinstrumentation

Time: 2:30 Hrs. **Max Marks : 50Marks**

SECTION - A

Answer any **THREE** of the following questions. Draw the diagram wherever necessary.
3X10=30M

1. Write about biosafety measures in laboratories.
2. Discuss about the Phase Contrast Microscopy.
3. Write an essay on Thin Layer Chromatography.
4. Give a brief account of Poly Acrylamide Gel Electrophoresis.
5. Give an account on UV spectrophotometry.
6. Write about Laminar Air Flow Unit?

SECTION – B

Answer any **FIVE** of the following questions. **5X4=20M**

7. Laboratory waste disposal
8. Focal length
9. Applications of GC
10. Agarose Gel Electrophoresis
11. Applications of Calorimetry
12. First AID in laboratory
13. Soxhlet extraction
14. Numerical aperture.

Blue Print for Question paper setting
Certificate Course-2: Bioinstrumentation (BOTCC-2)

Unit no. / Title	**SAQ**	**LAQ**	**Marks allotted to the Module**
Unit- 1 / Basic laboratory techniques	**1**	**2**	18
Unit- 2 / Microscopic techniques	**1**	**1**	14
Unit – 3/ Chromatography techniques	**1**	**2**	18
Unit- 4 / Electrophoretic techniques	**1**	**2**	18
Unit– 5 / Spectroscopic techniques	**1**	**1**	14
From any Unit (Unit-1 to Unit-5)	**1**	-	10
Total questions and marks allotted	06	05	**92**