

**BOARD OF STUDIES IN B.Sc BOTANY
2020-2021**

**DEPARTMENT OF BOTANY, MICROBIOLOGY
AND HORTICULTURE**

SYLLABUS FOR B.Sc BOTANY



PITHAPUR RAJAH'S GOVERNMENT COLLEGE

Autonomous and Accredited with 'A' Grade by NAAC (3.17 CGPA)
KAKINADA – 533 001, E G Dist., ANDHRA PRADESH

PITHAPUR RAJAH'S GOVERNMENT COLLEGE (AUTONOMOUS), KAKINADA

III B.Sc., -Botany-VII/ VI Semester End (W.E.F. 2020-21)

ADVANCED ELECTIVE

PLANT TISSUE CULTURE AND ITS BIOTECHNOLOGICAL APPLICATIONS

(Course: BO6209)

Total hours of Teaching 40hrs @ 3 hrs/week

Total Credits:03

UNIT I: PLANT TISSUE CULTURE – 1 (12h)

1. History of plant tissue culture research - basic principles of plant tissue callus culture, meristem culture, organ culture, Totipotency of cells, differentiation and dedifferentiation.
2. Methodology - sterilization (physical and chemical methods), culture media, Murashige and Skoog's (MS medium), phytohormones, medium for micro-propagation/clonal propagation of ornamental and horticulturally important plants.
3. Callus subculture maintenance, growth measurements, morphogenesis in callus culture –organogenesis, somatic embryogenesis.

UNIT II: PLANT TISSUE CULTURE -2 (12h)

1. Endosperm culture – Embryo culture -culture requirements – applications, embryo rescue technique.
2. Production of secondary metabolites.
3. Cryopreservation; Germplasm conservation.

UNIT III: RECOMBINANT DNA TECHNOLOGY (12h)

1. Restriction Endonucleases (history, types I-IV, biological role and application); concepts of restriction mapping.
2. Cloning Vectors: Prokaryotic (pUC 18, pBR322, Ti plasmid and Lambda phage, Eukaryotic Vectors (YAC and briefly PAC)
3. Gene cloning (Bacterial Transformation and selection of recombinant clones, PCR mediated gene cloning)
4. Construction of genomic and cDNA libraries, screening DNA libraries to obtain gene of interest by complementation technique, colony hybridization.

UNIT IV: METHODS OF GENE TRANSFER (12h)

1. Methods of gene transfer- Agrobacterium-mediated, direct gene transfer by Electroporation, Microinjection, Micro projectile bombardment.
2. Selection of transgenics– selectable marker and reporter genes (Luciferase, GUS, GFP).

UNIT V: APPLICATIONS OF BIOTECHNOLOGY (12h)

1. Applications of Plant Genetic Engineering – crop improvement, herbicide resistance, insect resistance, virus resistance.
2. Genetic modification – transgenic plants for pest resistant (Bt-cotton); herbicide resistance (Round Up Ready soybean); improved agronomic traits - flavrSavr tomato, Golden rice; Improved horticultural varieties Moon dust carnations

Books for Reference:

1. Pullaiah. T. and M.V.Subba Rao. 2009. Plant Tissue culture. Scientific Publishers, New Delhi.
2. Bhojwani, S.S. and Razdan, M.K., (1996). Plant Tissue Culture: Theory and Practice. Elsevier Science Amsterdam. The Netherlands.
3. Glick, B.R., Pasternak, J.J. (2003). Molecular Biotechnology- Principles and Applications of recombinant DNA. ASM Press, Washington.
4. Bhojwani, S.S. and Bhatnagar, S.P. (2011). The Embryology of Angiosperms. Vikas Publication House Pvt. Ltd., New Delhi. 5th edition.
5. Snustad, D.P. and Simmons, M.J. (2010). Principles of Genetics. John Wiley and Sons, U.K. 5th edition.
6. Stewart, C.N. Jr. (2008). Plant Biotechnology & Genetics: Principles, Techniques and Applications. John Wiley & Sons Inc. U.S.A.

Suggested Activities: In vitro initiation of callus on artificial medium, seminars on utilization of rDNA technology, debates on applications of Biotechnology (whether it is a boon or bane to the society) studying growth patterns, vegetative characteristics of Bt cotton and identifying the features of its pest resistance

PITHAPUR RAJAH'S GOVERNMENT COLLEGE (AUTONOMOUS), KAKINADA
III B.Sc., BOTANY PRACTICAL PAPER – VII PRACTICAL SYLLABUS
PLANT TISSUE CULTURE & PLANT BIOTECHNOLOGY

Total hours of laboratory Exercises 45 hrs @ 2hrs/week

Total credits:02

PAPER – VII PRACTICAL SYLLABUS

1. Preparation of MS medium.
2. Demonstration of in vitro sterilization methods and inoculation methods using leaf and nodal explants of Tobacco/ Datura/ Brassica etc.
3. Study of embryo and culture, micro propagation of Banana, somatic embryogenesis, artificial seeds through photographs.
4. Construction of restriction map of circular and linear DNA from the data provided.
5. Study of methods of gene transfer through photographs: Agrobacterium-mediated, direct gene transfers by electroporation, microinjection, and micro projectile bombardment.
6. Different steps involved in genetic engineering for production of Bt. cotton, Golden rice, FlavrSavr tomato through photographs.
7. Isolation of plasmid DNA.
8. Restriction digestion and gel electrophoresis of plasmid DNA (optional)
9. Field visit to a lab involved in tissue culture
10. Study project under supervision of lecturer – tissue culture/ genetic engineering

Expected domain skills to be achieved: Ability to prepare artificial nutrient media, preparing independently, applying various sterilization procedures for media, glassware and biological materials, in vitro propagation of Banana callus, morphogenesis--s, clonal propagation methods, isolation of plasmid DNA individually and as a group.

PITHAPUR RAJAH'S GOVERNMENT COLLEGE (AUTONOMOUS), KAKINADA
III B.Sc., Botany Practical Examinations at the End of Semester-VI
(PLANT TISSUE CULTURE & PLANT BIOTECHNOLOGY)
Botany Practical Model Paper-VII (w.e.f 2020-21)

Time: 2 hours

Max. Marks: 50

PRACTICAL MODEL PAPER

- | | |
|---|------------|
| Q1. Project report (A) | - 15 marks |
| Viva-voce on study project | -05 marks |
| Q2. Identify and write notes on B, C and D (3x4) | -12 marks |
| B- Tool/instrument/container used in sterilization | |
| C- Tool/instrument/container used in gene transfer | |
| D- GM crops (Photographs) | |
| Q3. Construct restriction map of circular and/ or linear DNA from the data provided – | |
| - 08 marks | |
| Q4. Field report | - 05 marks |
| Q5. Record | - 05 marks |

50 marks

PITHAPUR RAJAH'S GOVERNMENT COLLEGE (AUTONOMOUS), KAKINADA
III Year B.Sc., Degree Examinations at VI Semester End
Botany Paper VII: Plant Tissue Culture and its Biotechnological Applications
(Course: BO6209 Model Paper w.e.f. 2020-21)

Time: 2½ Hrs.

Max. Marks: 60

SECTION – A

3×10 =30M

Answer any **THREE** of the following by choosing atleast one question from each Part., draw neat and labeled diagrams wherever necessary.

PART - I

1. a) Explain about Somatic hybridization
OR
b) Write about Sterilization methods of plant tissue culture?
2. a) Write about Endosperm culture requirements, applications
OR
b) Write about Production of Secondary metabolites
3. a) Explain about Gene Cloning
OR
b) Write about restriction mapping

PART - II

4. a) Write about Methods of Gene transfer in rDNA technology
OR
b) Explain about Selection of Transgenic Plants
5. a) Write about Transgenic Plants
OR
b) Write about Applications of Genetic Engineering

SECTION – B

4×5=20M

Answer any **FOUR** of the following Questions, Draw neat and labeled diagrams wherever necessary

1. Differentiation, Dedifferentiation
2. Cryopreservation
3. Restriction Endonucleases
4. GFP
5. Golden Rice

SECTION – C

5×2=10M

Answer **ALL** Questions

1. Totipotency
2. Pyrethrin
3. What is PCR and what is its function?
4. Biolistics
5. Interferon

BLUE PRINT FOR QUESTION SETTER

UNIT NO/TITLE	LAQ	SAQ	VSAQ	Marks allotted to the Module
UNIT –I: PLANT TISSUE CULTURE – 1	1	1	1	17
UNIT-II: PLANT TISSUE CULTURE – 2	1	1	1	17
UNIT-III: RECOMBINANT DNA TECHNOLOGY	1	1	1	17
UNIT-IV: METHODS OF GENE TRANSFER	1	1	1	17
UNIT-V : APPLICATIONS OF BIOTECHNOLOGY	1	1	1	17
Total marks allotted to all question including choice				85

Note: Question paper setters are requested to adhere strictly to the above blue print while preparing the said paper

PITHAPUR RAJAH'S GOVERNMENT COLLEGE (AUTONOMOUS), KAKINADA
III B.Sc., -Botany-VII / VI Semester End (W.E.F. 2020-21)
ADVANCED ELECTIVE
PLANT TISSUE CULTURE AND ITS BIOTECHNOLOGICAL APPLICATIONS
III B.Sc., -Botany-VII/ VI Semester Question Bank

UNIT I: PLANT TISSUE CULTURE – 1

Essay Questions

1. Write about Sterilization methods of plant tissue culture?
2. Explain about Somatic hybridization

Short Questions

1. Meristem Culture
2. Differentiation, Dedifferentiation
3. Organ culture

Very Short notes.

1. Totipotency
2. Callus culture
3. Dedifferentiation
4. M.S. Medium
5. Micro-propagation
6. Explant
7. Inoculation
8. Somatic embryogenesis
9. Fusogens
10. Organogenesis

UNIT II: PLANT TISSUE CULTURE -2

Essay Questions

1. Write about Production of Secondary metabolites
2. Write about Endosperm culture requirements, applications

Short Questions

1. Cryopreservation
2. Embryo rescue technique
3. Embryo Culture

Very Short notes.

1. Embryogenesis
2. Haploid plants
3. Atropine
4. Pyrethrin
5. Reserpine
6. Cryopreservation
7. Germplasm

UNIT III: RECOMBINANT DNA TECHNOLOGY

Essay Questions

1. Explain about Cloning Vectors in rDNA technology

2. Write about restriction mapping
3. Write about cDNA libraries in rDNA technology

Short Questions

1. Restriction Endonucleases
2. PCR mediated gene cloning
3. Bacterial transformation

Very Short notes.

1. What is Molecular Scissor. Who discovered it?
2. Flush ended fragment
3. What is a plasmid and name artificial plasmids?
4. Chimeric DNA
5. What is Probe and mention its function?
6. YAC
7. Gene cloning
8. What is PCR and what is its function?
9. cDNA
10. Palindrome

UNIT IV: METHODS OF GENE TRANSFER

Essay Questions

1. Write about Methods of Gene transfer in rDNA technology
2. Explain about Selection of Transgenic Plants

Short Questions

1. Microinjection
2. Electroporation
3. GUS
4. GFP

Very Short notes.

1. Transgenic Plants
2. Name of the plasmid and vector which are widely used for obtaining transgenic plants?
3. What is molecular farming?
4. Electroporation
5. Micro injection
6. Biolistics
7. Selectable marker
8. Cohesive ends

UNIT V: APPLICATIONS OF BIOTECHNOLOGY

Essay Questions

1. Write about Applications of Genetic Engineering
2. Write about Transgenic Plants

Short Questions

1. Bt-Cotton
2. Golden Rice
3. Round Up Ready Soya bean

Very Short notes.

1. Glyphosate
2. Cry proteins
3. P.D.R.
4. Coat protein gene
5. BT Cotton
6. Flavrsavr tomato
7. Golden rice
8. Genome
9. G.M.P.
10. Interferon

PITHAPUR RAJAH'S GOVERNMENT COLLEGE (AUTONOMOUS), KAKINADA
III B.Sc., -Botany-VIII-A-1/ VI Semester End (W.E.F. 2020-21)
CLUSTER ELECTIVE
ECONOMIC BOTANY(COURSE:BO6250)

Total hours of Teaching 40hrs @ 3 hrs/week

Total Credits:03

UNIT – I

Introduction

- Introduction to economic botany
- Origin of agriculture
- The nature of variation in plants – consequences of sexual recombination, inbreeding and asexual reproduction

UNIT – II

Fruit Crops – Cultivation and Applications

- Citrus fruits
- Pine apple
- Banana
- Papaya

UNIT – III

Grains – Cultivation and Applications

- Barley
- Wheat
- Rice
- Oats

UNIT – IV

Vegetable Oils, Fiber Yielding Plants – Cultivation and Applications

- Sunflower oil
- Sesame oil
- Castor oil
- Cotton
- Jute

UNIT – V

Timber Yielding Plants and Ornamental Plants

- Teak wood
- Rose wood
- Red sandal
- Arjuna wood
- Brief account on ornamental plants

Suggested Readings:

- Berly Brintnall Simpson and Molly Conner- Ogorzaly – Economic Botany
Plants in our world, McGrahill International Editions
- Economic Botany 3rd Edition by Dr.V.Singh,Dr.P.C.Pande.Dr.D.K.Jain
- Economic Botany – A comprehensive study by S.L.Kochhar- Fifth Edition
- ATextbook Of Modern Economic Botany by A.V.S.S.Sambamurthy and
N.S.Subrahmanyam.

Suggested activities: Study of flora and its diversity in the college campus or local area, enumerating wild and exotic species (*Parthenium*, Water hyacinth etc.)

Project work on any one of the Industries oil yielding and fiber yielding plants study and Processing Methods Study.

Field Visit to Observe Cultivation of Grains and Fruit Crops.

PITHAPUR RAJAH'S GOVERNMENT COLLEGE (AUTONOMOUS), KAKINADA
III B.Sc., BOTANY PRACTICAL PAPER – VIII-A1 PRACTICAL SYLLABUS
ECONOMIC BOTANY (COURSE: BO6250)

Total hours of laboratory Exercises 45 hrs @ 2hrs/week

Total credits:02

1. Taxonomic status of food Plants, Industrial Plants, Drug yielding Plants and its uses
2. Propagation methods of fruit Plants: Citrus Fruits, Banana, Pineapple, Papaya
3. Agricultural and industrial uses of Plants
4. Classification of Ornamental Plants
5. Practical knowledge of operations from sowing to harvesting of Kharif crops
6. Judging the maturity and estimation of yield in oil crops.

Domain skills expected to achieve: Identification of exotic plant species, identification of forest trees based on the characteristics of bark, flowers and fruits, understanding the preservation methods of fresh and dry fruits, understanding the methods of safe disposal of biodegradable and non-biodegradable wastes

PITHAPUR RAJAH'S GOVERNMENT COLLEGE (AUTONOMOUS), KAKINADA
III B.Sc., Botany Practical Examinations at the End of Semester-VI
(PLANT DIVERSITY AND HUMAN WELFARE)
Botany Practical Model Paper-VIII-A-1 (w.e.f 2020-21)

Time: 2 hours

Max. Marks: 50

SCHEME OF PRACTICAL EXAMINATION

- | | |
|---|---|
| 1. Assign the plants A, B and C to their respective families, giving reasons, family name and classification-2 marks, important diagrams- 3 marks. | 15marks |
| 2. Give the protocol of D | 10marks |
| 3. Comment on specimens E, F and G (3x3 =) | 09 marks |
| 4. Report on Field visit
To study sources of firewood (10 plants),
timber-yielding trees (10trees) and bamboos. | 06 marks |
| 5. Viva-Voce | 05 marks |
| 6. Practical Record | 05 marks |
| | <hr style="border-top: 1px dashed black;"/> 50 Marks <hr style="border-top: 1px dashed black;"/> |

KEY

- A.** Cultivated Plant
- B.** Wild Plant
- C.** Exotic plant
- D.** Preservation and canning of fruits, solid and liquid waste management systems in rural/urban areas
- E.** Bark/wood/fruit yielding plant
- F.** Nuts/ Alcoholic beverage plant
- G.** wood /Fibre yielding plant

PITHAPUR RAJAH'S GOVERNMENT COLLEGE (AUTONOMOUS), KAKINADA
III B.Sc., -Botany-VIII-A-1 / VI Semester End (W.E.F. 2020-21)
CLUSTER ELECTIVE
ECONOMIC BOTANY (COURSE: BO6250)

Time: 2½ Hrs.

Max. Marks: 60

SECTION – A

3×10 =30M

Answer any **THREE** of the following by choosing atleast one question from each Part., draw neat and labeled diagrams wherever necessary.

PART - I

1. a) Inbreeding and Asexual Reproduction.
OR
b) Consequences of Sexual Reproduction.
2. a) Cultivation and Applications of Banana.
OR
b) Cultivation and Applications of Papaya.
3. a) Cultivation and Applications of Rice.
OR
b) Cultivation and Applications of Wheat.

PART - II

4. a) Cultivation and Applications of Jute.
OR
b) Cultivation and Application of Sunflower oil.
5. a) Brief account on ornamental plants.
OR
b) Write Essay on Wood Anatomy.

SECTION – B

4×5=20M

Answer any **FOUR** of the following Questions, Draw neat and labeled diagrams wherever necessary

1. Definition of Economic Botany and its importance?
2. Propagation methods of Banana.
3. Advanced Oats Varieties.
4. Commercial importance of Jute.
5. Monoculture.

SECTION – C

5×2=10M

Answer **ALL** the following Questions

1. Inbreeding definition.
2. Citrus canker.
3. Crop Rotation
4. Essential crop rotation for cotton crop.
5. Propagation of Arjun wood.

BLUE PRINT FOR QUESTION SETTER

UNIT NO/TITLE	LAQ	SAQ	VSAQ	Marks allotted to the Module
Unit –I: Economic Botany Introduction	1	1	1	17
Unit - II: Fruit Crops – Cultivation And Applications	1	1	1	17
Unit - III: Grains – Cultivation And Applications	1	1	1	17
Unit-IV: Vegetable Oils, Fiber Yielding Plants – Cultivation And Applications	1	1	1	17
Unit-V : Timber Yielding Plants And Ornamental Plants	1	1	1	17
Total marks allotted to all question including choice				85

Note: Question paper setters are requested to adhere strictly to the above blue print while preparing the said paper

PITHAPUR RAJAH'S GOVERNMENT COLLEGE (AUTONOMOUS), KAKINADA
III B.Sc., -Botany-VIII-A-1 / VI Semester End (W.E.F. 2020-21)
CLUSTER ELECTIVE
ECONOMIC BOTANY (COURSE: BO6250)
III B.Sc., -Botany-VIII-A-1/ VI Semester Question Bank

UNIT-1: ECONOMIC BOTANY INTRODUCTION

Essay Questions.

1. Origin of Agriculture.
2. Inbreeding and Asexual Reproduction.
3. Consequences of Sexual Reproduction.

Short notes.

1. Definition of Economic Botany and its importance?
2. Sexual recombination
3. Asexual reproduction
4. Geographic variations in Plants
5. Polyploidy
6. Vavilov's Centers

Very Short Notes.

1. Agriculture
2. Inbreeding definition.

UNIT-2: FRUIT CROPS – CULTIVATION AND APPLICATIONS

Essay Questions.

1. Cultivation and Applications of Citrus.
2. Cultivation and Applications of Banana.
3. Cultivation and Applications of Papaya.

Short notes.

1. Propagation methods of Banana.
2. Sex differentiation in Papaya.
3. Propagation Methods in Pine apple.

Very Short Notes.

1. Propping in Banana
2. Desakering in Banana
3. Citrus canker.

UNIT-3: GRAINS – CULTIVATION AND APPLICATIONS

Essay Questions.

1. Cultivation and Applications of Rice.
2. Cultivation and Applications of Wheat.

Short notes.

1. Soil requirement & Land preparation in Barley.
2. Seed treatment & Sexing & Planting Methods in Rice
3. Advanced Oats Varieties.

4. Cultivation Methods in Rice forming.

Very Short Notes.

1. Roughing
2. Crop Rotation
3. Intercropping system.

Unit-4: Vegetable Oils, Fiber Yielding Plants – Cultivation And Applications

Essay Questions.

1. Cultivation and Application of Sunflower oil.
2. Cultivation and Applications of Jute.

Short notes.

1. Castor oil uses and Benefits.
2. Manuring and Irrigation in Sesame oil cultivation.
3. Suitable soil and Climate for Sunflower oil plantation.
4. Commercial importance of Jute.

Very Short Notes.

1. Essential crop rotation for cotton crop.
2. Botany of Jute plant.
3. Harvesting of Caster
4. Botany of Sesame plant.
5. Agronomy of sun flower production.

UNIT-5: TIMBER YIELDING PLANTS AND ORNAMENTAL PLANTS

Essay Questions.

1. Brief account on ornamental plants
2. Write Essay on Wood Anatomy.

Short notes.

1. Importance of Red sandal.
2. Importance of Ornamental plants.
3. Monoculture.
4. Wood anatomy.

Very Short Notes.

1. Arboriculture.
2. Botany of Rosewood.
3. Propagation of Arjun wood.

PITHAPUR RAJAH'S GOVERNMENT COLLEGE (AUTONOMOUS), KAKINADA

III B.Sc., -Botany VIII-A-2 / VI Semester End (W.E.F. 2020-21)

CLUSTER ELECTIVE

ETHNOBOTANY AND MEDICINAL BOTANY (COURSE:BO6251)

Total hours of Teaching 40hrs @ 3 hrs/week

Total Credits:03

UNIT –I: ETHNOBOTANY (12h)

1. Introduction, concept, scope and objectives; Ethnobotany as an interdisciplinary science.
The relevance of ethno botany in the present context
2. Major and minor ethnic groups or Tribals of India, and their life styles.
3. Plants used by the tribal populations:
 - a) Food plants,
 - b) intoxicants and beverages,
 - c) Resins and oils and miscellaneous uses.

UNIT -II: ROLE OF ETHNOBOTANY IN MODERN MEDICINE: (12h)

- 1) Role of ethnobotany in modern medicine with special example *Rauvolfia serpentina*, *Trichopus zeylanicus*, *Artemisia annua*, *Withania somnifera*.
- 2) Medico-ethnobotanical sources in India
- 3) Significance of the following plants in ethno botanical practices (along with their habitat and morphology)
 - a) *Azadirachta indica*,
 - b) *Ocimum sanctum*,
 - c) *Vitex negundo*,
 - d) *Gloriosa superba*,
 - e) *Tribulus terrestris*,
 - f) *Phyllanthus niruri*,
 - g) *Cassia auriculata*,
 - h) *Indigofera tinctoria*,
 - i) *Senna auriculata*
 - j) *Curcuma longa*.
- 4) Role of ethnic groups in the conservation of plant genetic resources.

UNIT-III: Ethnobotany as a Tool to Protect Interests of Ethnic Groups (12h)

1. Sharing of wealth concept with few examples from India.
2. Biopiracy, Intellectual Property Rights and Traditional Knowledge.

UNIT -IV: History, Scope and Importance of Medicinal Plants.

Indigenous Medicinal Sciences (12h)

1. Definition and Scope-**Ayurveda**: History, origin, panchamahabhutas, saptadhatu and tridosha concepts, Rasayana, plants used in ayurvedic treatments.
2. **Siddha**: Origin of Siddha medicinal systems, Basis of Siddha system, plants used in Siddha medicine.
3. **Unani**: History, concept: Umoor-e- tabiya, tumors treatments/ therapy, polyherbal formulations (in brief).

UNIT -V: Conservation of endangered and endemic medicinal plants: (12h)

1. Definition: endemic and endangered medicinal plants,
2. Red list criteria
3. *In situ* conservation: Biosphere reserves, sacred groves, National Parks
4. *Ex situ* conservation: Botanical Gardens.

Suggested Readings:

- S.K. Jain, Manual of Ethnobotany, Scientific Publishers, Jodhpur, 1995.
- Glimpses of Indian. Ethnobotany, Oxford and I B H, New Delhi – 1981.
- S.K. Jain (ed.) 1989. Methods and approaches in ethnobotany. Society of ethnobotanists, Lucknow, India.
- S.K. Jain, 1990. Contributions of Indian ethnobotany. Scientific publishers, Jodhpur.
- Colton C.M. 1997. Ethnobotany – Principles and applications. John Wiley and sons – Chichester
- Rama Ro, N and A.N. Henry (1996). The Ethnobotany of Eastern Ghats in Andhra Pradesh, India. Botanical Survey of India. Howrah.
- Trivedi P C, 2006. Medicinal Plants: Ethnobotanical Approach, Agrobios, India.
- Purohit and Vyas, 2008. Medicinal Plant Cultivation: A Scientific Approach, 2nd edn. Agrobios, India.
- Pal, D.C. & Jain, S.K., 1998. Tribal Medicine. Naya Prakash Publishers, Calcutta
- Raychudhuri, S.P., 1991. (Ed.) Recent advances in Medicinal aromatic and spice crops. Vol.1, Today & Tomorrow's printers and publishers, New Delhi

Suggested Activities: Studying plant utilization methods by tribal/rural/migrant populations for their beverages, food, medicinal and uses, seminars on role of ethnic groups in conservation of plant genetic resources, project work on traditional knowledge about plant medicines, study of indigenous medicinal sciences and their efficacy.

PITHAPUR RAJAH'S GOVERNMENT COLLEGE (AUTONOMOUS), KAKINADA
III B.Sc., BOTANY PRACTICAL PAPER – VIII-A-2 PRACTICAL SYLLABUS
ETHNOBOTANY AND MEDICINAL BOTANY

Total hours of laboratory Exercises 45 hrs @ 2hrs/week

Total credits:02

PAPER – VIII PRACTICAL SYLLABUS

1. Ethnobotanical specimens as prescribed in theory syllabus
2. Detailed morphological and anatomical study of medicinally important part(s) of locally available plants (Minimum 8 plants) used in traditional medicine.
3. Field visits to identify and collect ethno medicinal plants used by local tribes/folklore.

Domain skills expected to achieve: Identification of various plant parts used as medicines by ethnic groups, understanding the difference between ancient wisdom and modern system of medicine, traditional medicine at the rescue of curing drug resistant maladies like malaria and viral diseases, understanding the role of spices in Indian kitchens, their therapeutic role

PITHAPUR RAJAH'S GOVERNMENT COLLEGE (AUTONOMOUS), KAKINADA
III B.Sc., Botany Practical Examinations at the End of Semester-VI
(ETHNOBOTANY AND MEDICINAL BOTANY)
Botany Practical Model Paper-VIII-A-2 (w.e.f 2020-21)

Time: 2 hours

Max. Marks: 50

1. Identify the specimen A- Give reasons (morphological and anatomical) and draw
2. labeled sketches **- 15 marks**
3. Identify and write about the medicinal uses of B-and C- (2x5=) **- 10 marks**
4. Comment on D and E. (2x 4=) **- 08 marks**
5. Report on Field visit: **- 07 marks**
List to be prepared mentioning special features of plants used by tribal
populations as Medicinal Plants & Spices. Write their botanical and common names,
parts used and diseases/disorders for which they are prescribed.
6. Viva-voce **- 05 marks**
7. Record **- 05 marks**

Total - 50 marks

KEY

- A.** Plants given in unit II (i)
- B.** Plants used in Ayurvedic preparations (Amla in Chyavanprash, Senna in Laxatives)
- C.** Do –
- D.** Photographs of National parks, Biosphere reserves and Botanical gardens.
- E.** Photograph of famous personalities in Ayurveda/Siddha medicine.

PITHAPUR RAJAH'S GOVERNMENT COLLEGE (AUTONOMOUS), KAKINADA
III Year B.Sc., Degree Examinations at VI Semester End
Botany Paper VIII-A-2: ETHNOBOTANY AND MEDICINAL BOTANY
(Course: BO6251 Model Paper w.e.f. 2020-21)

Time: 2½ Hrs.

Max. Marks: 60

SECTION – A

3×10 =30M

Answer any **THREE** of the following by choosing atleast one question from each Part., draw neat and labeled diagrams wherever necessary.

PART - I

1. a) Write an Essay on Classification of Tribes in India.
OR
b) Define Ethnobotany? Write an Essay on History, Concept and Scope of Ethnobotany.
2. a) Give a brief account on role of Ethnic groups in the Conservation of plant genetic Resources.
OR
b) Write an essay on Trichopus Zylanicus Morphology, Ethnobotany and its role in Modern medicine
3. a) Define Bio piracy? Write an Essay on bio piracy in India.
OR
b) Write an Essay on Intellectual property rights.

PART - II

4. a) Give a brief account on Siddha Medicinal System.
OR
b) Write an Essay on Unani System of Medicine.
5. a) Define In-Situ conservation? Give detailed account on Biosphere reserves.
OR
b) Define Ex-situ conservation. Write an Essay on Botanical gardens.

SECTION – B

4×5=20M

Answer any **FOUR** of the following Questions, draw neat and labeled diagrams wherever necessary

1. Plants used by tribals for edible purpose.
2. Systematic position of gloriosa superb
3. Differences between IPR and Sui-generis System.
4. Triphala rasayana Preparation
5. Endemic species.

SECTION – C

5×2=10M

Answer **ALL** the following Questions

1. Ethno toxicology
2. Monk's pepper
3. Bio piracy
4. Sodhana therapy
5. ICRISAT

BLUE PRINT FOR QUESTION SETTER

UNIT NO/TITLE	LAQ	SAQ	VSAQ	Marks allotted to the Module
Unit –I: Ethnobotany	1	1	1	17
Unit-II: Role Of Ethnobotany In Modern Medicine	1	1	1	17
Unit-III: Ethnobotany As A Tool To Protect Interest Of Ethnic Groups	1	1	1	17
Unit-IV: History, Scope And Importance Of Medicinal Plants Indigenous Medicinal Sciences	1	1	1	17
Unit-V : Conservation Of Endangered And Endemic Medicinal Plants	1	1	1	17
Total marks allotted to all question including choice				85

Note: Question paper setters are requested to adhere strictly to the above blue print while preparing the said paper.

PITHAPUR RAJAH'S GOVERNMENT COLLEGE (AUTONOMOUS), KAKINADA
III B.Sc., -Botany-VIII-A-2/ VI Semester End (W.E.F. 2020-21)
ETHNOBOTANY AND MEDICINAL BOTANY
III B.Sc., -Botany-VIII-A-2/ VI Semester Question Bank

UNIT-1: ETHNOBOTANY.

Essay Questions.

1. Define Ethnobotany? Write an Essay on History, Concept and Scope of Ethnobotany.
2. Give a brief account on Major and Minor Ethnic groups of India.

Short notes.

1. Tribal Music and Music instruments.
2. Beverages
3. Plants used by tribals for edible purpose.

Very Short Notes.

1. Ethnobotany
2. Janaki Ammal
3. S.K. Jain
4. Ethnogynocology
5. Ethno toxicology
6. Dravidians
7. Bigul
8. Boerhaaviadiffusa
9. Martyniaannua
10. hallucinogens

UNIT-2: ROLE OF ETHNOBOTANY IN MODERN MEDICINE.

Essay Questions.

1. Write an essay on Trichopus Zylanicus Morphology, Ethnobotany and its role in Modern medicine
2. Give a brief account on role of Ethnic groups in the Conservation of plant genetic Resources.

Short Notes.

1. Curcuma Longa.
2. Phyllanthus niruri Morphology and Ethno botany.
3. Ocimum Sanctum ethnobotany
4. Cassia auriculata

Very Short Notes.

1. Serpentine
2. Argogyapacha
3. Artemisinin
4. Cassiadora
5. Systematic position of gloriosa superba
6. Curcumin
7. Monk's pepper
8. Ethnobotany on Phyllanthus niruri

9. Systematic position of cassia-auriculata
10. Ocimum sanctum ethnobotany
11. Methane gas

UNIT-III: ETHNOBOTANY AS A TOOL TO PROTECT INTEREST OF ETHNIC GROUPS

Essay Questions.

1. Write an Essay on Intellectual property rights.
2. Give a brief account on Traditional Knowledge.
3. Define Bio piracy? Write an Essay on bio piracy in India.

Short notes.

1. Differences between IPR and Sui-generis System.
2. Equity considerations in Traditional Knowledge.
3. Write Short on plants used as Agricultural implements.

Very Short Notes.

1. Tambura
2. Tannin
3. Dyes
4. Asyoke
5. Madhukaindica
6. Biopiracy
7. IPR

UNIT-IV: HISTORY, SCOPE AND IMPORTANCE OF MEDICINAL PLANTS INDIGENOUS MEDICINAL SCIENCES.

Essay Questions.

1. Define on Ayurveda? Explain pancha maha bhutas, Saptadhatu and Tridosha concept.
2. Give a brief account on Siddha Medicinal System.
3. Write an Essay on Unani System of Medicine.

Short notes.

1. Triphala rasayana Preparation
2. Poly Herbal Formulations.
3. Plants used in Siddha Medicine.
4. Umur-e- tabi-iyya.

Very Short Notes.

1. Ayurveda
2. Shalyatantra
3. Brahami
4. Tridosha principle
5. Sodhana therapy
6. Siddhi
7. Rasayana
8. Sarangdhar Samhita
9. Arkau
10. Boerhaaviadiffusa

UNIT-V: CONSERVATION OF ENDANGERED AND ENDEMIC MEDICINAL PLANTS

Essay Questions.

1. Define In-Situ conservation? Give detailed account on Biosphere reservoirs
2. Define Ex-situ conservation. Write an Essay on Botanical gardens.

Short notes.

1. Endemic species.
2. In-situ Conservation.
3. Red Data book.
4. Biosphere reserves

Very Short Notes

1. Nandadevi
2. Kaziranga national park
3. ICARDA
4. ICRISAT
5. Scared Grooves
6. Endemic species
7. Endangered species
8. IUCN
9. Reddata Book
10. FRI

PITHAPUR RAJAH'S GOVERNMENT COLLEGE (AUTONOMOUS), KAKINADA
III B.Sc., -Botany-VIII-A-3 / VI Semester End (W.E.F. 2020-21)
CLUSTER ELECTIVE

PHARMACOGNOSY AND PHYTOCHEMISTRY(COURSE:BO6913)

Total hours of Teaching 40hrs @ 3 hrs/week

Total Credits:03

UNIT-I: Pharmacognosy (12h)

Definition, Importance, Classification of drugs - Chemical and Pharmacological, Drug evaluation methods

UNIT-II: Organoleptic and microscopic studies: (12h)

Organoleptic and microscopic studies with reference to nature of active principles and common adulterants of *Alstonia scholaris* (bark), *Adhatoda vasica* (leaf), *Strychnos nuxvomica* (seed), *Rauwolfia serpentine* (root) and *Zinziber officinalis* *Catharanthus roseus*.

UNIT-III: Secondary Metabolites: (12h)

1. Definition of primary and secondary metabolites and their differences, major types - terpenes, phenolics, alkaloids, terpenoids, steroids.
2. A brief idea about extraction of alkaloids. Origin of secondary metabolites – detailed account of acetate pathway, mevalonate pathway, shikimate pathway.

UNIT-IV: Phytochemistry: (12h)

1. Biosynthesis and sources of drugs:
 - a) Phenols and phenolic glycosides: structural types, biosynthesis, importance of simple phenolic compounds, tannins, anthraquinones, coumarins and furanocoumarins, flavones and related flavonoid glycosides, anthocyanins, betacyanins, stilbenes, lignins and lignans).
 - b) Steroids, sterols, saponins, withanolides, ecdysones, cucurbitacins: Biosynthesis, commercial importance.
 - c) Alkaloids: Different groups, biosynthesis, bioactivity.
 - d) Volatile oils, aromatherapy.

UNIT-V: Enzymes, proteins and amino acids as drugs: (12h)

1. Vaccines, toxins and toxoids, antitoxins, immune globulins, antiserums,
2. Vitamins, Antibiotics – chemical nature, mode of action.
3. Pharmacological action of plant drugs – tumor inhibitors, PAF antagonists, antioxidants, phytoestrogens and others.
4. Role of different enzyme inhibitors.

BOOKS FOR REFERENCE:

- Wallis, T. E. 1946. Text book of Pharmacognosy, J & A Churchill Ltd.
- Roseline, A. 2011. Pharmacognosy. MJP Publishers, Chennai.
- Gurdeep Chatwal, 1980. Organic chemistry of natural products. Vol.I. Himalaya Publishing house.
- Kalsi, P. S. and Jagtap, S., 2012. Pharmaceutical medicinal and natural product chemistry N.K. Mehra, Narosa Publishing House Pvt. Ltd. New Delhi.
- Agarwal, O. P. 2002. Organic chemistry–Chemistry of organic natural products. Vol. II. Goel publishing house, Meerut.
- Harborne, J. B. 1998. Phytochemical methods –a guide to modern techniques of plant analysis 3rd edition, Chapman and Hall
- Datta & Mukerji, 1952. Pharmacognosy of Indian roots of Rhizome drugs. Bulletin No.1 Ministry of Health, Govt. of India.

Suggested Activities: Isolation techniques of active principles from various parts of popular medicinal plants, debates on the efficacy of plant medicines and palliative cure, volatile oils from plants-extraction methods, project work on crude drugs

PITHAPUR RAJAH'S GOVERNMENT COLLEGE (AUTONOMOUS), KAKINADA
III B.Sc., BOTANY PROJECT WORKS
PHARMACOGNOSY AND PHYTOCHEMISTRY

Total hours of Botany Projects 45 hrs @ 2hrs/week

Total credits:02

1. Morphological Study and adaptable characters in Mangroves.
2. Pollen grains study in few locally available plants.
3. Biofuel production process and Cultivation.
4. Current Methods used for Farming of Cereals, Rice by using Bio fertilizers, Bio pesticides.
5. Plant Sps used for Cultivation and life Existence by Ethnic groups in East Godavari.
6. Collection of C3 Plants.
7. Production of Various Plantlets through Plant Tissue Culture.
8. Chromosome analysis in different plants.
9. Identification of C4 Plants.
10. Identification Angiosperms through different Keys.
11. Observation of Dicot and Monocot Stomata.
12. Preparation of Protein Rich foods from Plants.
13. Preparation Edible of Vitamin Rich Tonics from Plant Products.

PITHAPUR RAJAH'S GOVERNMENT COLLEGE (AUTONOMOUS), KAKINADA

III B.Sc., BOTANY PROJECT WORK

(w.e.f 2020-21)

Time: 2 hours

Max. Marks: 50

Total Study and Collection of Thesis	-	10M
Work done	-	20M
Submission of Work	-	10M
Viva	-	10M

PITHAPUR RAJAH'S GOVERNMENT COLLEGE (AUTONOMOUS), KAKINADA
III Year B.Sc., Degree Examinations at VI Semester End
Botany Paper VIII-A-3: PHARMACOGNOCY AND PHYTOCHEMISTRY
(Course: BO6913 Model Paper w.e.f. 2020-21)

Time: 2½ Hrs.

Max. Marks: 60

SECTION – A

3×10 =30M

Answer any **THREE** of the following by choosing atleast one question from each Part., draw neat and labeled diagrams wherever necessary.

PART - I

1. a) Define pharmacognocny.and write essay on classification of Drugs.
OR
b) Give a detailed note on Drug evaluation methods.
2. a) Give an account of Organoleptic and Microscopic Studies, active principles and common adulterants of Rauwolfia serpentina.
OR
b) Give an account of Organoleptic and Microscopic Studies, active principles and common adulterants of Zingiber officinal.
3. a) What are terpenoids? Explain various types of Terpenoids.
OR
b) What are alkaloids? Write essay on Alkaloids.

PART - II

4. a) What are the different types of Phenols? Describe their biosynthesis.
OR
b) Explain different groups of Alkaloids, biological source, active principles and their Pharmacological action.
5. a) What are Antibiotics? Classify them.
OR
b) What are vaccines? Explain various types of Vaccines.

SECTION – B

4×5=20M

Answer any **FOUR** of the following Questions, Draw neat and labeled diagrams wherever necessary

1. Importance of Pharmacognocny.
2. Chemical constituents of Ginger.
3. Phenols.
4. Importance of Sterols.
5. Phytoestrogens

SECTION – C

5×2=10M

Answer **ALL** Questions

1. Refractive index of Physical evaluation.
2. Pharmacological importance of Alstonia Bark.
3. Definition and molecular formula of Diterpenoids
4. Write about Tanins.
5. Define Enzyme inhibitors.

BLUE PRINT FOR QUESTION SETTER

UNIT NO/TITLE	LAQ	SAQ	VSAQ	Marks allotted to the Module
UNIT –I: UNIT-1: PHARMACOGNOSY	1	1	1	17
UNIT-II : ORGANOLEPTIC AND MICROSCOPIC STUDIES.	1	1	1	17
UNIT-III: SECONDARY METABOLITES	1	1	1	17
UNIT-IV: PHYTOCHEMISTRY	1	1	1	17
UNIT-V : ENZYMES, PROTEINS AND AMINOACIDS AS DRUGS	1	1	1	17
Total marks allotted to all question including choice				85

Note: Question paper setters are requested to adhere strictly to the above blue print while preparing the said paper

PITHAPUR RAJAH'S GOVERNMENT COLLEGE (AUTONOMOUS), KAKINADA
III B.Sc., -Botany-VIII-A-3/ VI Semester End (W.E.F. 2020-21)
PHARMACOGNOSY AND PHYTOCHEMISTRY
III B.Sc., -Botany-VIII-A-3/ VI Semester Question Bank

UNIT-1: PHARMACOGNOSY

Essay Questions

1. Define pharmacognocny.and write essay on classification of Drugs.
2. Give a detailed note on Drug evaluation methods.

Short notes.

1. Chemical evaluation of crude drugs.
2. Biological evaluation.
3. Importance of Pharmacognocny.

Very Short Notes.

1. Define pharmacognocny
2. Crude drug definition
3. Classification types
4. Give examples of plant names chemically evaluated resins.
5. Give examples of plant names chemically evaluated volatile oils.
6. Give examples of plant names chemically evaluated glycosides.
7. Pharmacological drugs acting on Respiratory system
8. Central nervous system therapeutic drug examples
9. Which plants are used to curing Anti malarial and Anti cancer .
10. Methods of evaluation crude drugs.
11. Refractive index of Physical evaluation
12. Define Quantitative Microscopy
13. Which tests are used to identify individually of Glycosides ,Flavanoids

UNIT-2: ORGANOLEPTIC AND MICROSCOPIC STUDIES.

Essay Questions

1. Give an account of Organoleptic and Microscopic Studies, active principles and common adulterants of Alstonia Scholaris bark.
2. Give an account of Organoleptic and Microscopic Studies, active principles and common adulterants of Rauwolfia serpentina.
3. Give an account of Organoleptic and Microscopic Studies, active principles and common adulterants of Zingiberofficinal.

Short notes.

1. Microscopic studies of Alstonia scholaris bark
2. Chemical constituents of Ginger.
3. Active principle of Nux-vomica seeds.

Very Short Notes.

1. Define Oraganoleptic and Microscopic studies
2. Active principles of Alstonia scholaris Bark
3. Pharmacological importance of Alstonia Bark
4. Pharmacological importance of Adhatoda vasica
5. Organoleptic studies on Strychnos nux-vomica

6. Biological classification of Rauwolfia serpentine
7. Active principles of Rauwolfia serpentine
8. Pharmacological importance of Zinziber rhizome
9. Active principles of Catharanthus
10. Common adulterants of Zinziber

UNIT-3: SECONDARY METABOLITES

Essay Questions

1. What are terpenoids? Explain various types of Terpenoids.
2. What are alkaloids? Write essay on Alkaloids.

Short notes.

1. Shikimate pathway.
2. Mevalonate Pathway.
3. Acetate Pathway.
4. Phenols.
5. Sterols.

Very Short Notes.

1. Definition of Secondary metabolites
2. Major types of secondary metabolites
3. Define Terpenoids
4. Classification types of Terpenoids
5. Definition and molecular formula of diterpenoids
6. Give detailed examples of Monoterpenoids
7. Write about protoalkaloids
8. Define steroids
9. Types of alkaloids
10. What is Morphium and who given this name

UNIT-4: PHYTOCHEMISTRY.

Essay Questions

1. What are the different types of Phenols? Describe their biosynthesis.
2. Explain different groups of Alkaloids, biological source, active principles and their Pharmacological action.

Short notes

1. Anthocyanin's and Betacyanins.
2. Anthraquinones.
3. Coumarins
4. Importance of Sterols.
5. Aromatherapy.
6. Volatile oils.

Very Short Notes.

1. Definition of Phenol
2. Structure and examples of Trihydric Phenols
3. Write about Tanins
4. Classification types of Tanins
5. Structures of Hydrolysable Tanins

6. Cyanogenetic and Cyanophoric Glycosides
7. Major types of Flavonoids
8. Define aldehydes
9. Pharmaceutical application of Volatile oils
10. Define Cardiac Glycosides
11. Write about Aromatherapy

UNIT-5: ENZYMES, PROTEINS AND AMINOACIDS AS DRUGS.

Essay Questions

1. What are vaccines? Explain various types of Vaccines.
2. Write an essay on Classes, subclasses, types and sub types of Human immunoglobulins.
3. What are Antibiotics? Classify them.

Short notes.

1. Phytoestrogens
2. Antiserum
3. Tumor inhibitors.
4. Anti-oxidants.
5. Enzyme inhibitors
6. Toxoids.

Very Short Notes.

1. What is Vaccine? Write present using major vaccines.
2. Classification of Vitamins
3. Define Enzyme inhibitors
4. What is Toxins and Toxoids
5. What was the uses of Immune globulins?
6. Definition of Anti-oxidants and give examples
7. Present widely using Human immune globulins
8. What are major Antibiotics
9. Uses of Antibiotics and give Examples
10. Define Phytoestrogens