

GOVERNMENT DEGREE COLLEGE, SIDDIPET

**TELANGANA STATE
(AUTONOMOUS)**

RE-ACCREDITED WITH “A” GRADE BY NAAC



SYLLABUS UNDER CBCS SCHEME

(w.e.f. 2017-18 Academic year)



DEPARTMENT OF P.G. BOTANY

Government Degree College (Autonomous)
M.Sc. Botany Scheme of Papers & Examinations

Semester-I

Paper	Title	Theory Hrs/Week	Practical Hrs/Week	Max.Marks Theory
I	Phycology and Mycology	4	4	100
II	Bryophyta and Pteridophyta	4	4	100
III	Taxonomy and Medicinal Botany	4	4	100
IV	Plant BioChemistry	4	4	100
V	Communicative English & Soft Skills (Add on Paper)	4	-	40+10 Internal Asses.+50 Qs. based on concept

Semester-II

Paper	Title	Theory Hrs/Week	Practical Hrs/Week	Max.Marks Theory
I	Applied Phycology and Mycology	4	4	100
II	Gymnosperms and Embryology	4	4	100
III	Plant Anatomy and Palynology	4	4	100
IV	Plant Physiology	4	4	100
V	Human Values and Professional Ethics (Add on Paper)	4	-	40+10Internal Asses+50Qs. Based on Concept.

Practical exams of I and II Semester will be conducted at the end of the Semester.

Internal Asses.15 Marks +5 Marks Assignment for each Paper and 80 marks for Final Exam.

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GOVERNMENT DEGREE COLLEGE, SIDDIPET,
(AUTONOMOUS)
M.Sc. Botany (CBCS)
INTERNAL ASSESSMENT
Paper Pattern and Marks

Internal-I Marks: 15

Question paper pattern

I. Multiple Choice Questions (10):	10x1/2=5M
II. Fill in the blanks (10):	10x1/2=5M
III. Very short answer questions (5):	5x1=5M

Internal-II Marks: 15

I. Multiple Choice Questions (10):	10x1/2=5M
II. Fill in the blanks (10):	10x1/2=5M
III. Very short answer questions (5):	5x1=5 M

Average marks of Internal I&II	:	15 Marks
Assignment marks`	:	05 Marks
Total marks	:	20 Marks

THEORY EXAMINATIONS
Paper Pattern and Marks

PART-A Short Answer Type **8X4=32M**

PART-B Essay Answer Type with internal choice **4X12=48M**

Total marks: **80 Marks**

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GOVERNMENT DEGREE COLLEGE, SIDDIPET, (AUTONOMOUS).
M.Sc. Botany I Semester

MBOT.CC.T.1.101

4 Hrs/week 4 Credits

Paper I: Phycology and Mycology

UNIT - I

1. General characters and comparative study of important systems of classification of algae – Fritsch and Parker systems of classifications.
2. Criteria used in the primary classification of algae: a) Pigments b) Reserve food materials c) flagella d) cell wall e) gross cell structure.
3. Algae of diverse habitats – a) Terrestrial. b) Freshwater algae and c). Marine algae
4. Reproduction of algae – a) Vegetative b) Asexual – Different types of spores.
Sexual – Zygotic, Sporic and Gametic with suitable examples.

UNIT - II

5. General characters, morphology, life history and classification of the following groups of algae:
 - a. Cyanophyceae - *Microcystis, Lyngbya and Aulosira*.
 - b. Chlorophyceae - *Eudorina, Pediastrum, Hydrodictyon, Pithophora, Ulva, Stigeoclonium, Draparnaldiopsis, Cosmarium, Closterium and Bryopsis*
 - c. Charophyceae – *Nitella*

UNIT --III

6. Introduction to Mycology - General characters of true fungi and fungi-like organisms; hyphal ultra structure; fungal wall and septa; main growth forms of fungi; mode of nutrition in fungi.
7. General characteristics of fungal spores; asexual and sexual reproduction in different groups of fungi.
8. Fungal cytology and genetics: Heterokaryosis, Parasexual cycle; Sex Pheromones (hormones) in fungi; Mechanism of nuclear inheritance; Mechanism of extra-nuclear inheritance.
9. Outlines of nomenclature, ICN, phylogeny and recent taxonomic criteria; Classification of Fungi (Alexopoulos and Mims, 1996 and Hibbett et. al., 2007)

UNIT -IV

10. Systematic position, lifecycle (Hibbett et. al., 2007) and brief account of the following types:
 - Microsporidia - General account
 - Chytridiomycota - *Synchytrium*
 - Blastocladiomycota - *Allomyces, Pilobolus*
 - Neocallimastigomycota - General account
 - Glomeromycota - *Glomus*
 - Ascomycota - *Taphrina, Emericella, Neurospora, Gibberella, Glomerella, Morchella*
 - Basidiomycota - *Melampsora, Phallus, Ustilago*
 - Oomycota - *Peronospora*
 - Fungi-like organisms - *Stemonitis*

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Practicals (Labs)

4 Hrs /Week

Practical lab –I

1. Identification of the genera mentioned in Cyanophyceae and Chlorophyceae.
2. Collection and identification of algae occurring in and around university college/campus.
3. Introduction to basic Mycological Techniques and Lab. Safety; Methods of sterilization, media preparation and culturing.
4. Identification of fungal cultures, slides and specimens of *Synchytrium*, *Allomyces*, *Glomus*, *Emericella*, *Neurospora*, *Morchella*, *Fusarium*, *Colletotrichum*, *Melampsora*, *Phallus*, *Ustilago*, *Peronospora*, and *Stemonitis*.
5. Study of Symptomology of the following fungal diseases by taking sections and slide preparation: Downy mildews, Tikka disease, *Melampsora* rust, Wheat rust and White rust.

References

1. Fritsch, F.E. The structure and reproduction of algae volume 1 and 2
2. Robin South, G and Alan Whittick: Introduction to Phycology
3. Morris, I: An Introduction to Algae
4. Bold, H.C. and Wynne, M.D.: Introduction to the Algae structure and reproduction
5. H.D. Kumar: Introductory Phycology
6. John Webster and Roland W.S. Weber - Introduction to Fungi
7. Alexopoulos C.J., C.W. Mims and M. Blackwell – Introductory Mycology
8. Mehrotra R.S. and K.R. Aneja – An Introduction to Mycology
9. Smith, J.E. - The Filamentous Fungi

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GOVERNMENT DEGREE COLLEGE, SIDDIPET, (AUTONOMOUS)
M.Sc. Botany, I-Semester (CBCS) Examination, 2017

Subject: Botany
Model Question Paper
Paper-I: PHYCOLOGY & MYCOLOGY

Time: 3 Hrs

Max Marks: 80

Note: Answer all questions from Part –A and Part-B

PART-A (8X4=32M)
(Short Answer Type)

1. Pigments of algae
2. Aquatic algae
3. *Pediastrum*
4. *Microcystis*
5. Heterokaryosis
6. Parasitic fungi
7. *Synchitrium*
8. *Pernospora*

PART-B (4X12=48)

(Essay Answer Type)

- 9 a) What is phycozoology? Write about Fritsch classification of algae
(or)
b) Discuss the various types reproduction included in algae with relevant examples.
- 10 a) Write the classification and general features of Cyanophyceae
(or)
b) Describe the morphology and sexual reproduction of *Nitella*.
11. a) Discuss the mode of nutrition in fungi.
(or)
b) Describe the events in parasexuality and add a note on its importance.
12. a) Write about systematic position and life cycle of Basidiomycotina.
(or)
b) Explain the various sexual fruit bodies of Ascomycetes.

GOVERNMENT DEGREE COLLEGE, SIDDIPET, (AUTONOMOUS)
M.Sc. Botany, Sem-I, (CBCS)
Internal Assessment Model Paper
Paper-I: Phycology & Mycology

H.T.No:
Name of the Student:

Date:
Max.marks:15

I) Answer the following Questions

10x1/2=5

- 1) Yeasts are ()
a) Unicellular forms b) Filamentous forms c) Branched forms d) Rhizoidal forms
- 2) Majority of fungi are having cell wall made up of ()
a) Muramic acid b) Pectin c) Cellulose d) Chitin
- 3) Dolipore septa are present in ()
a) Zygomycetes b) Oomycetes c) Basidiomycetes d) Ascomycetes
- 4) The specialized structures found between the cellwall and cell membrane of fungal cell are known as ()
a) Vacuoles b) Lomasomes c) Ribosomes d) Mitochondria
- 5) Reserve food material in fungi is ()
a) Glucose b) Glycogen c) Starch d) Oil granules
- 6) Nutrition of Fungi is ()
a) Ingestive type b) Absorptive heterotrophic type
c) Phagotrophic heterotrophic type d) Autotrophic type
- 7) Majority of fungi are ()
a) Saprophytes b) Parasites c) Symbionts d) None of the above
- 8) Isogamy is a common feature in ()
a) Monoblepharidales b) Blastocladales c) Chytridiales d) Pleosporales
- 9) Gametangial copulation mainly found in the members of ()
a) Basidiomycetes b) Zygomycetes c) Ascomycetes d) Dueteromycetes
- 10) Anteriorly arranged single tinsel flagellum is present in ()
a) Oomycetes b) Hypochytridiomycetes c) Chytridiomycetes d) Zygomycetes

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M.Sc. BOTANY- I SEMESTER

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4 Hrs/week, 4 Credits

PAPER – II: Bryophyta and Pteridophyta

UNIT – I

1. Classification systems of Bryophytes
2. Distribution, structure and reproduction of the following groups:
 - a) Marchantiales; Marchantiaceae-*Marchantia*, *Targionia*
 - b) Jugarmanniales- *Porella*
 - c) Anthocerotales- *Anthoceros*, *Notothyllas*
 - d) Sphagnales – *Sphagnum*
 - e) Polytrichales- *Polytrichum*

UNIT – II

3. Structure and evolution of gametophyte in Bryophytes
4. Structure and evolution of sporophytes in Bryophytes
5. Economic importance of Bryophytes
6. Fossil & Fossilization, types of plant fossils
7. Fossil Bryophytes.

UNIT – III

8. Classification systems of Pteridophytes
9. Distribution, structure and reproduction of the following groups:
 - Psilotales- *Psilotum*
 - Filicales – *Ophioglossum*, *Adiantum*, *Salvinia*, *Azolla*
 - Lycopodiales- *Lycopodium*, *Phylloglossum*
 - Selaginellales-*Selagenella*
 - Isoetales- *Isoetes*,
 - Equisetales-*Equisetum*Stelar evolution in Pteridophytes.

UNIT- IV

10. Telome theory & its application
11. Heterospory & seed habit
12. Geological time scale
13. Techniques employed in the types of fossils
14. Origin & evolution of early vascular plants
15. General characters of Lepidodendrales, Calamitales and Sphenophyllales.

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Practicals (Labs)

4Hrs/week

Practical Lab-II

1. Bryophytes: Morphological and structural study using whole mount
 - a) *Plagiochasma / Fimbrirania*
 - b) *Targionia*
 - c) *Notothylas*
 - d) *Sphagnum / Fumaria*.

2. Pteridophyta, Morphology and anatomy of vegetative and reproductive organs using cleared whole mount sections. Macerations and permanent preparation of *Psilotum*, *Isoetes*, *Ophioglossum*, *Adiantum*, *Salvinia*, *Azolla*.

References

1. Smith, G.M. Cryptogomic Botany. Vol.II
2. Parihar, N.S.: Bryophyta
3. Parihar, N.S.1976: Biology and Morphology of Pteridophytes
4. Sporne, K.R. Pteridophyta
5. Rashid: Introduction to Pteridophyta
6. Cavers, F. Inter-relations of Bryophytes.

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M.Sc. BOTANY- I SEMESTER

MBOT.CC.T.1.103

4 Hrs/week, 4 Credits

Paper-III: Taxonomy of Angiosperms and Medicinal Botany

UNIT –I

1. Systems of classification: Phenetic and Phylogenetic systems.
Critical account of the systems of classifications of a) Hutchinson b) Cronquist and c) Takhtajan.
2. Taxonomic evidence and techniques used there in a) Morphology b) Micromorphology c) Epidermology d) Cytology e) Phytochemistry f) Nucleic acid hybridization.

UNIT –II

3. Nomenclature: a) Concept of ICBN b) Salient features of Botanical Nomenclature c) Ranks and Nomenclature of taxa d) Typification e) Rules of Priority f) Effective and valid publication g) Author citations.
4. Biosystematics: a) Concept b) Categories c) Species concept

UNIT –III

5. A comparative study of the following pairs of families and their treatment in recent systems:
 - a) Magnoliaceae & Winteraceae
 - b) Malvaceae & Sterculiaceae
 - c) Rutaceae & Meliaceae
 - d) Apocynaceae & Asclepiadaceae
 - e) Verbenaceae & Lamiaceae
 - f) Amaranthaceae & Chenopodiaceae
 - g) Cyperaceae & Poaceae
6. Origin of angiosperms, with reference to recent findings.

UNIT –IV

7. Medicinal Botany:
 - a) Role of plants in medicine, its origin and development
 - b) Morphology, active principles and medicinal value of the following:
 - i. *Andrographis paniculata*
 - ii. *Asparagus racemosus*
 - iii. *Clitoria ternata*
 - iv. *Phyllanthus emblica*
 - v. *Gymnema sylvestre*
8. Flora of Telangana: Salient features of vegetational aspects.

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Practicals (Labs)

4 Hrs/week

Practical Lab-III

1. Study of the locally available plants and recording of the intraspecific variation.
2. Description and identification at family, genus and species levels using Floras.
3. Identification of key characters in a group of species of a genus and construction of keys.
4. Construction of indented keys for the given material
5. Simple Nomenclatural problems
6. Identification of families studied based on flowers or essential parts of the flowers
7. Knowledge of Herbarium techniques
8. Record and Herbarium

References

1. Lawrence: Taxonomy of Vascular Plants
2. Sivarajan, V.V. (Ed. Robson). Introduction to Principles of Plant Taxonomy
3. Heywood, V.H. Plant Taxonomy
4. Naik, V.N. Taxonomy of Angiosperms (1988)
5. Stace, C.R. Plant Taxonomy and biosystematics (2nd Ed.)
6. Hutchinson, J. The families of flowering plants (3rd Ed.),1973
7. Cronquist, R. The Evolution and classification of flowering plants (1988)
8. Cronquist 1981. An integrated system of classification of flowering plants
9. Takhtajan, K. Outline of classification of flowering plants. Botanical Rev. 46:225-359),1980
10. Flowering plants. Origin and Dispersal (Trans. By Jeffrey),1969
11. Jones, S.B. & Luchsinger, A.E. Plant systematics,1988
12. Davis, P.H. & V.H. Heywood. Principles of Angiosperm Taxonomy
13. Henry & Chandrabose. An aid to International Code of Botanical Nomenclature
14. Bennet. Plant Nomenclature
15. Dunn, C. and B.S. Veritt. An introduction to Numerical Taxonomy
16. R.Jain, S.K. & Rao, .R. A Handbook of Field and Herbarium Methods.
17. Herborne, J.B. & B.L. Turner. Plant Chaemosystematics
18. International code of Botanical Nomenclature – 2000. (Int. Association of Plant Taxonomist Pub.) Utrecht.
19. Takhtajan 1997. Diversity and Classification of flowering plants. Columbia Univ. Press, New York.
20. Nordenstam B., El/Gazalay and Kasas M. 2000. Plant Systematics for 21st Century. Portland Press Ltd., London.
21. Woodland DW 1991, Contemporary Plant systematics, Prentice Hall, New Jersey.

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M.Sc. BOTANY- I SEMESTER

MBOT.CC.T.1.104

4 Hrs/week, 4 Credits

Paper-IV: Plant Biochemistry

UNIT –I

1. **Bioenergetics:** Conservation of energy, Entropy and disorder, Gibbs free energy, Chemical reactions and equilibrium constants, Redox potential, energy currencies (ATP, NAD, NADP), ATP structure and reactions.
2. **Enzymes:** Properties of enzymes, Co-factors, Isozymes, enzyme kinetics, Michaelis – Menten equation, mechanism of enzyme action, regulation of enzyme action.

UNIT –II

3. **Carbohydrates:** Classification, structure and function of carbohydrates a) monosaccharides b) Oligosaccharides c) polysaccharides, storage polysaccharides, structural polysaccharides, glycoproteins.
4. **Lipids:** Classification of lipids – simple lipids, compound lipids, sterols and terpenoids, biosynthesis of fatty acids, polyunsaturated fatty acids,

UNIT –III

5. **Amino acids:** a) General properties b) Classification and characteristics c) Non protein amino acids d) Peptide bonds e) Biosynthesis of amino acids with reference to GS and GOGAT.
6. **Proteins:** a) Classification of proteins, b) Structure of proteins and Ramachandran plot
7. **Nucleic acids:** a) Structure of DNA and types – B, A and Z forms and DNA
b) Structure of RNA – m-RNA, t-RNA, r-RNA

UNIT –IV

8. **Structure and function of membranes:** a) Chemical composition b) Membrane models
c) Functions of Membranes d) Membrane proteins e) Membrane lipids
9. **Biochemistry of plant cell wall:** cellulose, hemicelluloses, lignin, pectin, suberin and cutin.
10. **Secondary metabolites:** introduction, classification, distribution and functions.

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Practicals (Labs)

4 Hrs/week

Practical Lab-IV

1. Determination of amylase activity
2. Estimation of fructose by resorcinol method
3. Estimation of protein by Biuret method
4. Estimation of reducing sugars in fruits.
5. Determination of iodine number.
6. Extraction and estimation of alkaloids from tea leaves/coffee seeds

References:

1. Plant Physiology, biochemistry and molecular biology. David, T: Dennis and Davis Turnip. Longman. Scientific and technical U.K. 1990.
2. Plant Biochemistry Voet, D and Voet J.G. International
3. Outlines of biochemistry. 5th edition Con E.E. and Stump P.K. 1995. Willey
4. Principles of biochemistry, Lehninger, A.L. 1982 CBS Publication
5. Biochemistry, Strayer W.H. 1976. Foreman Company.
6. Introduction to Plant Physiology. Willium G. Hopkins and Norman P. A. Huner
7. Plant Physiology. Lincoln Taiz and Eduardo Zeiger. International Edition
8. Plant Biochemistry. P.M. Dey and J.B. Harborne
9. Plant Biochemistry. Hans-Walter Heldt
10. Physicochemical and Environmental Plant Physiology. Park S. Nobel

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M.Sc. BOTANY- I SEMESTER

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Paper-V: Communicative English and Soft Skills

Unit - I Oral and Aural Skills

- A. Sounds of English Vowels sounds and consonant sounds
- B. Word Accent and Connected Speech – Contractions , Question Tags
- C. Listening for information; taking notes while listening to lectures(Use of Dictionary with CD- Rom for phonetic symbols, pronunciation and listening practice).

Unit - II Writing Skills

- A. Sentence Writing and Paragraph Writing; use of linkers and appropriate vocabulary.
- B. Business Letters and E-mail (writing & etiquette)
- C. Descriptive writing (describing a person, product and process)

Unit-III Job Skills

- i) Group discussions and debates
- ii) Presentation skills—Kinesis
- iii) Interview skills.

Unit - IV Soft Skills

- i) Interpersonal communication – Verbal and Non –Verbal , etiquette
- ii) Critical thinking
- iii) Team work

References:

1. English for Success, Suresh Kumar et al;Cambridge University Press India Pvt. Ltd. 2010.
2. Communication Skills and Soft Skills : An Integrated approach, Dorling Kindersley (India.) Pvt. Ltd., 2013.
3. Inter –Personal Communication by Radly 1989
4. Soft Skills – AV Suresh Kumar – Rishi Publication -2009
5. New Technologies in the Class Room. Dhanvel – McMillan Publications-2010.

FACULTY OF SCIENCE
GOVERNMENT DEGREE COLLEGE, SIDDIPET, (AUTONOMOUS)
M.Sc. Botany -I Semester (CBCS) Examination, 2017
Subject: Botany
Internal Assessment Model Paper
Paper- V: Communicative English and Soft Skills

- I. Mock interview
2. Official letter writing

1x5=5

1x5=5

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GOVERNMENT DEGREE COLLEGE, SIDDIPET, (AUTONOMOUS)
M.Sc. Botany -I Semester (CBCS) Examination, 2017
Model Question Paper
Paper- V: Communicative English and Soft Skills

40 marks

Part -A

(Short Question type/ Concept based Questions)

I. Answer all the questions

4x4=16

1. Write the correct question tag for the following.
 - a. I am a student.
 - b. She has invented an aerodynamic particle.
 - c. Ramu shall come tomorrow.
 - d. We have not finished our studies.
2. Write a letter to your principal requesting him/her to permit your classmates to visit the CCMB, Hyd.
3. Describe briefly the importance of listening in an interview.
4. Describe the importance of body language in negotiations.

II. Answer all the questions

4x6=24

- 5) a. Write the correct English words for the following phonetic script.

a. /'n^ngrr b. /'frrenk/ c. /k^b^d/ d. /'davn/

(or)

- b. Describe the process of making tea.

- 6) a. how is summing up done in a group discussion.

(or)

- b. Elaborate the importance of teamwork in Swach Bharat in your college.

7. a. write an E-mail to the manager, SBH Siddipet requesting him/her to open an account in your name

(or)

- b. Your in interview. Introduce yourself briefly. Describe your strength and weakness.

8. a. What is the importance of communication skills for leader in team work.

(or)

- b. How are the problems of present society overcome with the help of learning good etiquette?

SEMESTER-II

**FACULTY OF SCIENCE
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M.Sc. BOTANY- II SEMESTER

MBOT.CC.T.1.201

4 Hrs/week, 4 Credits

Paper-I: Applied Phycology and Mycology

UNIT-I

1. General characters and morphology, life history of the following groups of algae.

- a. Bacillariophyceae – *Cyclotella*, *Cymbella*, *Gomphonema*.
- b. Euglenophyceae - *Euglena*, *Phacus*
- c. Phaeophyceae - *Laminaria* , *Padina*
- d. Rhodophyceae - *Porphyra*, *Gracillaria*, *Corallina*.

UNIT-II

- 2. Algal blooms and Toxic algae
- 3. Algal biofertilizers.
- 4. Algae as Food and Feed.
- 5. Role of algae in industry (Alginic acid, Agar, Carrageenan)
- 6. Fossil Algae (A brief account only)

UNIT-III

- 7. Fungi in Industry: Production of alcohol and organic acids.
- 8. Fungi in Medicine: Types of metabolites used in medicine and production of antibiotics.
- 9. Fungi in Agriculture and Forestry:
 - a) Fungi as plant parasites (Wilts, Leafspots, Root rots, Smuts and Rusts).
 - b) Fungi as bio-fertilizers: Ecto and Endomycorrhizae.
 - c) Fungi as biopesticides: mycofungicides, weedicides, and insecticides.
- 10. Fungi as human and animal parasites (medical mycology)
- 11. Fungi as food: Mushrooms: Types of mushrooms, biology and growth of mushrooms, nutritional and medicinal value of edible mushrooms; Fungal protein (Yeast and *Fusarium*).

UNIT-IV

- 12. General account of Archaeobacteria and Eubacteria; General characters of Plant Pathogenic Bacteria - Ultra structure of bacterial cell, biochemistry of cell wall, nutritional and growth factors of bacteria. Plasmids - significance of plasmids; molecular events in genetic transfer (conjugation, transformation and transduction) in bacteria.
- 13. Viruses: Characteristics and ultrastructure of virions; isolation, purification, detection and characterization of viruses; Classification (ICTV) of viruses; Symptomatology and Transmission of plant viruses; Importance of the viruses.
- 14. Mollicutes: General characters, transmission and diseases caused by Spiroplasmas and Phytoplasmas.

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MBOT.CC.P.1.205

Practicals (Labs)

4 Hrs/week

Practical Lab-I

- 1. Identification of the genera mentioned in Bacillariophyceae, Euglenophyceae, Phaeophyceae and Rhodophyceae.

2. Identification of bloom forming algae.
3. Identification of Algal biofertilizers.
4. Identification of toxic algae.
5. Identification of fungal cultures, slides and specimens of *Rhizopus/Mucor*, *Aspergillus*, *Penicillium*, Yeast, *Fusarium*, *Alternaria*, *Cercospora*, *Pythium*, *Sphaecelotheca*, VAM fungi, *Trichoderma*, *Beauveria*.
6. Study of Mycorrhizal colonization in roots of *Parthenium* and *Tagetes*.
7. Study of Mushroom specimens
8. Staining of Gram + ve and Gram - ve Bacteria
9. Herbarium of diseased plants (fungal, bacterial, viral & mycoplasma diseases available locally - at least 2-3 specimens of each to be submitted).

References

1. Fritsch, F.E. The structure and reproduction of algae volume I and II
2. Robin South,G and Alan Whittick: Introduction to Phycology
3. Morris,I: An Introduction to Algae
4. Bold, H.C. and Wynne, M.D.: Introduction to the Algae structure and reproduction
5. H.D.Kumar: Introductory Phycology.
6. Change. S.T. and P.G. Miles - Edible mushrooms and their cultivation
7. Mosses, B.V.A. - Mycorrhizae
8. Powel, C and D. J. Bagyaraj - V.A. Mycorrhizae
9. Berry, R. - Industrial mycology (Vol. I)
10. Dubey, S.C. - Biotechnology.
11. Jeffrey C. Pommerville - Alcamo's Fundamentals of Microbiology
12. Arora D.R. and B. Arora - Text book of Microbiology

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M.Sc. BOTANY- II SEMESTER

MBOT.CC.T.1.202

4 Hrs/week, 4 Credits

Paper – II Gymnosperms and Embryology

UNIT – I

1. Distribution of Gymnosperms - Past and present.

2. Classification of Gymnosperms – Proposed by Sporne and Pant.
3. Economic importance of Gymnosperms
4. Wood anatomy of Conifers

UNIT – II

5. A general account of Gymnosperms with reference to their vegetative morphology and anatomy and male and female cones of the following taxa
 - a) Cycadales (*Cycas*, *Zamia*)
 - b) Ginkgoales (*Ginkgo*)
 - c) Coniferales (*Araucaria*, *Podocarpus*, *Cupressus* and *Cedrus*)
 - d) Taxales (*Taxus*)
 - e) Gnetales (*Ephedra*, *Welwitschia*)

UNIT – III

6. Development and trends of evolution of male gametophyte in Gymnosperms
7. Structure of Ovule and development of female gametophyte.
8. Embryogeny in Gymnosperms
9. General Account of Pteridospermales, Pantoxylales and Cordaitales.

UNIT -IV

10. Microsporangium: Anther, sporogenous tissue, formation of pollen wall, vegetative and generative nucleus.
11. Mega sporangium: Ovule, types of ovule, Nucellus, Megasporogenesis, embryo sac types, a special account of mature embryo sac.
12. Fertilization: Double fertilization, self-incompatibility, barriers of fertilization.
13. Endosperm: Development and types of endosperms. Embryogeny of dicots. A general account of Apomixis and Parthenocarpy.
14. Embryology in relation to Taxonomy.

FACULTY OF SCIENCE
GOVERNMENT DEGREE COLLEGE, SIDDIPET, (AUTONOMOUS)

MBOT.CC.P.1.206

Practicals (Labs)

4 Hrs/week

Practical Lab-II

1. Gymnosperms: Comparative study of the vegetative, reproductive parts and Anatomy of the following:

- Zamia, Araucaria, Cedrus, Thuja, Ginkgo and Taxus.*
2. Palaeobotany: *Lyginopteris, Medullosa, Ptilophyllum and Glossopteris.*
 3. Embryology: Study of embryology by specimens and slides.
 - a) T.S. of anther.
 - b) Study of ovules by hand section.
 - c) Globular embryo
 - d) Mature embryo
 - e) Poly embryony
 - f) Pollen viability.

References

1. Chamberlain, C.J. Gymnosperms: Structure and evolution
2. Sporne K. R: The Morphology of Gymnosperms.
3. Vashistha, P.C. 1978: Gymnosperms.
4. Foster & Gifford. Comparative Morphology of Vascular Plants
5. Delevoryas, T.1963. Morphology and evolution of Fossil Plants
6. Arnold C.W. introduction to Paleobotany
7. Shukla & Mishra: Essentials of Paleobotany
8. Steward, W.N. 1988: Paleobotany & Evolution of plants
9. Sergeiv, Moyen: Fundamentlis of Paleobotany – 1098
10. Taylor, T.N. 1981. Introduction to Fossils

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GOVERNMENT DEGREE COLLEGE, SIDDIPET, (AUTONOMOUS)

M.Sc. BOTANY- II SEMESTER

MBOT.CC.T.1.203

4 Hrs/week, 4 Credits

Paper: III Plant Anatomy and Palynology

UNIT –I

1. Introduction, importance and relationships of Plant Anatomy
2. Shoot Development:
 - a) Recent views on organization of shoot Apical Meristem and types of vegetative shoot apex in Gymnosperms and Angiosperms.
 - b) Cytological zonation – Anneau initial and Meristem :

- c) d' attente
 - d) Sub-apical differentiation of tissues.
3. Root Development:
- a) Organization of root apex and significance of Quiescent center
 - b) Recent experimental studies on differentiation of tissues.
4. Leaf: Structure with reference to C3 and C4 plants – Kranz and CAM Syndrome.

UNIT –II

5. Epidermology:
- a) Structural composition of Epidermal cells, stomata and trichomes
 - b) Epidermal cell complex – Structure, orientation and arrangement
 - c) Stomatal complex–Basic structure with reference to subsidiaries and ultrastructure of guard cells. Ontogeny of Paracytic, diacytic, and anisocytic stomata.
 - d) Trichome complex-Basic structure with reference to foot and body. Classification of trichomes.
6. Transfer cells: Structure, distribution, ontogeny and function.

UNIT –III

7. a) Secondary growth with reference to Dicot stem:
- b) Significance of Dicots wood anatomy.
 - c) Morphology and arrangement of Vessels, Axial Parenchyma Fibers and Ray parenchyma and their value in wood identification.
8. Salient features of the following woods.
- a) *Tectona grandis*
 - b) *Terminalia tomentosa*
 - c) *Shorea robusta*
 - d) *Pongamia pinnata*

UNIT – IV

9. Palynology:
- a) Introduction and scope of palynological science.
 - b) Pollen preparation, pretreatment, acetolysis.
 - c) Morphology of pollen – Polarity, symmetry, size and shape, apertural pattern, exine stratification and ornamentation of pollen wall.
10. Aeropalynology – principles, dissemination, distribution of aerospora and meteorological factors. Monitoring of aerospora with air samplers; pollen and spore allergy and clinical treatment.
11. Melittopalynology and Bee botany – pollen and nectar collection by Honey bees importance of melittopalynology.
12. Role of Palynology in Taxonomy
13. Application of palynology in oil exploration and Forensic science.

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GOVERNMENT DEGREE COLLEGE, SIDDIPET, (AUTONOMOUS)

MBOT.CC.P.1.207

Practicals (Labs)

4 Hrs/week

Practical Lab-III

1. Study of angiosperm leaf epidermis in the following taxa: *Crotalaria*, *Portulaca* or *Talinium*, *Tridax*, *Petunia* or *Datura*, *Barleria*, *Rheodiscolor* or *Commelina*, *Brassica*, *Cyperus* and Grass.
2. Estimation of stomatal frequency and stomatal index in the materials studied.
3. Maceration of wood and identification of various elements in *Michelia*, *Bombax*, *Tectona*, *Terminalia* and *Azadirathta*
4. Study of wood structure with the help of T.S., R.L.S. in the following: *Tectona*, *Bombax*, *Michelia*,

Pongamia and *Azadiratha*

5. Histochemical tests for identification of the following: a) Callose b) Lignin c) Pectin d) Starch e) Suberin f) Silica bodies in the leaf of grasses and sledges.
6. Study of shoot apex in suitable locally available materials to understand cyto histological zonation (*Coleus*, *Kalanchoe*)
7. Study of roots in Monocots and Dicots. Examination of L.S. of root from a permanent preparation to understand the organization of root apical meristem and its derivatives (maize, aerial roots of banyan, *Pistia*, *Jussiaea*)
8. Study of the pollen grains of *Hibiscus*, *Tribulus*, *Ocimum* and Grass.
9. Acetolysis

REFERENCES

1. Fahn, A. Plant Anatomy (4th Ed.), 1990.
2. Easu, K. Anatomy of Seed Plants.
3. Easu, K. Plant Anatomy, 2nd Ed. Wiley N.Y. 1965.
4. Cutter, E.G. Plant Anatomy, Part I and II Edward Arnold; London, 1971 and 1978
5. Metcalf and Chalk. Anatomy of dicots (2nd Edition) (1983). Clarendon Press, Oxford.
6. Metcalf (1982-87) Anatomy of Dicots Vol. I to III
7. meureth, J.D. 1988. Plant Anatomy. The Benjamin/Cummings Pub1. Inc., Menlo Park California.
8. Carlquist. S. (1988). Comparative wood anatomy, Springer – Berlag, Berlin.
9. Jeffrey, E.C. The Anatomy of woody plants.
10. Rao, K.R. & K.B.S. Juneja (1971) A Hand book for identification of fifty important Timbers of India.
11. Pearsom & Brown – Commercial Timbers
12. Lyndon R.F. 1990. Plant development – The cellular basis. Unwin Hyman, London.
13. Steeves T.A. & Sussex I. M, 1989, Pattersacin plant development 9^{2nd} Edition) Cambridge UNIT y Press, Cambridge.
14. P.K.K. Nair. Pollen Morphology of angiosperms.
15. P.K.K. Nair: Essentials of Palynology
16. Moor & Moor: Pollen analysis
17. R.B. Knox, Pollen allergy
18. M.R. Suxena : Palynology

FACULTY OF SCIENCE
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M.Sc. BOTANY- II SEMESTER

MBOT.CC.T.1.204

4 Hrs/week, 4 Credits

Paper-IV: Plant Physiology

UNIT –I

1. Water relations:

- a. Water potential
- b. SPAC concept

2. **Mineral nutrition:** Mechanism of ion uptake
- Electrochemical potential
 - Uptake of solutes and macromolecules from soil
 - Ion channels
 - ATPase carrier
 - Aquaporins
3. **Assimilation of Nutrients:**
- Physiology and biochemistry of nitrogen fixation
 - Sulphate reduction and assimilation

UNIT –II

4. **Photosynthesis:**
- Properties of light and absorption of light by photosynthetic pigments
 - Composition and characterization of photo systems I and II
 - Photophosphorylation
 - Path of carbon
- Differences between C₃ and C₄ photosynthesis
- CAM pathway and its regulation
- Photorespiration, biosynthesis of glycolate and regulation of photorespiration.

UNIT –III

5. **Respiration:**
- Glycolysis, fermentation, tricarboxylic acid cycle, Regulation of TCA cycle.
 - electron transport and oxidative phosphorylation, Coupling oxidative phosphorylation to electron transport, chemiosmotic hypothesis.
 - Hexose monophosphate shunt and its significance, Cyanide – resistant respiration.

UNIT –IV

6. **Hormonal control of growth and development**
- General role of auxins, Gibberellins, Cytokinins, ethylene and Abscisic acid
 - Mechanism of hormonal regulation-hormone receptors, secondary messengers,
 - amplification of kinases.
 - Structure and functions of Calmodulin
8. **Physiology of flowering**
- Photoperiodism
 - Phytochrome – structure and function
9. **Physiology and biochemistry of seed dormancy and germination:**
- Causes of dormancy and methods of breaking dormancy
 - Biochemical changes accompanying seed germination.

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GOVERNMENT DEGREE COLLEGE, SIDDIPET, (AUTONOMOUS)

MBOT.CC.P.1.208

Practicals (Labs)

4 Hrs/week

Practical Lab-IV

- Determination of water potential by Shardolo's methods.
- Determination of total and titrable acidity.
- Separation of chloroplast pigments by solvent method
- Determination of chlorophyll a, chlorophyll b and total chlorophylls in C₃ and C₄ plants.

5. Estimation of reducing sugars in fruits.
6. Determination of iodine number.

References

1. Principles of Plant nutrition 4th Edition by Mengel K. and E.A. Kirby International Institute of Polesh Switzerland 1987.
2. Mineral nutrition of crop plants. H. Marshener academic Press 1986.
3. Plant Physiology by F.B. Salisbury and C.W. Ross. Wordsworth biology series.
4. Growth and differentiation in plants by Wareing and Phillips, Pergamon press.
5. Plants Cell structure and metabolism. J.L. Hall, Flower and Roberts, ELBS, Longman.
6. Advanced Plant Physiology by M.B. Wilkinson, ELBS, Longman
7. Introduction to Plant Physiology by G.R. Noggle and G.J. Fritz, Printice Hall Press
8. Cell Biology by C.B. Powar, Himalaya Publishing
9. Plant Physiology by R.N. Devlin and F.H. Witham, CBS 1986
10. Introduction to plant physiology W.G. Hopkins and Norman P.A. Huner
11. Plant Physiology. Lincoln Taiz and Eduardo Zeiger

**FACULTY OF SCIENCE
GOVERNMENT DEGREE COLLEGE, SIDDIPET, (AUTONOMOUS)**

M.Sc. BOTANY- II SEMESTER

MBOT.CC.T.1.

Paper-V: Human values and Professional Ethics

- I. **Ethics:** Definitional aspects, relevance of ethics in society; scope of ethics.
- II. **The philosophical basis of ethics :** considerations on moral philosophy personal and family ethics
- III. **Ethics in public affairs :** ethical standards for elected representatives of the people; ethics for the bureaucracy , police and other institutions of coercive authority; basic values in the civil services such as dispassion , non- partisanship, moral integrity , objectivity, dedication to public service and empathy for the weaker sections and groups in society and non- corruptibility .
- IV. **Ethics and professions :** ethical values, standards and practices concerning the legal profession, medicine,engineering etc.
Ethics at the work place: cybercrime, plagiarism, sexual misconduct, Fraudulent use of institutional resources etc.

References

Subramanian R. 2013 Professional ethics, New Delhi: Oxford

FACULTY OF SCIENCE
GOVERNMENT DEGREE COLLEGE, SIDDIPET, (AUTONOMOUS)
M.Sc.Botany, -II Semester (CBCS) Examination, 2017
Subject: Botany

Paper- V Human values and Professional Ethics

40 marks

Question Paper
Part -A

(Short Question type/ Concept based Questions)

A) Answer all the questions **4x4=16**

1. Scope of Ethics
2. Moral philosophy
3. Non corruptibility
4. Plagiarism

B) Answer all the questions **4x6=24**

- 5) a. What is the relevance of ethics in society?
(or)
b. Write about the defiritional aspects of ethics.
- 6) a. Ethics of bureaucracy-Enumerate.
(or)
b. Basic values in civil services.
- 7) a. Describe about family ethics.
(or)
b. Describe the philosophical basis of ethics.
- 8) a. Write about the standard & practices concerning the legal profession.
(or)
b. Ethics at work place-fraudulent use of institutional resources.

Note: 10 marks for internal assessment and 40 marks for the descriptive Question on concept.

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M.Sc. Botany, -II Semester (CBCS) Examination, 2017
Internal Assessment Model Paper

Subject: Botany
Paper- V Human values and Professional Ethics

Note: Answer all questions

I. Multiple choice questions

10X1/2=5

II. Very short questions

5x1=5

M.Sc. Botany (CBCS)

PRACTICAL MODEL QUESTION PAPERS
(w.e.f 2017-2018)

FACULTY OF SCIENCE
GOVERNMENT DEGREE COLLEGE, SIDDIPET, (AUTONOMOUS)
M.Sc. Botany-Previous (CBCS) Examination, 2017

Subject: Botany

Practical Model Question Paper
Paper-I: PHYCOLOGY, MYCOLOGY, APPLIED PHYCOLOGY & MYCOLOGY

Time: 4 Hrs

Max Marks: 100

Answer all Questions

Note: Leave all the preparation for evaluation by giving reasons.

- 1) Identify the algal species (**A,B,C,D**) from the given mixture. Describe their characters with well labeled diagram
And assign them to their taxonomic position. 24 Marks

- 2) Identify Pathogen with the help of section. Describe its characters with well labeled diagram.
Assign the species to its systematic position 16 Marks

- 3) Stain the bacteria and identify giving reasons. 10 Marks

- 4) Identify the given slides **E,F,G,H** and **I** by giving reasons. 20 Marks

- 5) Identify the specimens **J,K,L,M** and **N** by giving reasons. 20 Marks

- 6) Record and Viva Voice. 10 Marks

FACULTY OF SCIENCE
GOVERNMENT DEGREE COLLEGE, SIDDIPET, (AUTONOMOUS)
M.Sc. Botany-Previous (CBCS) Examination, 2017

Subject: Botany
Practical Model Question Paper
Paper-II: BRYOPHYTA, PTERIDOPHYTA, GYMNOSPERMS AND EMBRYOLOGY

Answer all Questions**Note: Leave all the preparation for evaluation by giving reasons.**

- 1) Describe the gross morphology and evaluation of the given material
(A, Bryophyta) by preparing temporary mount and identify it? 15 Marks
- 2) Describe the anatomy the specimen (B, Pteridophyta) by preparing necessary glycerin mounts.
Draw diagram and identify the giving reason. 20 Marks
- 3) Prepare single stained temporary slides of **T.S, T.L.S.** And **R.L.S.** of material
(C, Gymnosperms) describe with it labeled sketches and identify giving reasons. 20 Marks
- 4) Identify the specimens D,E and F by giving reasons (Fossils, Pteridophyta and Gymnosperms) (3X5) 15 Marks
- 5) Identify the slides G,H,I and J,K by giving reasons.
(Bryophyta (1), Pteridophyta (1), Gymnosperms (1), Embryology (2)) 20 Marks.
- 6) Record and Viva Voice 10 Marks

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GOVERNMENT DEGREE COLLEGE, SIDDIPET, (AUTONOMOUS)
M.Sc. Botany-Previous (CBCS) Examination, 2017

Subject: Botany
Practical Model Question Paper

Paper III: TAXONOMY OF ANGIOSPERMS, MEDICINAL BOTANY, ANATOMY & PALYNOLOGY

Answer all Questions

Note: Leave all the preparation for evaluation by giving reasons.

- | | |
|--|----------|
| 1) Prepare and identify Key for the given leaf materials (A-H). | 10 Marks |
| 2) Identify the twig ('I') up to species level with the help of the Floras | 15 Marks |
| 3) Assign the flowers/ floral parts 'J' to their respective families giving reasons. | 10 Marks |

OR

Explain the given two Nomenclature problems

- | | |
|---|----------|
| 4) Comment on 'K' and 'L' add a note on their medicinal importance. | 10 Marks |
| 5) Provide the silent epidermal features of the materials 'M' and
estimate the stomatal index for the lower surface. | 15 Marks |
| 6) Macerate the wood material 'N' and describe various wood elements in it. | 10 Marks |
| 7) Identify the given material 'O' by sectional features. | 10 Marks |

OR

Conduct Histochemical tests on the materials 'P', 'Q' and 'R' identify them with reasons.

- | | |
|--|----------|
| 8) Describe and identify the slides 'S' and 'T'. | 10 Marks |
| 9) Record, Herbarium and Viva Voice. | 10 Marks |

**FACULTY OF SCIENCE
GOVERNMENT DEGREE COLLEGE, SIDDIPET, (AUTONOMOUS)
M.Sc. Botany-Previous (CBCS) Examination, 2017**

**Subject: Botany
Practical Model Question Paper
Paper IV: PLANT BIOCHEMISTRY and PLANT PHYSIOLOGY**

Time: 4 Hrs

Max Marks: 100

Answer all Questions

Note: Leave all the preparation for evaluation by giving reasons.

- | | | |
|--|----------|----------|
| 1) Given the procedure for the experiment (Major). Conduct the experiment and give results and conclusions. | (15+25) | 40 Marks |
| 2) Given the procedure for the experiment (Minor). Record the data and give the inference. | (10+20) | 30 Marks |
| 3) Comment on the following A, B, C and D . | (4X5=20) | 20 Marks |
| 4) Record and Viva Voice | | 10 Marks |

III SEMESTER

Specialization

Cytogenetics, Molecular Genetics and Biotechnology

FACULTY OF SCIENCE

GOVERNMENT DEGREE COLLEGE, SIDDIPET, (AUTONOMOUS)

M.Sc. Botany III Semester CBCS

Common paper

MBOT.CC.T.2.301

Paper-I: Cell Biology, Genetics and Biostatistics

UNIT -I

1. Brief account of DNA replication and transcription. Introns and exons.
3. Brief study of regulation of gene expression in prokaryotes (Lac-operon) and eukaryotes (promoters, transcription factors and enhancers).
4. Overview of cell cycle. Control mechanisms: role of cyclins and cyclin-dependent kinases. Apoptosis and Programmed cell death.

UNIT –II

5. Mutations: Gene mutations (substitutions and frame-shift mutations), Chromosomal aberrations (structural), Transposon-induced mutations; Site-directed mutagenesis.
6. Brief study of DNA damage and repair mechanisms
7. Inherited human diseases: Haemophilia and Sickle cell Anaemia. Gene therapy
8. Brief account of Proto-oncogenes, oncogenes and tumor suppressor genes.
9. Mendelian inheritance. Gene interaction (12:3:1; 9:3:4; 9:7 ratios).
10. Linkage and chromosome mapping in eukaryotes

UNIT –III

11. Extra nuclear inheritance: Cytoplasmic male sterility
12. Hardy-Weinberg Law. Gene pool, Gene frequency and genotype frequency
13. Brief account of plant tissue culture, micropropagation and Transgenic plants.
14. Overview of recombinant DNA technology. Gene cloning, genomic / cDNA libraries, restriction mapping, blotting methods, polymerase chain reaction and DNA fingerprinting.
15. Brief overview of plant breeding methods: Conventional, mutation breeding, QTLs and MAS.

UNIT –IV

13. Basic concepts of gene sequencing, genomics, proteomics and Bioinformatics.
14. Mean, Variance, Standard deviation and Standard error.
15. Chi-square and Student's "t" test. Probability distribution (Binomial, Poisson and Normal).
16. Introduction to computers. Use of Word and PowerPoint in the preparation and presentation of documents. Use of Internet and World Wide Web in research.

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MBOT.CC.P.2.305

Practicals (Labs)

4 Hrs/week

Practical Paper-I (Common)

1. Cytological Squash preparation of onion root tips to study mitosis.
2. Problems in Genetics:
 - Mendelian inheritance and gene interaction.

- Chromosome mapping in eukaryotes
- Population Genetics
- 3. Problems in Restriction mapping of plasmids.
- 4. Problems in Biostatistics:
 - Graphic representation of data: Histogram.
 - Mean, Variance, Standard Deviation and Standard Error.
 - Chi-square and Student's "t" test.
 - Problems on Probability.
- 5. Demonstration of Isolation of DNA from plants/Chicken spleen.
- 6. Demonstration of plant tissue culture methods.
- 7. Maintenance of Practical Record.

List of books recommended

1. A. K. Sharma and A. Sharma. 1990. Chromosome techniques. Butterworths. 1990 Ed.
2. E.D.P. De Robertis and E. M. F. De Robertis. 1987. Cell and Molecular biology 8th Ed (Indian Ed)
3. G. M. Cooper. 1997. The Cell and Molecular approach. ASM Press. Ed.
4. Strickberger. Genetics. 3rd Ed. 1990. Ed.
5. Snustad and Simmons. 1997. Principles of Genetics. Ed.
6. Benjamin Lewis. 1999. Genes VII.
7. Daniel Hartl. 1994. Basic Genetics. Ed.
8. Griffiths, Miller, Suzuki, Lewontin & Gelbert 1999 An introduction to Genetic analysis
9. Winter, Hicky and Fletcher. 1999. Instant notes in Genetics. Ed.
10. A.V.S.S. Sambamurthy. 1999. Genetics.
11. Ahluwalia. 1993 Genetics.
12. P.K. Gupta. 1990. Genetics.
13. U. Sinha and S. Sinha. 1994. Cytogenetics, Plant Breeding & Evolution. Ed.

14. K. K. De. 1992. Plant tissue culture.
15. Narayanaswamy. 1994. Plant cell & tissue culture.
16. Y.P.S. Bajaj. 1986 to 1990. Biotechnology in Agriculture and Forestry. Vol. 1 to 16. Ed..
17. I. Vasil. 1995. Plant tissue culture. Vol. 1 to 4. Ed.
18. Watson, Gilman, Wittkowsky and Zoller. 1992. Recombinant DNA.
19. Shaw, G. M. 1988. Plant Molecular Biology. A practical approach. Ed.
20. Twyman. 1998. Advanced Molecular Biology.
21. Turner, Mclennon, Bates and White. 1999. Instant notes in Molecular Biology.
22. Primrose. 1999. Molecular Biotechnology.
23. Prathibha Devi. Principles & Methods in Plant Molecular Biology, Genetics & Biochemistry, Agrobios.
24. Purohit. S. S. 1999. Agricultural Biotechnology.
25. Stansfield. 1996. Theory & Problems in Genetics. Schaum's Series. McGraw & Hill.
26. Khan, I. A. and A. Khanum. 1994 Fundamentals of Biostatistics
27. B. N. Mishra and K. K. Mishra. Naya Prakash. 1983. Introductory practical Biostatistics
28. Jain, v. k. Computers for beginners. PustakMahal.
29. Vikas Gupta, 2000. Rapidex computer course. Rapidex series.
30. Cynthia Gibas. O'Reilly & Assoc. 2000. Developing Bioinformatics Computer skills.
31. Balasubramanian. Ed. Concepts in Biotechnology. Universities Press. 1996.
32. Deepak Bharihoke. 2000. Fundamentals of Information technology.
33. Gralla. 2000. How the Internet works.
34. White. 2000. How computer works.

FACULTY OF SCIENCE
GOVERNMENT DEGREE COLLEGE, SIDDIPET, (AUTONOMOUS)

Common paper

MBOT.CC.T.2.302 :

Paper-II: Environmental pollution and protection

UNIT I

1. Kinds of pollution, Air pollution-Sources of air pollution,
2. Major air pollutants, Primary and Secondary Pollutants stationary and mobile sources.
3. Effects of air pollutants on plants, human beings and materials, control of air pollution.
4. Noise pollution- sources, effects and control measures.
5. Acid rain- causes and effects on terrestrial and aquatic systems.

UNIT II

6. Water pollution- Sources, Effects and control of water pollution.
7. BOD, COD, Hardness of water, criteria of water quality.
8. Primary treatment (Industrial wastewater) - Segregation, equalization, neutralization, sedimentation, flotation and oil separation.
9. Secondary treatment (Biological treatment)- Principles of biological treatment
10. Waste stabilization ponds, Aerated lagoons-Activated sludge process, Trickling filters.

UNIT III

11. Soil pollution – Sources, effects and control measures.
12. Bioremediation- Insitu and Ex-situ bioremediation
13. Bioremediation of toxic metals.
14. Concept of Phytoremediation

UNIT IV

15. Classification of solid wastes, types and sources. Disposal methods,
16. Management of Municipal waste,
17. Hazardous and Biomedical waste.
18. Environmental (protection) Act-1986

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MBOT.CC.P.2.306

Practicals (Labs)

4 Hrs/week

Practicals Common paper:

1. Estimation of the following in water:
 - a. Total hardness
 - b. Calcium
 - c. Organic matter
 - d. BOD
2. Estimation of noise.
3. Qualitative estimation of the following:
 - a. Solid waste
 - b. Coal
 - c. Fly ash
 - d. Sugarcane bagasse
 - e. Wood

f. Cow dung

REFERENCES

1. MN Rao, McGraw Hill 1993 – Air pollution
2. C.S.Rao- Environmental Engineering and technology
3. S.P. Misra and Pandey- Essential Environmental Studies
4. Y.Anjaneyulu- Introduction to Environmental Science.
5. P.D.Sharma- Ecology and Environment
6. P.C.Santra- Environmental Science

FACULTY OF SCIENCE GOVERNMENT DEGREE COLLEGE, SIDDIPET, (AUTONOMOUS) M.Sc. Botany III Semester CBCS

MBOT.EC.T.2.303

Paper-III: Cytogenetics

UNIT –I

1. Introduction to Cytogenetics. Cytological methods, pretreatment, fixation, chemical, fixatives, stains and mechanism of staining.
2. The architecture of bacterial and eukaryotic chromosomes. Structural organization of Eukaryotic chromosomes. Nucleosome concept. Importance of Telomeres and Telomerase.
3. Euchromatin, Heterochromatin. X Chromosome inactivation, Xist RNA, Chromosome banding and chromosome painting. Genomic imprinting
4. Different forms of chromosomes: Somatic metaphase (Salivary gland Chromosomes), Meiotic prophase, (Lampbrush), B chromosomes or supernumerary chromosomes.

UNIT –II

5. Karyotype, evolution of karyotype, changes in the basic number.
6. Mechanics of cell division. Mitotic cycle. Cell cycle, G1, S phases and cell cycle regulation. Cyclin dependent kinases (CDKs) and cyclins. MPF activity, anaphase promoting complex (APC).
7. DNA damage check point controlled by P 53 protein. Ras and Map (mitogen activated protein kinases). Programmed cell death.
8. Meiotic prophase. Synaptonemal complex, organization, structure, role of synaptonemal complex in meiotic cross over.

UNIT –III

9. Recombination models. Homologous Recombination, Holliday model I and II. Heteroduplex, mismatch repair.
10. Genetic systems of *Oenothera*. Genome of *Arabidopsis thaliana*.
11. Position effects of heterochromatin: Variegated eye in *Drosophila*. Red & white colonies of yeast, α & α type gamete type formation in yeast. Ac/Ds system in maize.
12. Cytological effects of chromosomal aberrations, deletions, duplications, inversions, bridge breakage fusion cycle, translocations alternate, adjacent 1&2 disjunctions. Robertsonian translocations. Centric fusion & fission.

UNIT –IV

13. Variations involving chromosomal numbers. Aneuploidy, trisomics, (primary, secondary, tertiary) Monosomics, nullisomics, meiotic behaviour of trisomics, (primary, secondary & tertiary). Aneuploidy of sex chromosomes.
14. Euploidy, Haploidy, Autopolyploidy, Allopolyploids. Haploidy in crop improvement. Chromosome elimination (bulbosum technique).
15. Transitions & Transversions, repair & mis repair mechanisms.
16. Recombinase type of repair mechanism SOS response in *E. Coli*.

FACULTY OF SCIENCE
GOVERNMENT DEGREE COLLEGE, SIDDIPET, (AUTONOMOUS)

MBOT.EC.P.2.307

Practicals (Labs)

4 Hrs/week

Practical Lab- (Special)

Section-A

1. Preparation of fixatives (3:1 and 6:3:1).
2. Preparation of stains Acetoorcein, Acetocarmine and Feulgen.
3. Squash and smear preparations to study mitosis and meiosis: Mitosis in onion root tips and meiosis in maize and onion flower buds.
4. Demonstration of salivary gland chromosome preparations in *Drosophila* larvae.
5. G-banding of chromosomes (demonstration).
6. Squashes of onion root tip to study Karyotype and preparation of Idiograms
7. Smear of *Rhoeo discolor* flower buds to study metaphase plate
8. Study of C mitosis by Colchicine treatment.
9. Record

List of books recommended

1. A. K. Sharma and A. Sharma. 1990. Chromosome techniques. Butterworths. 1990 Ed.
2. Edward. S. Lenhoff. 1990. Tools of Biology Mc Millan Company.
3. E.D.P. De Robertis and E. M. F. De Robertis. 1987. Cell and Molecularbiology. 8th Ed.. (Indian Edition is also available.. Varghese Company).
4. G. M. Cooper. 1997. The Cell and Molecular approach. ASM Press. Ed.
5. Strickberger. Genetics. 3rd Ed. 1990. Ed.
6. Snustad and Simmons. 1997. Principles of Genetics. Ed.

7. Benjamin Lewis. 1999. Genes VII.
8. Daniel Hartl. 1994. Basic Genetics. Ed.
9. Griffiths, Miller, Suzuki, Lewontin and Gelbert 1999. An introduction to Genetic analysis.
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16. Primrose. 1999. Molecular Biotechnology.
18. Stansfield 1996 III Ed Theory & Problems in Genetics. Schaum's Series McGraw & Hill.
19. Cynthia Gibas. O'Reilly & Assoc. 2000. Developing Bioinformatics Computer skills.
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19. Cell and molecular biology by Lodish.
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22. DNA science I and II

FACULTY OF SCIENCE
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M.Sc. BOTANY- III SEMESTER

MBOT.EC.T.2.304

Paper-IV Genetics

UNIT –I

1. Classical and modern concept of the gene.
2. Experiments including DNA and RNA as the genetic material.
3. Detailed study of DNA double helical structure and different forms of DNA, A,B,Z and their physical properties. Central Dogma of Molecular Biology.
4. Cot curves and their significance.

UNIT –II

5. DNA replication, semi conservative mode of replication, Differences in prokaryotic & eukaryotic replication.
6. Enzymes involved in DNA replication. DNA polymerase in prokaryotes (I, II, III) & eukaryotic DNA polymerases (α , ϵ and δ), Ligases. Primosome and Replisome.
7. General features of transcription Eukaryotic & Prokaryotic transcriptional factors and Promoters. RNA processing in Eukaryotes (splicing, capping and polyadenylation).
8. Regulation of transcription by noncoding RNA, RNA editing, DNA methylation.

UNIT –III

9. Salient features of Genetic Code. Codon assignment. Genetic code of mitochondria. Structure of t-RNA, Translation.

10. Regulation of gene expression by Lambda phage virus. Repressible system of gene regulation with reference to Trp operon.
11. Fine structure of gene rII locus. Mapping of viral chromosome by complementation, deletion & recombination.

UNIT –IV

12. Eukaryotic mapping by 3 point test cross, mapping by tetrad analysis.
13. Brief account of Quantitative inheritance with special reference to kernel colour in wheat.
14. Sex linked inheritance with reference to X and Y chromosomes.
15. Extra nuclear inheritance (cytoplasmic male sterility)

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Practicals (Labs)

4 Hrs/week

Practical Lab- (Special)

1. Estimation of RNA by Orcinol method.
2. Problems on tetrad analysis.
3. Problems on chromosome mapping in viruses by deletion and complementation.
4. Problems on bacterial chromosome mapping by conjugation and transformation.
5. Problems on quantitative genetics. Heritability genetic advance genotypic and phenotypic variance.
6. Problems on sex linked inheritance.
7. Record

List of books recommended

1. A. K. Sharma and A. Sharma. 1990. Chromosome techniques. Butterworths.1990 Ed.
2. Edward. S. Lenhoff. 1990. Tools of Biology Mc Millan Company.
3. E.D.P. De Robertis and E. M. F. De Robertis. 1987. Cell and Molecularbiology. 8th Ed..
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18. Stansfield. 1996. III Ed. Theory & Problems in Genetics. Schaum's Series. McGraw & Hill.
19. Cell and molecular biology by Lodish.
20. Plant breeding by B D Singh.
21. Cytogenetics by Swanson
22. Molecular biology by Robert F. Weaver.
23. DNA Science I and II

IV SEMESTER

Specialization

Cytogenetics, Molecular Genetics and Biotechnology

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M.Sc. BOTANY- IV SEMESTER
(common paper)

MBOT.CC.T.2.401

Paper-I: Ecology and Phytogeography

UNIT I

1. **The Environment:** Physical environment; biotic and abiotic interactions.
2. **Habitat and Niche:** Concept of habitat and niche; Niche width and overlap; Fundamental and realized niche; Resource partitioning; Character displacement- Allopatric and Sympatric.
3. **Ecosystem Ecology:** Ecosystem structure and function; Food Chain, Food Web, Energy flow and Mineral cycling (C,N); Primary production and Methods of measurement of primary productivity;

UNIT II

4. **Population Ecology:** Characteristics of a population(Density ,Natality, Mortality ,Dispersion Population size, Age structure , Life tables); Population growth curves; Population regulation; life history strategies (r and K selection);
5. **Species Interactions:** Types of Interactions,Positive interactions- Mutualism,Symbiosis, commensalism, Protocooperation.
6. Negative interactions – Exploitation, Herbivores, Carnivores, antibiosis, competition.

UNIT III

7. **Community Ecology:** Characteristics of commUNIT ies Analytical Quantitative – Frequency,

density, Abundance, Cover and Basal area. Qualitative – Physiognomy, Phenology, Stratification, sociability, vitality and Life form and Synthetic - Presence and constance, Fidelity Dominance.); Raunkiaer concept ; Levels of species diversity and its measurement; Ecotones. Biodiversity: Monitoring; Hotspots (with reference to India), Major drivers of biodiversity change;

8. **Ecological Succession:** Types; mechanisms; Changes involved in succession;

9. Concept of climax- Monoclimax and Polyclimax theories.

UNIT IV

10. **Biogeography:** Plant distribution , Theory on plant distribution(Age and area theory, Theory of tolerance), Major terrestrial biomes; Biogeographical zones of India. Classification of climate – Koppens and Thornthwaites classification.

11. **Applied Ecology:** Pollution -Global environmental change -Atmosphere composition and structure ,Green house gases , Global warming, Ozone depletion.

12. **Conservation Biology:** Principles of conservation In situ - Protected areas, National parks, Wildlife sanctuaries, Biosphere reserves and Project tiger. Ex situ - Botanical gardens, Zoological parks and cryopreservation.

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MBOT.CC.P.2.405

Practicals (Labs)

4 Hrs/week

Practical Lab-I (Common)

1. Determination of quantitative characters by random quadrat method -Abundance, Density ,Frequency ,IVI and Dominance : Similarity And Dissimilarity Index
2. Estimation of Carbonates ,Bicarbonates , Chlorides and Dissolved Oxygen
3. Morphology And Anatomy of Hydrophytes and Xerophytes And their Adaptations
4. Maintenance of Practical records

Reference books

1. E.P. Odum 1996 Fundamentals of ecology
2. E.J Koromondy .1996 Concept of Ecology
3. P.D Sharma . 1996 Ecology and environment
4. S.P. Misra .S.N. 2010 Pandey Essentail Enviromental studies
5. N.S Subrahmanyam and Sambamurty 2000 Ecology.

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M.Sc. BOTANY IV Semester
Common paper

MBOT.CC.T.2.402 :

Paper-II: Horticulture and Plant breeding

Unit-I

1. Importance and propagation of horticultural plants:
 - a. Propagation through seeds.
 - b. Propagation through cuttings i.e., leaf, stem and roots.
 - c. Grafting- normal and special grafting procedures.
2. Nutrient management: General account of chemical fertilizers and biofertilizers. Symptoms of deficiencies of macro and micro nutrients.

Unit-II

3. Disease and pest management of horticultural plants:
 - a. Identification/Symptoms
 - b. Remedies/Control measures
 - c. IPM (Integrated Pest Management)
4. Mass production of horticultural plants and plantation crop plants through tissue culture and micropropagation.

Unit-III

5. Plant breeding objectives. Traits of interest for field crops, fruits and vegetable crops (yield, duration, adaptability and tolerance / Resistance to Biotic and Abiotic stresses.
6. Selection. Back cross breeding and usefulness of marker-assisted selection.
7. Development of inbred cultivars and commercial hybrids. Heterosis, Combining ability and Heritability.

Unit-IV

8. Mutation breeding. Induced polyploidy in plant breeding. Importance of haploids and dihaploids.
9. Transgenic technology and its acceptance. Bt-cotton and Bt-brinjal, Herbicide resistant crops and Golden rice.
10. PCR based zygosity analysis and ELISA.

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MBOT.CC.P.2.406

Practicals (Labs)

4 Hrs/week

Practicals (common)

1. Identification of Horticultural tools & implements and their use.
2. Study of containers, preparation of potting mixture, potting, de-potting and repotting.
3. Estimation of moisture content in soils. Determination of pH, electrical conductivity, sodium adsorption ratio and exchangeable sodium percentage of soils.
4. Propagation through seeds, methods to overcome the seed dormancy - a) Mechanical scarification
b) Soaking the seeds in water c) Acid scarification d) Stratification
5. Rapid tissue test, seed dormancy, seed viability by tetrazolium test.
6. Vegetative propagation by corms, bulbs, rhizomes etc.
7. Propagation methods like cutting, layering, budding and grafting.
8. Micropropagation.
9. Identification and description of important fruit varieties: Mango, Guava and Citrus, Grape, Sapota, Banana and Papaya; Commercial flower varieties: Roses, Chrysanthemums, Dahlias, Orchids etc.
10. Study of plant breeding techniques.
11. Estimation of leaf area index, growth analysis parameters including harvest index.
12. Identification of synthetic plant hormones and growth retardants, preparations of hormonal solution and induction of rooting in cuttings, ripening of fruits and control of flower and fruit drop.

References:

1. Plant propagation (Principles and practices) Hortman, Kester, Fred T Davies, Robert Genene
2. Floriculture in India – T.K. Bose
3. Principles of horticultural science – Janick
4. Beautiful shrubs – Prathibha P. Trivedi
5. Commercial flowers Vol. I & II- T.K. Bose, Yadav, P. Pal, P.Das, V.A. Parthasarathy.
6. Floriculture in India – Randhawa and Mukhopadhyaya Allied Publishers.
7. Biotechnology and its application in horticulture S.P. Ghosh- Narosa Publishers.
8. Agricultural dairy- published by Agriculture Department A.P.
9. Horticulture dairy- Horticulture Department A.P.
10. Field Crops research. By Poehlman.
11. Genetics by Sambamurthy.
12. Plant breeding by Allard.
13. Plant breeding by Randhawa
14. Plant Tissue Culture-Protocols in Plant Biotechnology by MC Gayathri& R.Kavyashree- Narosa Publ.

FACULTY OF SCIENCE
GOVERNMENT DEGREE COLLEGE, SIDDIPET, (AUTONOMOUS)

M.Sc. BOTANY- IV SEMESTER

MBOT.EC.T.2.403 Paper-III: Molecular Genetics & Recombinant DNA Technology

UNIT -I:

1. General concept of genetic engineering & recombinant DNA technology. Biosafety measures.
2. Restriction endonucleases: type I, II, III, DNA ligases, reverse transcriptase, alkaline phosphatases, S1 nucleases and DNA polymerases.
3. Gene cloning. Restriction mapping, Vectors used in gene cloning: Plasmids, Cosmids, Phagemids, YAC, BAC, Ti and Ri plasmids. Preparation of genomic & cDNA libraries.
4. Southern, Northern, Western blotting, DNA finger printing, single locus & multi locus. Paternity tests & forensic applications.

UNIT -II:

5. DNA sequencing: Sangers method, Pyro sequencing.
6. Gene knockout techniques, DNA foot printing, RNA i technology (mi-RNA, Si RNA).
7. Molecular markers: Randomly Amplified Polymorphic DNA (RAPD), Amplified Length Fragment Polymorphism (AFLP), Simple Sequence Repeats (SSR). Expressed Sequence Tags (ESTs) for gene discovery. SNPs.

UNIT -III:

8. Brief overview of plant genome mapping. BACs (large-insert libraries) for map-based cloning of candidate genes and physical mapping. Mapping of quantitative trait loci (QTLs). Marker-assisted selection (MAS).
9. Gene amplification by PCR, RT PCR, Real Time PCR. Molecular diagnosis of human diseases: Sickle cell anaemia & cystic fibrosis, Production of monoclonal antibodies, synthetic vaccines.
10. Brief account and recent developments in stem cell research and cloning, Gene Therapy

UNIT -IV:

11. Genomics, functional genomics, proteomics. DNA chips, Microarrays.
12. Bioinformatics: Introduction, sequence databases, pair-wise alignment using BLAST, multiple sequence alignment with CLUSTAL.
13. Analysis of variance (ANOVA) one factor & two factor analysis.
14. Correlation coefficient positive & negative correlation

Practical Lab- (Special)

1. Extraction of DNA from plants.
2. Restriction analysis of Bacteriophage Lambda DNA.
3. Problems on RFLP
4. Problems on restriction mapping
5. Problems on DNA sequencing
6. Problems on correlation coefficient.
7. Problems on ANOVA
8. Record

List of books recommended

1. A. K. Sharma and A. Sharma. 1990. Chromosome techniques. Butterworths.1990 Ed.
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30. Molecular biology by Robert F.Weaver.
31. DNA Science I and II

M.Sc. BOTANY- IV SEMESTER

MBOT.EC.T.2.404

Paper IV: Plant Biotechnology and Crop improvement

UNIT -I:

1. Introduction to plant tissue culture. Totipotency and cyto differentiation.
2. Establishment of tissue culture lab, preparation of culture media and culture techniques. Cell suspension, callus, meristem and organ culture.
3. Somatic embryogenesis and synthetic seeds. Morphogenesis. Shoot regeneration, rooting and establishment of plantlets. Somaclonal variations.

UNIT -II:

4. Micropropagation and its application in horticulture & forestry. Cryopreservation and germplasm storage.
5. Anther and pollen culture and their importance.
6. Isolation, culture and fusion of protoplasts. Somatic hybridization & cybrids.
7. *In vitro* production of secondary metabolites from medicinal plants, hairy root cultures.

UNIT -III:

8. Genetic engineering for production of transgenic plants: (1) *Agrobacterium*-mediated gene transfer method and (2) microprojectile bombardment method.
9. Current status of transgenic plants in the world. Transgenics resistant to herbicides, pests, diseases (viral, fungal and bacterial) and with nutritional benefits (Golden rice).
10. Role of QTLs in crop improvement.

UNIT -IV:

11. Conventional method of crop improvement. Principles of plant breeding. Selective selfing & crossing techniques. Introduction, pure line selection, mass selection, clonal selection, hybridisation, pedigree method, back cross method of production of synthetic varieties.
12. Germplasm banks (National & International).
13. Alien addition & substitution. Wheat homologous & homeologous chromosomal pairing. role of 5B chromosomes in wheat. Evolution of wheat & cotton.

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1. A. K. Sharma and A. Sharma. 1990. Chromosome techniques. Butterworths. 1990 Ed.
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28. Plant breeding by B D Singh.
29. Cytogenetics by Swanson
30. Molecular biology by Robert F.Weaver.
31. DNA Science I and II

Practical Lab- (Special)

1. Preparation of stock solutions and tissue culture medium (MS medium).
2. Plant tissue culture for callus induction, somatic embryogenesis, shoot regeneration and rooting.
3. Preparation of synthetic seeds with somatic embryos.
4. Enzymatic isolation of protoplasts from leaves.
5. Record