S.R.R. & C.V.R. Government Degree College (A)

An Autonomous & ISO 9001: 2015 Certified Institution:: Ranked by NIRF in 101-150 band at NIRF-2020 & 151-200 band in NIRF 2019 NAAC accredited Institution with grade B+ with C.G.P.A 2.6 during March, 2017

Machavaram, Vijayawada, Krishna District, AP-520 004

BOTANY SYLLABUS
2019-2020

DEPARTMENT OF BOTANY

SRR & CVR GOVT. DEGREE COLLEGE (A)

MACHAVARAM, VIJAYAWADA – 4

Minutes of the meeting On up gradation of the Syllabus in the subject of

BOTANY

The meeting of the Board of Studies in the subject of **BOTANY** was held on 25FEB2019 in staff room :BOTANY,SRR & CVR Govt. Degree College (Autonomous), Vijayawada – 520 004.

The following members attended the meeting :

1. **D.Jyothi** (In-charge of the Department & Chairman, BOS)
   Asst. Prof. in Botany
   SRR & CVR GDC ,VIJAYAWADA
   D. Jyothi

2. **Prof.M.Vijaya Lakshmi** (University Nominee)
   Ssst. Prof. in Botany
   Acharya Nagarju University
   Guntur .AP
   M. Vijaya Lakshmi

3. **Dr.Ch. Baskhara Rao.** (Subject Expert)
   Asst. Prof. in Botany
   GDC Women (A)
   Guntur
   Ch. Bhaskar

4. **Dr.J.Ramudu.** (Subject Expert)
   Asst. Prof. in Botany
   GDC MOVVA Krishna (Dt)
   J. Ra

5. **Dr.M.Lakshmi Prasad.** (Special Member)
   SUJA BIOTECHS VIJAYAWADA

6. **V. Naga Lakshmi.** (Guest Faculty)
   Lecturer in Botany SRR & CVR GDC
   VIJAYAWADA.
   V. Naga Lakshmi

SRR & CVR GOVERNMENT DEGREE COLLEGE (A), VIJAYAWADA-52004

An autonomous college in the jurisdiction of Krishna University, Machilipatnam. A.P.

I-BZC	BOTANY-I	SEM-I	Course code: BOT 1321	2019-2020	No. of Credits:4	No. of Hrs /Week:4

Microbial Diversity, Algae and Fungi

Objective: On successful completion of this course, the students will be able to know the diversity of Microbes, Algae and Fungi.

CO1: Students will be able to acquire, articulate, retain and apply specialized skills and knowledge relevant to Microbiology
CO2: Able to explore the diversity of microorganisms and microbial communities as well as their significance to humans and nature.
CO3: To Understand the classification, Structure , reproduction and Life History of Algae and Fungi
CO4: To understand history, relevance of microbiology and classification of Microorganisms and special groups of Bacteria
CO5: To understand bacterial cell structure, Nutrition, Reproduction and Economic importance, Virus structure, Replication , Viral diseases

UNIT- I: MICROBIAL WORLD (Origin and Evolution of Life, Microbial diversity **(12hrs)**

Discovery of microorganisms, origin of life, spontaneous, biogenesis, Pasteur experiments, germ theory of disease.
Classification of microorganisms – R.H. Whittaker's five kingdom concept, Carl Woese's- Domain system.
Brief account of special groups of bacteria- Archaebacteria, Mycoplasma, Chlamydia, Actinomycetes, Rickettsias and Cyanobacteria.

UNIT- II: VIRUSES **(12hrs)**

Viruses- Discovery, general account, structure & replication of –T4 Phage (Lytic, Lysogenic) and TMV, Viroids, Prions.
Plant diseases caused by viruses– Symptoms, transmission and control measures (Brief account only).
Study of Tobacco Mosaic, Bhendi Vein clearing and Papaya leaf curl diseases.

UNIT III: BACTERIA **(12hrs)**

Bacteria: Discovery, General characteristics, cell structure and nutrition.
Reproduction- Asexual and bacterial recombination (Conjugation, Transformation, Transduction).
Economic importance of Bacteria.

UNIT –IV Algae **(12hrs)**

General account - thallus organization and reproduction in Algae.
Fritsch classification of Algae (up to classes only) and economic importance.
Structure, reproduction and life history of Oedogonium, Ectocarpus and Polysiphonia.

UNIT V: FUNGI **(12hrs)**

General characteristics and outline classification (Ainsworth).

Structure, reproduction and life history of Rhizopus (Zygomycota),Penicillium (Ascomycota), and Puccinia (Basidiomycota).

Lichens-Structure and reproduction; ecological and economic importance.

Suggested activity: Seminar, Quiz, debate, collection of diseased plant parts –studying symptoms and identification of pathogen, collection and study of fresh and marine Algae available in local area.

Additional inputs:

Penicillium life cycle

Mushroom cultivation

Outlines of Bacillariophyceae

Books for Reference:

1. Oladele Ogunseitan (2008) Microbial Diversity: Form and Function in Prokaryotes Wiley- Blackwell.

2. Pelczar, M.J. (2001) Microbiology, 5th edition, Tata Mc Graw-Hill Co, New Delhi.

3. Presscott, L. Harley, J. and Klein, D. (2005) Microbiology, 6th edition, Tata Mc Graw- Hill Co. New Delhi.

4. Fritsch F.E. (1935 The Structure & Reproduction of Algae 1945): Cambridge University Press Cambridge, U.K. Vol. I, Vol. II.

5. Smith, G.M (1955) :Cryptogamic Botany(Vol. I Algae, Fungi, & Lichens) McGraw-Hill Book Co., New York .

6. Ian Morris (1967): An Introduction to the Algae, Hutchinson, London.

7. Alexopoulos,C.J.., Mims, C.W. & Blackwell, M. (1996): Introductory Mycology John Wiley& Sons., Inc., N.Y., Chicester, Berisbane, Toronto, Singapore.

8. Webster, J (1999) : Introduction to Fungi(2nd edition) Cambridge University Press.

I-BZC	BOTANY-I	SEM-I	Course code: BOT 1321P	2019-2020	No. of Credits:1	No. of Hrs /Week:2

MICROBIAL DIVERSITY, ALGAE AND FUNGI

1. Knowledge of Equipment used in Microbiology: Spirit lamp, Inoculation loop, Hot-air oven, Autoclave/Pressure cooker, laminar air flow chamber and Incubator.
2. Preparation of liquid and solid media for culturing of microbes (Demonstration).
3. Study of viruses and bacteria using electron photomicrographs (TMV, Bacteriophage, HIV, Cocci, Bacillus, Spirillum bacteria).
4. Gram staining technique.
5. Study of Plant disease symptoms caused by Bacteria (Citrus canker, leaf blight of rice, Angular leaf spot of Cotton) and viruses (TMV, Bhendi vein clearing and Leaf curl of Papaya),Fungi (Late blight of potato, Red rot of Sugarcane and Paddy blast).
6. Study of vegetative and reproductive structures of the following :
   a) **Cyanobacteria:** *Nostoc and Scytonema.*
   b) Algae: *Oedogonium, Ectocarpus, Polysiphonia*,
   c) Fungi: *Rhizopus, Penicillium and Puccinia* .
7. Study of plant material infected by Fungi (Rot of tomatoes,blue and green mould of Citrus fruits and wheat rust(Section cutting of diseased parts of Wheat and Barberry -identification of different spores).
8. Lichens: Morphology and anatomy of different thalli.
9. Field Visit.

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I-BZC	BOTANY-II	SEM-II	Course code: BOT 2321	2019-2020	No. of Credits:4	No. of Hrs /Week:4

DIVERSITY OF ARCHEGONIATES AND PLANT ANATOMY

Objective: On successful completion of this course, the students will be able to know the diversity, life cycle of Pteridophytes and Gymnosperms and tissues, tissue systems and anomalous secondary growth.

CO1: Able to explore the diversity of Bryophytes and their life cycles
CO2: Able to understand the life cycle of Pteridophytes
CO3: To understand evolution and life cycles of Gymnosperms
CO4: To understand the tissues and tissue systems in Angiosperms.
CO5: Able to know the process of secondary and anomalous secondary growth.

UNIT – I: BRYOPHYTES 12 Hrs

1. Bryophytes: General characters, Classification (up to classes)
2. Structure, reproduction and Life history of *Marchantia*, and *Funaria.*
3. Evolution of Sporophyte in Bryophytes.

UNIT - II: PTERIDOPHYTES 12 Hrs

1. Pteridophytes**:** General characters, classification (up to Classes)
2. Structure, reproduction and life history of *Lycopodium,* and *Marsilea.*
3. Heterospory and seed habit.
4. Evolution of stele in Pteridophytes.

UNIT – III: GYMNOSPERMS 12 Hrs

1. Gymnosperms: General characters, classification (up to classes)
2. Morphology, anatomy**,** reproduction and life history of *Pinus and Gnetum*
3. Economic importance with reference to wood, essential oils and drugs

UNIT-IV: TISSUES AND TISSUE SYSTEMS 12Hrs

1. Meristems - Root and Shoot apical meristems and their histological organization.
2. Tissues – Meristematic and permanent tissues (simple, complex, secretory)
3. Tissue systems**–**Epidermal, ground and vascular.

UNIT-V: SECONDARY GROWTH 12Hrs

1. Anomalous secondary growth in Achyranthes, Boerhaavia and Dracaena
2. Study of local timber of economic importance-Teak, Rose wood, Red sanders and Arjun (Tella maddi)

Additional Inputs:

Study of Rhynia
structure of Anthoceros sporophyte

Study of fossil Gymnosperms
General process of secondary growth

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I-BZC	BOTANY-II	SEM-II	Course code: BOT 2321P	2018-2019	No. of Credits:1	No. of Hrs /Week:2

DIVERSITY OF ARCHEGONIATES AND ANATOMY

Practical syllabus

1. Morphology (vegetative and reproductive structures) , anatomy of the following :

   Marchantia, Funaria, Lycopodium and *Pinus.*

2. Anatomy:

   a) Demonstration of double staining technique.

   b) Tissue organization in root and shoot apices using permanent slides

   c) Preparation of double staining slides

   d) Anomalous secondary structure of *Achyranthes, Boerhavia* and *Dracaena.*

   e) Anatomical study of wood in T.S., T.L.S. and R.L.S.

3. Field visits to local timber depots

Inclusions in Practicals:

Anthoceros (Vegetative and Reproductive

structures) Selaginella Reproductive structures

Gnetum Leaf , Male and Female cone study

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DEPARTMENT OF BOTANY

II B. Sc - SEMESTER –III: BOTANY THEORY ~~PAPER-II~~ SYLLABUS

(Paper-DSC IIA : Plant Taxonomy and Embryology)

Total hours of teaching 60 hrs @ 4 hrs per week

w.e.f.2018-19

UNIT – I: INTRODUCTION TO PLANT TAXONOMY (12 hrs)

1.Fundamental components of taxonomy (identification, nomenclature, classification)

2.Taxonomic resources: Herbarium- functions & important herbaria, Botanical gardens, Flora, Keys- single access and multi-access.

3. Botanical Nomenclature- Principles and rules of ICBN (ranks and names; principle of priority, binomial system; type method, author citation, valid-publication).

UNIT – II: CLASSIFICATION (12 hrs)

1.Types of classification- Artificial, Natural and Phylogenetic.

2. Bentham & Hooker's system of classification- merits and demerits.

3. Engler and Prantle's system of classification- merits and demerits

4. Phylogeny – origin and evolution of Angiosperms

UNIT –III: SYSTEMATIC TAXONOMY-I (12 hrs)

1. Systematic study and economic importance of the following families: Annonaceae, Rutaceae, Curcurbitaceae, and Apiaceae.

UNIT –IV: SYSTEMATIC TAXONOMY-II (12 hrs)

1. Systematic study and economic importance of plants belonging to the following families Asteraceae,Asclepiadaceae, Lamiaceae, Euphorbiaceae, and Poaceae.

UNIT – V: EMBRYOLOGY (12 hrs)

1. Anther structure, microsporogenesis and development of male gametophyte.
2. Ovule structure and types; Megasporogenesis, development of Monosporic, Bisporic and Tetrasporic types (Peperomia, Drusa, Adoxa) of embryo sacs.
3. Pollination and Fertilization (outlines) Endosperm development and types.
4. Development of Dicot and Monocot embryos, Polyembryony.

Suggested activity: Collection of locally available plants of medicinal importance, observing pollen grains in honey, Aero-palynology - collection of pollen from air using glycerin strips in different seasons. 13

Books for Reference

1. Porter, C.L. ( ): Taxonomy of flowering Plants, Eurasia Publishing House, New Delhi.
2. Lawrence, G.H.M. (1953): Taxonomy of Vascular Plants, Oxford & IBH Publishers, New Delhi, Calcutta.
3. Jefferey, C. (1968) : An Introduction to Plant Taxonomy J.A. Churchill, London.
4. Mathur, R.C. (1970) : Systematic Botany (Angiosperms) Agra Book Stores
5. Maheswari, P (1963) : Recent Advances in the Embryology of Angiosperms (Ed.,) International Society of Plant Morphologists-University of Delhi.
6. Swamy, B.G.L. and Krishnamoorthy. K.V. (1980): From flower to fruit
7. Maheswari, P.(1985): An Introduction to the Embryology of Angiosperms Tata McGraw Hill Publishing Co., Ltd., New Delhi.
8. Bhojwani, S.S. and Bhatnagar, S.P. (2000) : The Embryology of Angiosperms (4th Edition) Vikas Publishing House(P) Ltd., UBS Publisher's Distributors, New Delhi. 14

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II B.Sc - SEMESTER-III BOTANY PRACTICAL – DSC IIA

Plant Taxonomy and Embryology

Total hours of laboratory Exercises 30 hrs @ 2 per week

Suggested Laboratory Exercises

1.Systematic study of locally available plants belonging to the families prescribed in theory syllabus

2. Demonstration of herbarium techniques

3. Structure of pollen grains using whole mounts [Catharanthus, Hibiscus, Acacia, Grass (Typha)].

4.Demonistration of pollen viability test using in in-vitro germination(catharanthus).

5. Study of ovule types and developmental stages of embryo sac using permanentslides /Photographs. Demonstration of polyembryony in Citrus.

6 . Structure of endosperm (nuclear and cellular); Developmental stages of dicot and monocot Embryos using permanent slides /Photographs

7. Isolation and mounting of embryo (using Symopsis / Senna / Crotalaria)

8. Field visits

9. Preparation and submission of 30 herbarium specimens for evaluation during practical Examination.

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DEPARTMENT OF BOTANY

II B. Sc - SEMESTER- IV THEORY: BOTANY SYLLABUS

PAPER – DSC IIB: Plant Physiology and Metabolism

Total hours of teaching 60 hrs @ 4 hrs per week

w.e.f.2018-19

UNIT – I: Plant – Water relations (12 hrs)

1. Physical properties of water, Importance of water to plant life.
2. Diffusion, imbibition and osmosis; concept & components of water potential.
3. Absorption and transport of water and ascent of sap.
4. Transpiration –Definition, types of transpiration, structure and mechanism of opening and closing mechanism of stomata.

UNIT –II: Mineral nutrition & Enzymes (12hrs)

1. Mineral Nutrition: Essential elements (macro and micronutrients) and their role in plant metabolism, deficiency symptoms.
2. Mineral ion uptake (active and passive transport).
3. Nitrogen metabolism- biological nitrogen fixation in Rhizobium.
4. Enzymes: General characteristics, mechanism of enzyme action and factors regulating enzyme action.

UNIT –III: PHOTOSYNTHESIS (12 hrs)

1. Photosynthesis: Photosynthetic pigments, photosynthetic light reactions, photophosphorylation, carbon assimilation pathways: C3, C4, and CAM (brief account)
2. Photorespiration and its significance.
3. Translocation of organic solutes: mechanism of phloem transport, sourcesink relationships.

UNIT – IV: PLANT METABOLISM (12 hrs) 1.

1.Respiration: Glycolysis, anaerobic respiration, TCA cycle, electron transport system. Mechanism of oxidative phosphorylation.

2. Lipid Metabolism: Types of lipids, Beta-oxidation.

UNIT –V: GROWTH AND DEVELOPMENT (12hrs)

1. Growth and development: definition, phases and kinetics of growth.
2. Physiological effects of phytohormones - Auxins, Gibberellins, Cytokinins, ABA, Ethylene and Brassinosteroids.
3. Physiology of flowering - photoperiodism, role of phytochrome in flowering; Vernalization.
4. Physiology of Senescence and Ageing.

Suggested activity: Seminars, Quiz, Debate, Question and answer sessions, Observing animations of protein biosynthesis in You-Tube.

Books for Reference

1. Steward. F.C (1964): Plants at Work (A summary of Plant Physiology) AddisonWesley Publishing Co., Inc. Reading, Massachusetts, Palo Alto, London.
2. Devlin, R.M. (1969) : Plant Physiology, Holt, Rinehart & Winston and Affiliated East West Press (P) Ltd., New Delhi. 3. Noggle, R. and Fritz (1989): Introductory Plant Physiology Prentice Hall of India.
4. Lawlor. D.W. (1989): Photosynthesis, metabolism, Control and Physiology ELBS/Longmans - London.
5. Mayer, Anderson and Bonning (1965): Introduction to Plant Physiology D. Van Nostrand Publishing Co., N.Y.
6. Mukherjee, S. A.K. Ghosh (1998): Plant Physiology, Tata McGraw Hill Publishers (P) Ltd., New Delhi.
7. Salisbury, F.B and C.W. Ross (1999): Plant Physiology CBS Publishers and Printers, New Delhi.
8. Plummer, D.(1989): Biochemistry–the Chemistry of life, McGraw Hill Book Co., London, N.Y., New Delhi, Paris, Singapore, Tokyo.
9. Day, P.M. and Harborne, J.B. (Eds.,) (2000): Plant Biochemistry. . Harcourt Asia (P) Ltd., India and Academic Press, Singapore.

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II B. Sc SEMESTRE- IV. – BOTANY PRACTICAL SYLLABUS

PAPER- DSC IIB - Plant Physiology and Metabolism)

Total hours of laboratory Exercises 30 hrs @ 2 per week

Suggested Laboratory Exercises:

1. Osmosis – by potato osmoscope experiment
2. Determination of osmotic potential of plant cell sap by plasmolytic method using leaves of Rhoeo / Tradescantia.
3. Structure of stomata (dicot and monocot)
4. Determination of rate of transpiration using cobalt chloride method.
5. Demonstration of transpiration by Ganongs' photometer
6. Demonstration of ascent of sap/Transpiration pull.
6. Effect of Temperature on membrane permeability by colorimetric method.
7. Study of mineral deficiency symptoms using plant material/photographs.
8. Separation of chloroplast pigments using paper chromatography technique.
9. Rate of photosynthesis under varying CO_2 concentrations.
10. Effect of light intensity on oxygen evolution in photosynthesis using Wilmott' bubbler.

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III B. Sc - SEMESTER- V: BOTANY SYLLABUS

THEORY PAPER – V

Paper DSC IIIA: Cell Biology, Genetics and Plant Breeding

Total hours of teaching 60 hrs @ 4 hrs per week

UNIT – I Cell Biology: (12 hrs)

1. Cell, the unit of life- Cell theory, Prokaryotic and eukaryotic cells; Eukaryotic cell components.

2. Ultra structure and functions of cell wall and cell membranes.

3. Chromosomes: morphology, organization of DNA in a chromosome (nucleosome model), Euchromatin and heterochromatin.

UNIT – II Genetic Material: (12 hrs)

1. DNA as the genetic material: Griffith's and Avery's transformation experiment, Hershey – Chase bacteriophage experiment.

2. DNA structure (Watson & Crick model) and replication of DNA (semi-conservative)

3. Types of RNA (mRNA, tRNA, rRNA), their structure and function.

UNIT – III Mendelian Inheritance: (12 hrs)

1. Mendel's laws of Inheritance (Mono- and Di- hybrid crosses); backcross and test cross.

2. Chromosome theory of Inheritance.

3. Linkage: concept, complete and incomplete linkage, coupling and repulsion; linkage maps based on two and three factor crosses.

4. Crossing Over: concept & significance.

UNIT – IV Plant Breeding: (12 hrs)

1. Introduction and Objectives of plant breeding.

2. Methods of crop improvement: Procedure, advantages and limitations of Introduction, Selection, and Hybridization (outlines only).

D. Jyothi

M. Vijayalakshmi

UNIT – V Breeding, Crop Improvement and Biotechnology: (12 hrs)

1. Role of mutations in crop improvement.

2. Role of somaclonal variations in crop improvement.

3. Molecular breeding – use of DNA markers in plant breeding and crop improvement (RAPD, RFLP).

Suggested activity:

Seminar, Debate, Quiz, observation of live cells and nucleus in Onion peels, observation of Meiotic nuclei in Maize pollen. Solving Problems related to Genetics.

Books for Reference:

1. Old, R.W. and Primrose S.B. 1994, Principles of Gene Manipulation Blackwell Science, London

2. Grierson, D. and Convey S.N. 1989, Plant Molecular Biology, Blackie Publishers, New York.

2. Lea, P.J. and Leegood R.C. 1999, Plant Biochemistry and Molecular Biology, John Wiley and Sons, London.

3. Power C.B. 1984, Cell Biology, Himalaya Publishing Co. Mumbai

4. De Robertis and De Robertis, 1998, Cell and Molecular Biology, K.M. Verghese and Company.

5. Sinnott, E.W., L.C. Dunn & J. Dobshansky (1958): Principles of Genetics (5th Edition) McGraw Hill Publishing Co., N.Y. Toronto, London.

6. Winchester, A.M. (1958): Genetics (3rd Edition) Oxford and IBH Publishing House, Calcutta, Bombay, New Delhi.

7. Singleton, R. (1963): Elementary Genetics, D. Van Nostrand Co., Ltd., Inc., N.Y. and Affiliated East West Press (P) Ltd., New Delhi.

8. Strickberger, M.W. (1976): Genetics (2 nd Edition) MacMillan Publishing Co., Inc., N.Y., London

9. Watson, J.D. (1977): Molecular Biology of the Gene, W.A. Benjamin, Inc., Menlo Park- California, Reading - Massachusetts, London, Amsterdam, Don Mills, Ontario, Sydney.

10. Gardner, E.J and Snusted, D.P. (1984): Principles of Genetics (7th edition) John Wiley and Sons, N.Y. Chichester, Brisbane, Toronto, Singapore.

11. Lewin, B. (1985) Genes VII, Wiley Eastern Ltd., New Delhi, Bombay, Calcutta, Madras, Hyderabad. 12. Allard R.W (1999): The Principles of Plant Breeding, John & Wiley and Sons.

13. Poelman J.M: Breeding Field Crops, Springer.

14. George Acquaah (2012): Principles of Plant Genetics & Breeding: Wiley-Blackwell.

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VIJAYAWADA -520004::KRISHNA DISTRICT:: ANDHRAPRADESH

III B. Sc - BOTANY SYLLABUS SEMESTER- V

Practical Paper DSC IIIA: CELL BIOLOGY, GENETICS AND PLANT BREEDING

Total hours of teaching 30 hrs @ 3 hrs per week

Suggested Laboratory exercises

1. Study of the structure of cell organelles through photomicrographs.
2. Study of structure of plant cell through temporary mounts.
3. Study of various stages of mitosis using cytological preparation of onion root tips.
4. Study of DNA packing by micrographs.
5. Study of effect of temperature and organic solvent on permeability of cell membrane.
6. Numerical problems solving Mendel's Laws of inheritance.
7. Chromosome mapping using 3-point test cross data.
8. Hybridization techniques – emasculation, bagging (for demonstration only).
9. Field visit to a plant breeding research station.
10. Calorimetric estimation of DNA by diphenylamine method.

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III B. Sc - SEMESTER- VI: BOTANY THEORY SYLLABUS

PAPER – DSC IIIB: PLANT ECOLOGY & PHYTOGEOGRAPHY

Total hours of teaching 60 hrs @ 4 hrs per week

UNIT – I. Elements of Ecology (12 hrs)

1. Ecology: definition, branches and significance of ecology.
2. Climatic Factors: Light, Temperature, precipitation.
3. Edaphic Factor: Origin, formation, composition and soil profile.
4. Biotic Factor: Interactions between plants and animals.

UNIT– II. Ecosystem Ecology (12 hrs)

1. Ecosystem: Concept and components, energy flow, Food chain, Food web, Ecological pyramids.
2. Productivity of ecosystem-Primary, Secondary and Net productivity.
3. Biogeochemical cycles- Carbon, Nitrogen and Phosphorous.

UNIT – II Population &Community Ecology (12 hrs)

1. Population -definition, characteristics and importance, outlines –ecotypes.
2. Plant communities- characters of a community, outlines – Frequency, density, cover, life forms, competition.
3. Interaction between plants growing in a community.

UNIT – IV Phytogeography (12 hrs)

1. Principles of Phytogeography, Distribution (wides, endemic, discontinuous species)
2. Phytogeographic regions of India.
3. Phytogeographic regions of World.
4. Endemism – types and causes.

UNIT- V: Plant Biodiversity and its importance (12 hrs)

1. Definition, levels of biodiversity-genetic, species and ecosystem.
2. Biodiversity hotspots- Criteria, Biodiversity hotspots of India.
3. Loss of biodiversity – causes and conservation (In-situ and ex-situ methods).
4. Seed banks - conservation of genetic resources and their importance

D. Jyothi M. Vijayalakshmi

J. Rao

Suggested activity :

Collection of different soils, studying their texture, observing polluted water bodies, student study projects, debates on man's activity on ecosystem and biodiversity conservation methods, visiting a nearest natural vegetation area. Visit to NGO, working in the field of biodiversity and report writing; to study Honey Bees and plants yielding honey.

Books for Reference

1. Daubenmire, R.F. ( ): Plants & Environment (2nd Edn.,) John Wiley & Sons., New York
2. Puri, .G.S. (1960): Indian Forest Ecology (Vol. I and II) Oxford Book Co., New Delhi and Calcutta.
3. Billings, W.B. (1965): Plants and the Ecosystem Wadsworth Publishing Co., Inc., Belmont.
4. Misra, R. (1968): The Ecology work Book Oxford and INH Publishing Co., Calcutta
5. Odum E.P. (1971): Fundamentals of Ecology (2nd Edn.,) Saunders and Co., Philadelphia and Natraj Publishers, Dehradun.
6. Odum E.P. (1975): Ecology By Holt, Rinert and Winston.
7. Oosting, H.G. (1978): Plants and Ecosystem Wadworth Belmont.
8. Kochhar, P.L. (1975): Plant Ecology. (9th Edn.,) New Delhi, Bombay, Calcutta-226 pp.,
9. Kumar, H.D. (1992): Modern Concepts of Ecology (7th Edn.,) Vikas Publishing Co., New Delhi. 10. Kumar H.D. (2000): Biodiversity & Sustainable Conservation Oxford and IBH Publishing Co Ltd. New Delhi.
11. Newman, E.I. (2000): Applied Ecology Blackwell Scientific Publisher, U.K.
12. Chapman, J.L&M.J. Reiss (1992): ecology (Principles and Applications). Cambridge University Press, U.K.
13. Cain, S.A. (1944): Foundations of Plant Geography Harper & Brothers, N.Y.
14. Mani, M.S (1974): Ecology & Biogeography of India Dr. W. Junk Publishers, The Haque
15. Good, R. (1997): The Geography of flowering Plants (2nd Edn.) Longmans, Green and Co., Inc., London & Allied Science Publishers, New Delhi

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III B. Sc - SEMESTER- VI: BOTANY PRACTICAL

PAPER – DSC IIIB: PLANT ECOLOGY & PHYTOGEOGRAPHY

Total hours of teaching 30 hrs @ 4 hrs per week

1. Study of instruments used to measure microclimatic variables; soil thermometer, maximum and minimum thermometer, anemometer, psychrometer, rain gauze, and lux meter.
2. Permeability (percolation; total capacity as well as rate of movement) of different soil samples.
3. Determination of soil pH.
4. Study of morphological and anatomical adaptations of hydrophytes and xerophytes (4 each). 5. Determination of minimal quadrat size for the study of herbaceous vegetation in the college campus by species area curve method.
6. Study of Phytoplankton and macrophytes from water bodies.
7. Study of species diversity index of vegetation.
8. Estimation of Primary Productivity of an ecosystem
9. To study field vegetation with respect to stratification, canopy cover and composition.
10. Study of plants included in agro forestry and social forestry.
11. To locate the hotspots, phyto geographical regions and distribution of endemic plants in the map of India.
12. The following practical should be conducted in the Field/lab with the help of photographs, herbarium, Floras, Red data book- Study of endangered plants species, critically endangered plants species, vulnerable plant species and monotypic endemic genera of India.

S.R. R. & C.V.R. GOVT.DEGREE COLLEGE (AUTONOMOUS)

VIJAYAWADA,ANDHRA PRADESH, KRISHNA DISTRICT

III B. Sc - BOTANY SYLLABUS SEMESTER- VI (Elective 1) PAPER – VII (A)

Theory Paper VII(C) -T: Plant tissue culture and its biotechnological applications

Total hours of teaching 60 hrs @ 4 hrs per week

Unit I: PLANT TISSUE CULTURE – 1 (12hrs)

1. History of plant tissue culture research - basic principles of plant tissue callus culture, meristem culture, organ culture, Totipotency of cells.
2. Methodology - sterilization (physical and chemical methods), culture media, Murashige and Skoog's (MS medium), phytohormones, medium for micropropagation/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 (12hrs)

1. Endosperm culture – Embryo culture -culture requirements – applications, embryo rescue technique.
2. Cryopreservation; Germplasm conservation.

Unit III: Recombinant DNA technology (12hrs)

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)

Unit IV: Methods of gene transfer (12hrs)

1. Methods of gene transfer- Agrobacterium-mediated, direct gene transfer by Electroporation, Microinjection, Microprojectile bombardment.

2. Selection of transgenics– selectable marker and reporter genes (Luciferase, GUS, GFP).

Unit V: Applications of Biotechnology (12 hrs)

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 (Roundup Ready soybean); improved agronomic traits (flavrSavr tomato, Golden rice); Improved horticultural varieties , (Moon dust carnations)

S.R. R. & C.V.R. GOVT.DEGREE COLLEGE (AUTONOMOUS)

VIJAYAWADA, KRISHNA DISTRICT, ANDHRA PRADESH

III B. Sc - BOTANY SYLLABUS SEMESTER- VI (Elective-1) PAPER – VII (A) (Optional)

Practical Paper VII (A) -Plant Tissue Culture & Plant Biotechnology

Total hours of teaching 30hrs @ 3 hrs per week

1. (a) Preparation of MS medium.

(b) Demonstration of in vitro sterilization methods and inoculation methods using leaf and nodal explants of Tobacco/ Datura/ Brassica etc.

2. Study of embryo and culture, micro propagation of Banana, somatic embryogenesis, artificial seeds through photographs.

3.Study of methods of gene transfer through photographs: Agrobacterium-mediated,Direct gene transfer by electroporation, microinjection, and microprojectile bombardment.

4.Different steps involved in genetic engineering for production of Bt. cotton, Goldenrice,FlavrSavr tomato through photographs.

5.Isolation of plasmid DNA.

6. Field visit to a lab involved in tissue culture

7. 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, clonal propagation methods, isolation of plasmid DNA individually and as a group.

S.R. R. & C.V.R. GOVT.DEGREE COLLEGE (AUTONOMOUS)

VIJAYAWADA, ANDHRA PRADESH, KRISHNA DISTRICT

CLUSTER ELECTIVES (Group –A)

III B.Sc.: BOTANY SYLLABUS SEMESTER-VI THEORY [CLUSTER ELECTIVE-1]

Paper VIII-A-1 -Theory: PLANT DIVERSITY AND HUMAN WELFARE

Total hours of teaching 60hrs @ 3 hrs per week

Unit- I: Plant diversity and its scope: (12hrs)

i. Genetic diversity, Species diversity, Plant diversity at the ecosystem Agro biodiversity and cultivated plant taxa, wild taxa.
ii. Values and uses of biodiversity: Ethical and aesthetic values,
iii.for valuation, Uses of plants.level,Methodologies

Unit -II: Loss of biodiversity: (12hrs)

i. Loss of genetic diversity, Loss of species diversity, Loss of ecosystem diversity, Loss of agro biodiversity, projected scenario for biodiversity loss
ii. Management of plant biodiversity: Organizations associated with biodiversity management-Methodology for execution-IUCN, UNEP, UNESCO, WWF, NBPGR; Biodiversity legislation and conservations, Biodiversity information management and communication.

Unit-III: Contemporary practices in resource management: (12hrs)

i. Environmental Impact Assessment (EIA), Geographical Information System GIS.
ii. Solid and liquid waste management

Unit -IV: Conservation of biodiversity (12hrs)

i. Conservation of genetic diversity, species diversity
ii. Social approaches to conservation, Biodiversity awareness programmes, Sustainable development.

Unit- V: Role of plants in relation to Human Welfare (12hrs)

i. Importance of forestry, their utilization and commercial aspects-
a) Avenue trees, b) ornamental plants of India. c) Alcoholic beverages through ages.
ii. Fruits and nuts: Important fruit crops their commercial importance. Wood, fiber and their uses.

S.R. R. & C.V.R. GOVT.DEGREE COLLEGE (AUTONOMOUS)

VIJAYAWADA, KRISHNA DISTRICT, ANDHRA PRADESH

III B. Sc - BOTANY PRACTICAL SYLLABUS

Practicals:

1) Study of plant diversity (flowering plants).
2) Study of exotic species- Identification and morphological characteristics.
3) Identification of forest trees through bark, wood, flowers, leaves and fruits.
4) Maceration, Study of wood (Tracheary elements, fibers).
5) Methods of preservation and canning of fruits.
6) Visit to the local ecosystem to study the plants.
7) Write up on the conservation efforts of International organizations.
8) Study of Solid and Liquid waste management systems in rural/urban areas.

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

S.R. R. & C.V.R. GOVT.DEGREE COLLEGE (AUTONOMOUS)

VIJAYAWADA, ANDHRA PRADESH, KRISHNA DISTRICT
III B. Sc - BOTANY SYLLABUS SEMESTER- VI THEORY [CLUSTER ELECTIVE -2]
Paper VIII-A-2-Theory: ETHNOBOTANY AND MEDICINAL BOTANY
Total hours of teaching 60hrs @ 3 hrs per week

Unit –I: Ethnobotany (12hrs)

i. Introduction, concept, scope and objectives; Ethnobotany as an interdisciplinary science. The relevance of ethnobotany in the present context
ii. Major and minor ethnic groups or Tribes of India, and their lifestyles.
iii. 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: (12hrs)

i. Role of ethnobotany in modern medicine with special example Rauvolfia Serpentina, Trichopuszeylanicus, Artemisia annua, Withaniasomnifera.
ii. Significance of the following plants in ethno botanical practices (along with their habitat and morphology) a) Azadirachtaindica, b) Ocimum sanctum, c) Vitex negundo,
d)Gloriosa superba, e) Tribulus terrestris, f) Phyllanthus niruri , g) Cassia auriculata, h) Indigoferatinctoria ,i) Senna auriculata j).Curcuma longa.
ii. Role of ethnic groups in the conservation of plant genetic resources.

Unit-III: Ethnobotany as a tool to protect interests of ethnic groups (12hrs)

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

Unit -IV: History, Scope and Importance of Medicinal Plants. indigenous Medicinal Sciences (12hrs)

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

Unit -V: Conservation of endangered and endemic medicinal plants: (12hrs)

i. Definition: endemic and endangered medicinal plants,
ii. Red list criteria
iii. In situ conservation: Biosphere reserves, sacred groves, National Parks
iv. Ex situ conservation: Botanical Gardens.

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.

Practical:

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

S.R. R. & C.V.R. GOVT.DEGREE COLLEGE (AUTONOMOUS)

VIJAYAWADA, ANDHRA PRADESH, KRISHNA DISTRICT

III B. Sc - BOTANY SYLLABUS SEMESTER- VI THEORY[CLUSTER ELECTIVE -3]

Paper VIII-A-3 -Theory: Pharmacognosy and Phytochemistry

Total hours of teaching 60hrs @ 3 hrs per week

Unit-I: Pharmacognosy (12hrs)

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

Unit –II: Organoleptic and microscopic studies: (12hrs)

Organoleptic and microscopic studies with reference to nature of active principles and common adulterants of Alstonia Scholaris (bark), Adhatodavasica(leaf), Strychnos Nux Vomica (seed), Rauwolfia serpentina(root) and Zingiber officinalis Catharanthus roseus.

Unit-III: Secondary Metabolites: (12hrs)

i. Definition of primary and secondary metabolites and their differences, major types - terpenes, phenolics, alkaloids, terpenoids, steroids.

ii. A brief idea about extraction of alkaloids.Origin of secondary metabolites – detailed account of acetate pathway, mevalonate pathway, shikimate pathway.

UNIT-IV: Phytochemistry: (12hrs)

Biosynthesis and sources of drugs:
(i) 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).
(ii) Steroids, sterols, saponins, withanolides, ecdysones, cucurbitacins:
(iii) Alkaloids: Different groups, biosynthesis, bioactivity.
(v) Volatile oils, aromatherapy.

UNIT-V: Enzymes, proteins and amino acids as drugs: (12hrs)
i. Vaccines, toxins and toxoids, antitoxins, immune globulins, antiserums,
ii. Vitamins, Antibiotics – chemical nature, mode of action.
iii. Pharmacological action of plant drugs – tumor inhibitors, PAF antagonists, antioxidants, phytoestrogens and others.
iv. Role of different enzyme inhibitors.

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

S.R.R.& C.V.R. GOVT.DEGREE COLLEGE (AUTONOMOUS)

VIJAYAWADA, KRISHNA DISTRICT, ANDHRA PRADESH

III B. Sc - BOTANY PRACTICAL SYLLABUS

PRACTICALS:

1. Physical and chemical tests for evaluation of unorganized drugs- Asafoetida. Honey, Castor oil. Acacia.

2. Identification of bark drugs – cinchona, cinnamon

3. Identification of fruit drugs – Cardamom, Coriander

4. Identification of root and rhizome drugs- Ginger, Garlic, Turmeric

5. Identification of whole plant – Aloes,Vinca, Punarnava

6. Herbarium of medicinal plants (minimum of 20 plants)

7. Collection of locally available crude drugs from local venders (minimum of 20)

Domain skills expected to achieve: Identification of various plant parts used as medicines, extraction of active principles from them, isolation by chromatographic techniques, learning callus culture techniques for secondary metabolite enrichment and understanding ethno-pharmacological principles

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VIJAYAWADA- 520004 ::KRISHNA DISTRICT::ANDHRA PRADESH.

III B. Sc - BOTANY SYLLABUS SEMESTER- VI (ELECTIVE-2) PAPER – VII(B)

(Optional)

Theory Paper VII(B)-T: Nursery, Gardening and Floriculture.

Total hours of teaching 60 hrs @ 4 hrs per week

Unit I: Nursery: **(12 hrs.)**

1. Definition, objectives, scope and building up of infrastructure for nursery.
2. Planning and seasonal activities - Planting - direct seeding and transplants.
3. Nursery Management and Routine Garden Operations.

Unit III: Gardening (12 hrs.)

1. Definition, objectives and scope - different types of gardening.
2. Landscape and home gardening - parks and its components, plant materials and design .
3. Computer applications in landscaping.
4. Gardening operations: soil laying, manuring, watering.
5. Landscaping Places of Public Importance: Landscaping highways and Educational Institutions)
6. Some Famous gardens of India.

Unit III: Propagation methods (12 **hrs.)**

1 Sowing/raising of seeds and seedlings, transplanting of seedlings.

2.Air-layering, cutting, selection of cutting ,propagule collecting season, treatment of cutting rooting medium and planting of cuttings - Hardening of plants.

3. Propagation of ornamental plants by rhizomes, corms tubers, bulbs and bulbils.

4. Greenhouse - mist chamber, shed root, shade house and glass house for propagation.

5.Hydroponics

Unit IV: Floriculture: (12 hrs.)

1. Ornamental Plants: Flowering annuals; herbaceous, perennials; Divine vines; Shade and ornamental trees.
2. Ornamental bulbous and foliage plants; Cacti and succulents.
3. Ornamentals-palms.
4. Cultivation of plants in pots; Indoor gardening; Bonsai.

Unit V: Commercial Floriculture (12 hrs.)

1. Factors affecting flower production; Production and packaging of cut flowers; Flower arrangements; Methods to prolong vase life of flowers
2. Cultivation of Important cut flowers (Carnation, Aster, Dahlia, Gerbera, Anthuriums, Gladiolus, Marigold, Rose, Lilium)
3. Management of pests, diseases and harvesting.
4. Methods of harvesting.

S.R. R. & C.V.R. GOVT.DEGREE COLLEGE (AUTONOMOUS)

III B. Sc - BOTANY SYLLABUS SEMESTER- VI (Elective-II)

Practical Syllabus VII (B)-Nursery, Gardening and Floriculture

Total hours of teaching 30 hrs @ 2 hrs per week

1. Tools, implements and containers used for propagation and nursery techniques.
2. Propagation by cutting, layering, budding and grafting
3. Seed propagation- preparation of portable trays, seed treatments, sowing and seedling production.
4. Identification and description of annuals, herbaceous perennials, climbers, creepers, foliage flowering shrubs, trees, palms, ferns, ornamental grasses; cacti and succulents..
5. Planning and designing of gardens, functional uses of plants in the landscape
6. Preparation of land for lawn and planting.

7. Identification of commercially important flower crops and their varieties.
8. Propagation practices in flower crops, sowing of seeds and raising of seedlings of annuals.
9. Use of chemicals and other compounds for prolonging the vase life of cut flowers.
10. Grading, packing and marketing of cut flowers.
11. Visit to commercial nurseries and commercial tissue culture laboratory
12. Study project under supervision of lecturer – nursery/ornamental flowers/ plants/lawn designing/ landscape designing

Expected domain skills to be achieved: Ability to use a variety of garden tools and implements, proficiency in layering and grafting techniques (cleft grafting and bud grafting), landscape drawings using computers, raising of healthy nurseries of flowering plants, managing vase life of cut flowers etc.

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VIJAYAWADA, KRISHNA DISTRICT, ANDHRA PRADESH

CLUSTER ELECTIVES (Group –A)

III B.Sc.: BOTANY SYLLABUS SEMESTER-VI THEORY

Paper VIII-B-1 -Theory: Biological instrumentation and Methodology

Total hours of teaching 60hrs @ 3 hrs per week

Unit -I:Imaging and related techniques: **(12hrs)**

Principles of microscopy; Light microscopy; Fluorescence microscopy; Electron Microscopy,

Applications of fluorescence microscopy

Unit- II: PH and Centrifugation: (12 hrs)

pH meter: Principles and instrumentation, Centrifugation: Principles, types of centrifuges, types of rotors, differential and density gradient centrifugation, application. Sonication, Freeze drying.

Unit- III: Spectrophotometry: (12hrs)

Principle involved in Spectrophotometer; Spectrophotometric techniques, Instrumentation: ultraviolet and visible spectrophotometry (single and double beam, double wavelength spectrophotometers), Infrared spectrometers - Luminometry and densitometry – principles and their applications.

Unit- IV: Chromatography: (12hrs)

Chromatographic techniques: Principle and applications – Column - thin layer –paper, affinity - Gel filtration - Ion exchange and High performance liquid chromatography techniques– Examples of application for each chromatographic system - Basic principles of electrophoresis.

Unit-V: Preparation of molar, molal and normal solutions, buffers, the art of scientific writing

(12hrs)

Understanding the details on the label of reagent bottles . Molarity and normality of common acids and bases.Preparation of solutions. Dilutions. Percentage solutions, Molar, molal and normal solutions. Technique of handling micropipettes ; Knowledge about common toxic chemicals and safety measures in their handling.

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VIJAYAWADA, KRISHNA DISTRICT, ANDHRA PRADESH.

PRACTICAL SYLLABUS

1. Microscopy – Light microscopy: principles, parts & function
2. Micrometry- principle and measurement of microscopic objects: Low power and high power.
3. Camera Lucida drawing with magnification and scale.
4. Principle and working of phase contrast microscope
5. Principle & operation of Centrifuge
6. Preparation of standard acid and alkali and their standardization.

b) Preparation of various solutions (normal, molar, and percent) and ppm/ppb by serial dilutions

7. Study of principle and working of pH meter and Measurement of pH of Milk, Pepsi, Lemon juice etc. using pH paper and pH meter
8. Study of principle of Chromatography and separation of amino acids mixture By ascending Paper Chromatography
7. Principle & operation of Colorimeter
8. Principle & operation of Spectrophotometer
9. Chromosome banding, FISH, chromosome painting
10. Principle and technique of TLC (demonstration)

11. TLC separation of Amino acids from purified samples and biological materials (demonstration)
12. PCR - The Polymerase Chain Reaction (protocol) -demonstration
13. Study visit to an institute /laboratory

Domain skills expected to achieve:

Skill in operating laboratory equipment, their upkeep, and adept at various biological techniques. Ability to prepare molar, molal, normal solutions and solutions of different dilutions.Interpreting scientific results, and ability to present results in a scientific way through graphs, photographs, poster presentations and powerpoint presentations.

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VIJAYAWADA, KRISHNA DISTRICT, ANDHRA PRADESH

CLUSTER ELECTIVES (Group –B)

III B.Sc.: BOTANY SYLLABUS SEMESTER- VI THEORY

Paper VIII-B-2 Theory: Mushroom Culture and Technology

Total hours of teaching 60hrs @ 3 hrs per week

Unit I: Introduction, history: (12hrs)

Introduction - history - scope of edible mushroom cultivation, Types of edible mushrooms available in India –*Volvariellavolvacea, Pleurotus Citrinopileatus, Agaricus Bisporus.* Nutritional and medicinal value of edible mushrooms; Poisonous mushrooms.

UNIT II:Pure culture-spawn preparation: (12hrs)

Pure culture - preparation of medium (PDA and Oatmeal agar medium)sterilization - preparation of test tube slants to store mother culture – culture of Pleurotus mycelium on Petri Plates, preparation of mother spawn in saline bottle and polypropylene bag and their Multiplication

Unit III: Cultivation Technology: (12hrs)

Infrastructure: Substrates (locally available) Polythene bags, vessels, Inoculation hook, inoculation loop, low cost stove, sieves, culture rack, mushroom unit (Thatched house) water sprayer, tray, small polythene bag. Mushroom bed preparation - paddy straw, sugarcane trash, maize straw, banana leaves. Factors affecting the mushroom bed preparation - Low cost technology, composting technology in mushroom production.

Unit IV:Storage and nutrition : (12hrs)

Short-term storage (Refrigeration - up to 24 hours) Long term Storage (canning, pickels, papads), drying, storage in salt solutions. Nutrition - Proteins - amino acids, mineral elements nutrition - Carbohydrates, Crude fibre content – Vitamins.

Unit V:FoodPreparation: (12hrs)

Types of foods prepared from mushrooms;soup,cutletomlette,samosa,pickles and curry.ResearchCentres - National level and Regional level. Cost benefit ratio - Marketing in India and abroad, Export Value.

S.R. R. & C.V.R. GOVT.DEGREE COLLEGE (AUTONOMOUS)

VIJAYAWADA, KRISHNA DISTRICT, ANDHRA PRADESH

PRACTICAL SYLLABUS

1. Identification of different edible and poisonous mushrooms.
2. Microscopic and anatomical observations of different mushroom species.
3. Pure culture - preparation of medium (PDA and Oatmeal agar medium) sterilization.
4. Isolation and preparation of spawn under controlled conditions(preparation of mother spawn saline bottle and polypropylene bag and their multiplication).
5. Types of Compost preparation and sterilization.
6. Mushroom bed preparation - paddy straw, sugarcane trash, maize straw, banana leaves/waste.
7. Inoculation and spawning of compost.
6. Incubation and harvesting of mushrooms (collection, drying and preservation).
7. Diseases of mushrooms (photographs).
8. Post-harvest technology steps (photographs).
9. Study tour to mushroom cultivation farms
11. Project work – cultivation of paddy straw/ oyster/white button mushrooms.

Domain skills expected to achieve: Identification of different edible species, skill in media and substrate preparation, isolation of pure culture for spawn, compost preparation, and practices in growing methods of different cultivated mushrooms, Postharvest handling and packing

S.R. R. & C.V.R. GOVT.DEGREE COLLEGE (AUTONOMOUS)

VIJAYAWADA, KRISHNA DISTRICT, ANDHRA PRADESH

CLUSTER ELECTIVES (Group –B)

III B. Sc.: BOTANY SYLLABUS SEMESTER- VI

Paper VIII-B-3 Project Work preferably either in an Institute or Industry

Guidelines for Project Work

1. Project work (VIII (A)) – VIII-A3 must be done on Pharmacognosy and Phytochemistry.
2. Project work can be chosen from either VIII-B-1 OR VIII-B-2 papers.
3. Every student has to undertake the research oriented academic/study project and has to submit a report at the end of the semester VI.
4. The report should be submitted in the prescribed format only (75 - 100 pages)
5. The project work carried out in the VI Semester is to be submitted Two Weeks before the Semester end examinations.
6. The academic project work has to be done under the guidance faculty of Botany Department.
7. The external valuation of the project work will be done along with the SEM VI practical examination.

Blueprint of the Project Report

This project report shall be presented in a number of chapters, starting with Introduction and ending with Summary and Conclusions. Each of the other chapters will have a precise title reflecting the contents of the chapter. A chapter can be subdivided into sections, subsections and sub subsections so as to present the content discretely and with due emphasis. When the work comprises two or more mutually independent investigations, the project report may be divided into two or more parts, each with an appropriate title. However, the numbering of chapters will be continuous right through.

1.1 Introduction , 1.2 Review of Literature and Experimental

1.3 Report on the present investigation

1.4 Results and Discussions

1.5 Summary and Conclusions ,1.6 References

Signature of the members of the BOS:

Name	Position	Signature
1. D.Jyothi Asst.Prof. in Botany SRR & CVR GDC ,VIJAYAWADA	(in-charge of the Department & Chairman ,BOS)	D. Jyothi
2. Prof.M.Vijaya Lakshmi Prof in Botany Acharya Nagarju University Guntur .AP	(University Nominee)	M. Vijayalakshmi
3. Dr.Ch. Baskhara Rao. Asst.Prof. in Botany GDC Women (A) Guntur	(Subject Expert)	Ch. Bhaskar
4. Dr.J.Ramudu. Asst.Prof. in Botany GDC MOVVA Krishna (Dt)	(Subject Expert)	J. Ramudu
5. Dr.M.Lakshmi Prasad. SUJA BIOTECHS VIJAYAWADA	(Special Member)	M. Lakshmi Prasad
6. V. Naga Lakshmi. Lecturer in Botany SRR & CVR GDC , VIJAYAWADA.	(Guest Faculty)	