

W. e. f. 2015-16

Andhra Pradesh Common Core Syllabus
SRI KRISHNADEVARAYA UNIVERSITY:: ANANTHAPURAMU
CBCS – SEMESTER SYSTEM w.e.f.(2015-2016)
B.Sc - BOTANY
I SEMESTER

Paper - I: Microbial Diversity, Algae and Fungi

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

1. Origin of life –theories
2. Geological time scale
3. Microbial diversity-Mycoplasma – Chlamydia -Archaeobacteria –Actinomycetes

UNIT- II: VIRUSES AND BACTERIA (12 hrs)

1. Viruses: General account of Viruses, structure, replication and transmission of plant diseases Caused by Viruses.
2. Bacteria: Structure, nutrition, reproduction and economic importance. Outline of plant diseases of important crop plants caused by Bacteria and their control.

UNIT III: CYANOBACTERIA AND LICHENS (12 hrs)

1. Cyanobacteria: General account of cell structure, thallus organization and their uses as Biofertilizers
2. Structure and reproduction and life history of Nostoc and Scytonema
3. Lichens – Morphology –Anatomy –Reproduction –Economic importance

UNIT –IV Algae (12 hrs)

1. General account, Fritsch classification of Algae and economic importance.
2. Structure, reproduction, life history of Oedogonium, Ectocarpus and Polysiphonia

UNIT V: FUNGI (12 hrs)

1. General characters, classification(Alexopolous) and economic importance
2. Structure, reproduction and life history of *Albugo*, *Penicillium*, *Puccinia*
3. General account of plant diseases caused by Fungi and their control



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Andhra Pradesh Common Core Syllabus
SRI KRISHNADEVARAYA UNIVERSITY ANANTHAPURAMU
I B.Sc - BOTANY
I SEMESTER

PRACTICAL SYLLABUS: PAPER I SEMESTER -I

Paper-I-IP: Microbial Diversity, Algae and Fungi

Total hours of laboratory Exercises 48 hrs @ 3 per week

1. Knowledge of Equipment used in Microbiology: Spirit lamp, Inoculation loop, Hot-air oven, Autoclave/Pressure cooker, Laminar air flow chamber, Incubator, etc.
2. Preparation of solid and liquid media for culturing of microbes (Demonstration)
3. Study of viruses and bacteria using electron micro photographs
4. Gram staining of Bacteria
5. Study of Plant disease symptoms caused by Bacteria (Citrus canker, leaf blight of rice, Angular leaf spot of Cotton) and viruses (TMV, Vein clearing of Bhendi and Leaf curl of Papaya), Fungi (Late blight of potato, Red rot of Sugarcane and Paddy blast)
6. Vegetative and reproductive structures of the following :
 - a. **Algae:** Oedogonium, Ectocarpus, Polysiphonia, Nostoc and Scytonema
 - b. **Fungi:** Albugo, Penicillium and Puccinia .
7. Section cutting of diseased material infected by Fungi and identification of pathogens as per theory syllabus
8. Lichens: Different types of thalli and Anatomy
9. **Field Visit**



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I SEMESTER

PRACTICAL EXAMINATIONS - MODEL PAPER

PAPER -I SEMESTER -I

Paper-I-1 P: Microbial Diversity, Algae and Fungi

Time 3hrs

Max. Marks: 50

75+25

1. Identify giving reasons two of the given **Algal mixture** "A". Leave your preparation for evaluation. Draw labeled diagrams. (Slide--1marks, Diagrams--1marks, Identification--1mark)

3 x 2 = 6 Marks

2. Make suitable stained preparation of the **material "B"** to bring out the details of internal structure--identify giving reasons. Draw labeled diagrams and leave your preparations for evaluation. (Slide-4 marks, diagrams-3 marks, Identification-3marks)

10 Marks

3. Conduct C.- Gram staining of Bacteria

9Marks.

4. Write critical notes and Identify D, E, F, G and H

15 Marks.

5. Record (submission is compulsory)

10Marks.

Total: 50 Marks

Key:

- A. Algal material
- B. Fungi material
- C. Bacterial material.
- D. Instruments of Micro biology.
- E. Whole specimen or permanent slide of Algae.
- F. Whole specimen or permanent slide of Fungi.
- G. Whole specimen or permanent slide of plant pathology.
- H Whole specimen or permanent slide of Lichens



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S.D.G.S. College :: HINDUPUR
Department of Botany
I Year, II Semester
Paper –II T: Diversity of Archaeogniatae & plant Anatomy
Total Hours of teaching 60 Hrs @ 4 Hrs per week

UNIT – I: BRYOPHYTA

(12hrs)

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

UNIT - II: PTERIDOPHYTA

(12 hrs)

1. **Pteridophyta:** General characters and Classification (up to classes).
2. **Structure, reproduction** and life history of *Lycopodium*, and *Marsilea*
2. Heterospory and seed habit
4. Stellar Evolution in Pteridophytes

UNIT – III: GYMNOSPERMS

(12 hrs)

1. **Gymnosperms:** General characters and classification (upto classes).
2. **Morphology, Anatomy, reproduction** and life history of *Pinus*, *Gnetum*

UNIT –IV: Tissues And Tissue systems

(12 hrs)

1. **Tissues** – meristematic and permanent tissues (simple and complex)
2. Shoot apical meristem and its histological organisation
3. Root apical meristem and its histological organization

UNIT – V. Secondary growth

(12 hrs)

1. Anomalous secondary growth in *Dracaena*, *Boerhavia* and *Bignonia*
2. Wood structure – general account. Study of local timbers Teak, Rosewood, Red sanders and *Neem (Azadirachta Indica)*

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II B. Sc - SEMESTER - III: BOTANY THEORY PAPER - III
(Paper-DSC IIA : Plant Taxonomy and Embryology)
Total hours of teaching 60hrs @ 4 hrs per week

★ **UNIT - I: INTRODUCTION TO PLANT TAXONOMY**

(12hrs)

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 & Prantle's system of classification- merits and demerits
4. Phylogeny – origin and evolution of Angiosperms

UNIT - III: SYSTEMATIC TAXONOMY-I

(12hrs)

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

UNIT - IV: SYSTEMATIC TAXONOMY-II

(12hrs)

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

★ **UNIT - V: EMBRYOLOGY**

(12hrs)

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 (out lines) 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.



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II B.Sc - SEMESTER-III
BOTANY PRACTICAL – DSC IIA
Plant Taxonomy and Embryology
Total hours of laboratory Exercises 30hrs @ 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).
4. Demonstration of Pollen viability test using *in-vitro* germination (*Catharanthus*).
5. Study of ovule types and developmental stages of embryo sac using permanent slides /Photographs.
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. Study of local flora and submission of Field Note Book.

II B.Sc., BOTANY- SEMESTER -III
PRACTICAL MODEL PAPER III Plant Taxonomy and Embryology

1. Describe the given Plant specimens (A & B) in technical terms. Draw neat labeled diagrams of twig with inflorescence, L.S. of Flower, T.S. of Ovary and floral Diagram. Give floral formula. Identify the family.

2x 10 = 20 Marks

(Description- vegetative - 2 marks, floral - 4 marks; diagrams-3 marks, Identification-1 marks)
2. Derive the plant specimens C & D to their respective families- 2x4 = 08 marks
3. Identification of spotters -D, E ,and F (Embryology) 3x4 =12 marks
4. Record & Herbarium (submission compulsory) 10 marks

Total : 50 Marks



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II B. Sc - SEMESTER- IV THEORY: BOTANY SYLLABUS
PAPER – DSC IIB: Plant Physiology and Metabolism
Total hours of teaching 60hrs @ 4 hrs per week

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 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*, outlines of protein synthesis (transcription and translation).
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, photo-phosphorylation, carbon assimilation pathways: C₃, C₄, and CAM (brief account)
2. Photorespiration and its significance.
3. Translocation of organic solutes: mechanism of phloem transport, source-sink relationships.

UNIT – IV: PLANT METABOLISM

(12 hrs)

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.



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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 & monocot)
4. Determination of rate of transpiration using cobalt chloride method.
5. Demonstration of transpiration by Ganong's 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's bubbler.

II B. Sc – SEMESTRE- IV. BOTANY PRACTICAL MODEL PAPER
(PAPER- IV - Plant Physiology and Metabolism)

1. Perform the Experiments A & B. Give the aim, principle, procedure and observation. Tabulate the results if any. Draw labeled diagram. 2 x 15 = 30 marks
 2. Give the protocol of the experiments C & D 2 x 5 = 10 marks
 3. Record & Viva 10 marks
- 50 marks



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III B. Sc - SEMESTER- V: BOTANY SYLLABUS

THEORY PAPER – V

Paper-V: Cell Biology, Genetics and Plant Breeding

Total hours of teaching 60 hrs @ 3 hrs per week

UNIT – I Cell Biology:

(12hrs)

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:

(12hrs)

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).

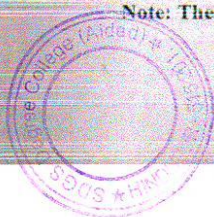
UNIT – V Breeding, Crop Improvement and Biotechnology:

(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 Genetics problems.

Note: Theory Model paper as per with I, II, III & IV Semesters



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Total hours of teaching 30hrs @ 2hrs per week

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 & 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- V, BOTANY PRACTICAL MODEL PAPER
PAPER-V: CELL BIOLOGY, GENETICS AND PLANT BREEDING

1. Perform the Experiment A .Perform squash on onion root tip, prepare the slide, identify at least one division stage. Write the procedure and draw the diagram of reported stage.

1 x 15 = 15marks

2. Give the experimental protocol of the experiments B

1 x 10 = 10 marks

3. Solving numerical problems on Mendelian inheritance C,D

2x 7 1/2 = 15 marks

1. Record & Viva

= 10 marks

50 marks

A-Onion root squash technique

B- Estimation of DNA by diphenylamine method

C&D Numerical problems on Mendelian Inheritance.



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III B. Sc - SEMESTER- V: BOTANY THEORY SYLLABUS
PAPER-VI: PLANT ECOLOGY & PHYTOGEOGRAPHY

Total hours of teaching 60 hrs @ 3 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

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.

Note: Theory Model paper as per with I, II, III & IV Semesters



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III B. Sc - SEMESTER- V: BOTANY PRACTICAL
PRACTICAL PAPER-VI: PLANT ECOLOGY & PHYTOGEOGRAPHY

Total hours of teaching 30 hrs @ 3 hrs per week

1. Study of instruments used to measure microclimatic variables; soil thermometer, maximum and minimum thermometer, anemometer, psychrometer, rain gauge, 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.
6. Study of species diversity index of vegetation.
7. Estimation of Primary Productivity of an ecosystem
8. To study field vegetation with respect to stratification, canopy cover and composition.
9. Study of plants included in agro forestry and social forestry.
10. To locate the hotspots, phyto geographical regions and distribution of endemic plants in the map of India.
2. 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.



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III B. Sc - SEMESTER- V: BOTANY PRACTICAL MODEL PAPER
PAPER-VI: PLANT ECOLOGY & PHYTOGEOGRAPHY

1. Study Project under supervision	= 15 Marks
2. Record & Viva-Voce	= 10 Marks
3. Experiment A	= 10 Marks
4. Anatomical adaptations of B (Section cutting)	= 10 Marks
5. Spotters C&D (2x2 1/2)	= 5 Marks
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Total =	50 Marks

1. Study Project of a surrounding Ecosystem (terrestrial or aquatic)(plant diversity, animal diversity, human activity, pollution levels, restoration efforts under supervision.
2. Presentation of the project work in Q & A session.
3. A -determination of soil porosity/PH/percolation/retaining capacity.
4. B- Xerophyte/Hydrophyte anatomical adaptations.
5. C & D-anemometer/rain gauge/lux meter.



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~~anemometer/rain gauge/lux meter~~

SEMESTER-VI: Electives

Andhra Pradesh State Council of Higher Education

w.e.f. 2015-16 (Revised in April 2016)

III B. Sc - BOTANY SYLLABUS SEMESTER- VI

PAPER – VII – ELECTIVE [(A) or (B) or (C)]

Paper VII-(A): ORGANIC FARMING & SUSTAINABLE AGRICULTURE

Total hours of teaching 60hrs (@ 3hrs per week)

Unit - I: Concept of organic farming:

(12hrs)

1. Introduction: Farming, organic farming, concept and development of organic farming.
2. Principles of organic farming, types of organic farming, biodynamic farming.
3. Benefits of organic farming, need for organic farming, conventional farming v/s organic farming
4. Scope of organic farming; Andhra Pradesh, National and International status.
5. Agencies and institutions related to organic agriculture.
6. Requirements for organic farming, farm components for an organic farm.

Unit - II: Organic plant nutrient management:

(12hrs)

1. Organic farming systems, soil tillage, land preparation and mulching.
2. Choice of varieties.
3. Propagation-seed, planting materials and seed treatments, water management
4. Green manuring, composting- principles, stages, types and factors, composting methods, Vermi composting
5. Bulky organic manures, concentrated organic manures, organic preparations, organic amendments and sludges.
6. Bio-fertilizers- types, methods of application, advantages and disadvantages, standards for organic inputs- fertilizers

APPROVED

4. ~~Expts~~ BOC
Health marks



Unit-III: Organic plant protection:**(12hrs)**

1. Plant protection- cultural, mechanical, botanical pesticides, control agents
2. Weed management
3. Standards for organic inputs- plant protection.

Unit- IV: Organic crop production practices:**(12hrs)**

1. Organic crop production methods- rice, coconut.
2. Organic crop production methods- vegetables- okra, amaranthus, cucurbits.
3. Livestock component in organic farming.
4. Sustainable Agriculture-Apiculture, Mushroom cultivation.

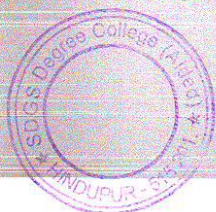
Unit- V: Organic Certification**(12hrs)**

1. Farm economy: Basic concept of economics- demand & supply, economic viability of a farm.
2. Basic production principles, reducing expenses, ways to increase returns, cost of production system. Benefit/ cost ratio, marketing, imports and exports.
3. Policies and incentives of organic production.
4. Farm inspection and certification.
5. Terrace farming

Books for Reference:

1. Palaniappan SP & Anandurai K. 1999. Organic Farming-Theory and Practice. Scientific Publishers, Jodhpur
2. Joshi, M. 2014. New Vistas of Organic Farming 2nd Ed. Scientific Publishers, Jodhpur.
3. Farming system : Theory and Practice - S.A.Solaimalai
4. Organic Farming: Theory and Practice- S.P.Palaniappan and K.A. Annadurai
5. A hand book of Organic Farming by A.K.Sharma

Suggested Activities: Preparation of Vermicompost in small scale, observing sewage sludge disposal mechanisms in urban/semi urban areas, studying the usage, of green manures, neem oil, neem cake, pongamia oil in organic farming, livestock component in various farming methods, visiting an Apiculture center, drawing various terrace farming models



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Paper-VII-A : Practical**Semester – VI, Paper-VII-A : Organic Farming and Sustainable Agriculture**

Total hours of teaching 30 hrs @ 2 hrs per week

1. Study of different bio pesticides, weedicides, inorganic and organic fertilizers
2. Deficiency symptoms of nutrient deficiency symptoms (photographs)
3. Soil testing, liming, and fertilizing
4. Preparation of enriched Farm Yard Manure.
5. Study of composting methods.
6. Preparation of vermicompost.
7. Study of recycling of farm waste.
8. Study of methods of green manuring.
9. Study of steps in mushroom cultivation
10. Visit to urban waste recycling unit.
11. Study project report under supervision of lecturer – farm manure preparation/vermi-compost// waste management// green manures/ mushroom cultivation / nutrient requirements of vegetables

Expected domain skills to be achieved: Performing Soil analysis, soil enrichment methods, composting procedure, recycling of wastes, use of waste materials in mushroom cultivation, understanding nutrient requirement of various crops, identifying various methods of keeping soil health



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CRITICAL MODEL PAPER

aper- (A) : Organic Farming and Sustainable Agriculture

Q1. Project report (A) - 15 marks

Viva-voce on study project -05 marks

Q2. Identify and write notes on B, C, D, and E (4x5) -20 marks

B- inorganic manures/bio-weedicides/bio-pesticides (photograph/ specimen)

C- Compost preparation method (photograph/instrument)

D- Green manure type (plant specimen/photograph)

E- Waste recycling method (photograph/live specimen/institute/organization)

Q4. Field report - 05 marks

Q5. Record - 05 marks

TOTAL: 50 marks



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member

CLUSTER ELECTIVES (Cluster-A or Cluster-B)
III B.Sc.: BOTANY SYLLABUS SEMESTER-VI
Paper VIII, CLUSTER ELECTIVE, Cluster-A,
Paper VIII-A-1 : PLANT DIVERSITY AND HUMAN WELFARE
Total hours of teaching 60hrs @ 3hrs per week

Unit- I: Plant diversity and its scope:

(12hrs)

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

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, Participatory resource appraisal, Ecological footprint with emphasis on carbon footprint, Resource accounting;
- ii. Solid and liquid waste management

Unit -IV: Conservation of biodiversity

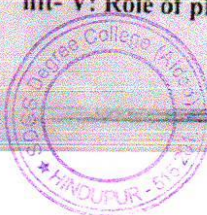
(12hrs)

- i. Conservation of genetic diversity, species diversity and ecosystem diversity, *In situ* and *ex situ* conservation,
- ii. Social approaches to conservation, Biodiversity awareness programmes, Sustainable development.

Unit- V: Role of plants in relation to Human Welfare

(12hrs)

Y. B. J. BOS
16/9/18



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.

Suggested Readings:

1. Krishnamurthy, K.V. (2004). An Advanced Text Book of Biodiversity - Principles and Practices. Oxford and IBH Publications Co. Pvt. Ltd. New Delhi.
2. Singh, J. S., Singh, S.P. and Gupta, S. (2006). Ecology, Environment and Resource Conservation. Anamaya Publications, New Delhi.
3. Rogers, P.P., Jalal, K.F. and Boyd, J.A. (2008). An Introduction to Sustainable Development. Prentice Hall of India Private Limited, New Delhi.

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

Project work on any one of the International organizations striving for preservation of biodiversity, study of conservation efforts of local people, and civic bodies, study of locally available fruits in different seasons, enumerating the avenue plantations and their diversity in your town/city

Paper – VIII-A-1 : Practicals: PLANT DIVERSITY AND HUMAN WELFARE

- 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, fibres).
- 5) Methods of preservation and canning of fruits.



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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



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SCHEME OF PRACTICAL EXAMINATION

PRACTICAL- VIII-A-1 : Cluster Elective (MODEL QUESTION PAPER)
PLANT DIVERSITY AND HUMAN WELFARE

Time: 3hrs

Max. Marks: 50

- I. Assign the plants **A, B and C** to their respective families, giving reasons, family name and classification-2 marks, important diagrams- 3 marks.

15 marks

- II. Give the protocol of D

10 marks

- III. Comment on specimens **E, F and G**

3x3 = 9 marks

- IV. Report on Field visit

6 marks

To study sources of firewood (10 plants), timber-yielding trees (10 trees) and bamboos.

- V. Viva-Voce

5 marks

- VI. Practical Record

5 marks

KEY

A-Cultivated Plant

B- Wild Plant

C -Exotic plant

D- Preservation and canning of fruits, solid and liquid waste management systems in rural/urban areas

E. Bark/wood/fruit yielding plant

F. Nuts/ Alcoholic beverage plant

G. wood /Fibre yielding plant



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III B. Sc - BOTANY SYLLABUS

SEMESTER- VIII : CLUSTER ELECTIVE -A

Paper VIII-A-2 : ETHNOBOTANY AND MEDICINAL BOTANY

Total hours of teaching 60hrs @ 3hrs 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 Tribals of India, and their life styles.
- 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*, *Trichopus zeylanicus*, *Artemisia annua*, *Withania somnifera*.
- ii. Medico-ethnobotanical sources in India
- iii. Significance of the following plants in ethno botanical practices (along with their habitat and morphology)
a) *Azadirachta indica*, b) *Ocimum sanctum*, c) *Vitex negundo*, d) *oriosa superba*, e) *Tribulus terrestris*, f) *Phyllanthus niruri*, g) *Cassia auriculata* j). *Curcuma longa*.
- iv. 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)



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- 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).

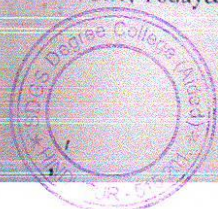
Unit -V: Conservation of endangered and endemic medicinal plants:
(12hrs)

- 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.

Suggested Readings:

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



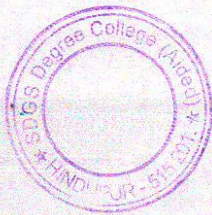
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Cluster Elective VIII-A-2: Practical:

ETHNOBOTANY AND MEDICINAL BOTANY

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



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PRACTICAL- VIII-A-2 Cluster Elective : MODEL QUESTION PAPER

Paper VIII-A-2: ETHNOBOTANY AND MEDICINAL BOTANY

Time: 3 Hours

Max. Marks- 50

I. Identify the specimen A- Give reasons (morphological and anatomical) and draw labeled sketches 15marks

II. Identify and write about the medicinal uses of B-and C- 2x5= 10 marks.

III. Comment on D and E, 2x 4=8 marks

IV. Report on Field visit: 7 marks

List to be prepared mentioning special features of plants used by tribal populations as Medicinal Plants & Spices. Write their botanical and common names, parts used and diseases/disorders for which they are prescribed.

V. Viva-voce 5 marks

VI. Record 5 marks

Total = 50 marks

KEY

A-Plants given in unit II (i)

B-Plants used in Ayurvedic preparations (Amla in Chyavanprash, Senna in Laxatives)

C -- Do --

D. Photographs of National parks, Biosphere reserves and Botanical gardens.

E. Photograph of famous personalities in Ayurveda/Siddha medicine.



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III B. Sc - BOTANY SYLLABUS SEMESTER- VIII
CLUSTER ELECTIVE, Paper VIII-A-3

Paper VIII-A-3: Pharmacognosy and Phytochemistry

Total hours of teaching 60hrs @ 3hrs 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), *Adhatoda vasica* (leaf), *Strychnos nuxvomica* (seed), *Rauwolfia* *Catharanthus roseus*, *Zinziber officinalis* (root)

Unit-III: Secondary Metabolites: (12hrs)

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

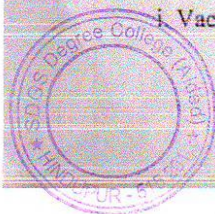
UNIT-IV: Phytochemistry: (12hrs)

Biosynthesis and sources of drugs:

- 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).
- Steroids, sterols, saponins, withanolides, ecdysones, cucurbitacins: Biosynthesis, commercial importance.
- Alkaloids: Different groups, biosynthesis, bioactivity.
- Volatile oils, aromatherapy.

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

- Vaccines, toxins and toxoids, antitoxins, immune globulins, antiserums,



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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.

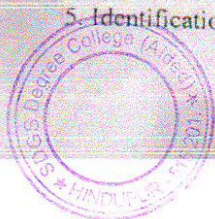
Suggested Activities: Isolation techniques of active principles from various parts of popular medicinal plants, debates on the efficacy of plant medicines and palliative cure, volatile oils from plants-extraction methods, project work on crude drugs

BOOKS FOR REFERENCE:

1. Wallis, T. E. 1946. Text book of Pharmacognosy, J & A Churchill Ltd. 2. Roseline, A. 2011. Pharmacognosy. MJP Publishers, Chennai.
2. Gurdeep Chatwal, 1980. Organic chemistry of natural products. Vol.I.Himalaya Publishing house.
3. Kalsi, P. S. and Jagtap, S., 2012. Pharmaceutical medicinal and natural product chemistry N.K. Mehra . Narosa Publishing House Pvt. Ltd New Delhi.
4. Agarwal, O. P. 2002. Organic chemistry–Chemistry of organic natural products. Vol. II. Goel publishing house , Meerut.
5. Harborne, J. B. 1998. Phytochemical methods –a guide to modern techniques of plant analysis 3 rd edition, Chapman and Hall
6. Datta & Mukerji, 1952. Pharmacognosy of Indian roots of Rhizome drugs. Bulletin No.1 Ministry of Health, Govt. of India.

VIII-A-3: Pharmacognosy and Phytochemistry: PRACTICALS

1. Physical and chemical tests for evaluation of unorganized drugs- Asaphoetida. Honey, Castor oil. Acacia
2. Identification of bark drugs – cinchona, cinnamom
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



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

7. Collection of locally available crude drugs from local vendors (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

PRACTICAL: VIII-A-3 Cluster Elective: MODEL QUESTION PAPER
Pharmacognosy and Phytochemistry

Time: 3hrs.

Max. Marks=50

I. Identify the given crude drugs **A & B** by morphological study and chemical tests. **10 marks**

II. Perform suitable chemical test and identify the given phytochemical **C** **10 marks**

III. Comment on D and E

2x5=10 marks

IV. Herbarium and submission of drugs

-10 marks

IV. Viva-Voce

5 marks

V. Practical Record

5 marks

Total = 50 marks

KEY

A-Flower/fruit drugs

B-Rhizome/whole plant drugs

C- Tannins/ phenolics/steroids/ isoprenoids /Asaphoetida/ Honey/ Castor oil/ Acacia

D. Column Chromatography/ Gas Chromatogram/HPLC (photograph/ instrument used for chemical analysis of drugs

E. photograph/instrument used for tissue culture



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Andhra Pradesh Common Core Syllabus
SRI KRISHNADEVARAYA UNIVERSITY ANANTHAPURAMU
I B.Sc - BOTANY
II SEMESTER
THEORY MODEL QUESTION PAPER
ALL PAPERS ; SEMESTERS (I - VI + CLUSTERS)

Time: 3 Hours

Max. Marks: 75

SECTION-A (Short Answer Questions)

(Instructions to the paper setter: Set minimum ONE question from each unit, max Eight from all.)

Answer any five of the following question

5x5=25Marks

- 1.
- 2.
- 3.
- 4.
- 5.
- 6.
- 7.
- 8.

SECTION-B (Essay Questions)

(Instructions to the paper setter: Set minimum two questions from each unit, either or internal choice)

Answer All of the following questions

5x10=50Marks

9. a) _____ from unit I
b) Or _____
- 10.. a) _____ from unit II
b) Or _____
- 11.. a) _____ from unit III
b) Or _____
- 12.. a) _____ from unit IV
b) Or _____
- 13.. a) _____ from unit V
b) Or _____

INTERNAL EXAMS

- 25Marks

15 marks for unit tests, 5 marks for assignments and remaining 5 marks for seminar etc.



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