Pteridophytes, Gymnosperms, Paleobotany, Anatomy and Embryology

I - M.Sc(Botany) / I - Semester

Choice Based Credit System(CBCS)

- By

Prof. N. Savithramma
Prof. Nagalakshmidevamma
Department of Botany
Sri Venkateswara University

Tirupati-517502, Andhra Pradesh, India.

Centre for Distance and Online Education

Sri Venkateswara University

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Cell:+91 94405 75657, 93925 75657, 93935 75657
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mail : directorddesvu@gmail.com
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CONTENTS

Unit-IV: Anatomy

Unit-V: Embryology

BOT-101: Pteridophytes, Gymnosperms, Paleobotany, Anatomy and Embryology

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Course Objectives

1. To create awareness on classification and description of lower plants.
2. To create the knowledge about lower plants and their utilization in different methods.
3. Economic importance of lower plants.
4. To provide basic distribution pattern and structural organization of lower plants.

Unit- I: Pteridophytes

General Characteristics, Classification (Sporne), Structure, Reproduction and Life cycle of the following genera. Psilotum, Lycopodium, Equisetum and Marsilea. Stelar Evolution - Homospory, Heterospory and seed Habit.

Unit- II : Gymnosperms

General Characteristics, Classification (Sporne), Structure; Reproduction and Life Cycle of the following genera. Pinus and Gnetum.

Unit- III : Paleobotany

Fossil, Fossil types and Fossilization methods - Geological time scale, Carbon dating. A Brief study of the following form genera. Rhynia, Lepidodendron and Calamites.

Unit- IV: Anatomy

Classification of Tissues. Meristems and their types. Complex tissues, xylem and phloem. Stomatal types. Secondary growth and Anomalous secondary growth.

Unit- V: Embryology

Development of Anther, Microsporogenesis, Male gametophyte development, Development of ovule. Megasporogenesis, Female gametophyte development (Polygonum type) Double fertilization, Endosperm types and Development. Embryogeny of Dicot and Monocot.

REFERENCES

PTERIDOPIYTES

1. Sporne, K.R (1970): The Morphology of pteridophytes (The Structure of Ferns and Allied Plants) Hutchinson University Library, London
2. Sundara Rajan, S. (1994) : Introduction to Pteridophyta New Age International Publishers Ltd., Wiley Eastern Ltd., New Delhi, Bangalore, Bombay, Calcutta,Guwahati, Hyderabad, Lucknow, Madras, Pune, London
3. Vashista, P.C. (1997): Botany for Degree Students- Pteridophyta S. Chand & Co., NewDelhi,
4. Rashhed, A. (1999) : An Introduction to Pteridophyta Vikas publishing Co., New Delhi,

GYMNOSPERMS

1. Coulter, J.M.& C.J. Chamberlain (1964): Morphology of Gymnosperms Cental Book Depot, Allahabad
2. Sporne, K.R (1971) : The Morpholory of Gymnosperms (The Structure and Evolution of Primitive seed Plants) Hutchinson University Library, London
3. Vashista, P.C. (1996) : Botany forDegree Students-Gymnosperms(2nd Edn.,) S. Chand & Co.,New Delhi,

Course Outcomes

1. Discuss the importance of morphological structure, classification, reproduction and economic importance of Algae. Study and impart knowledge about the general Characteristics, structure, reproduction, life history and economic importance of fungi. Understand the features of Lichens.
2. Know the control measures of plant diseases. Students are able to explain about structure, classification, reproduction, life cycle and economic importance of Bryophytes.
3. Study and impart knowledge about the Structure, reproduction, life cycle, fossil, fossilization and geological time scale.
4. Students able to explain about structure, classification, reproduction, life cycle and economic importance of Gymnosperms.

Plant Taxonomy

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CONTENTS

BOT-102: Plant Taxonomy

Course Objectives

1. To create awareness in Classification of Plants and its arrangements.
2. To train the students to naming (create new names) the newly identified plants.
3. Recognize the plants with the scientific names.
4. To develop skills in identifying the pants for research work to other departments.

SCOPE AND APPLICATIONS OF PLANT TAXONOMY

Unit-1: Scope and applications- Species concept, Biotype, Ecad, Ecotype-Binomial System of Nomenclature.

Unit-2: Theories of Biological Classification- Structural, Biological and Molecular systematics.

Unit-3: Historical Background, Plant classification- Plant classification systems: Bentham and Hooker, Engler and Prantl, Takhtajan and Hutchinson.

TAXONOMIC STRUCTURE

Unit-4: Taxonomic structure: Biosystematics, Chemotaxonomy, Numerical taxonomy-Modern inter-disciplinary approaches to Taxonomy.

Unit-5: Botanical Nomenclature- Need for scientific names- Principles of ICBN. Type method, author citation, Publication of names, rejection of names.

Unit-6: Principle of priority, limitations, conservation of names of species- Draft Biocode.

SALIENT FEATURES OF PLANT FAMILIES

Unit-7: Study of the Monocotyledons: Hydrocharitaceae and Dioscoreaceae

Unit-8: Study of the Monocotyledons: Arecaceae and Cyperaceae.

Unit-9: Study of the Monochlamydeae families: Polygonaceae and Amaranthaceae.

Unit-10: Study of the Monochlamydeae families: Aristolochiaceae and Loranthaceae.

SALIENT FEATURES OF PLANT FAMILIES

Unit-11: Study of the Gamopetalae families: Sapotaceae, Rubiaceae,Asteraceae, Apocynaceae.

Unit-12: Study of the Gamopetalae families: Convolvulaceae,Bignoniaceae, Scrophulariaceae and Verbenaceae.

Unit-13: Study of the Polypetalae families: Magnoliaceae, Menispermaceae, Papaveraceae, Polygalaceae and Tiliaceae.

Unit-14: Study of the Polypetalae families: Geramiaceae, Mimosaceae, Myrtaceae, Meliaceae and Sapindaceae.

Course Outcomes:

Course Outcomes:

1. Classify the plants based on the Morphological variation for experimental work.
2. Every student able to create new name to the innovative plant species as per the rules formulated by ICN.
3. Student can help to other Scientists for identification of plants for their research fields.
4. He can learn the preparation of Herbaria for identification purpose.

Suggested Books:

1. Battacharya, B and Johri, B. M.1998. Flowering Plant taxonomy and Phylogeny. Narosa Publishing House, New Delhi.
2. Cronquist, A. 1981. An integrated system of classification of Flowering Plants. Columbia University Press, New York.
3. Davis, P.H. and Heywood, V.H. 1963. Principles of Angiosperm Taxonomy, Oliver and Boyed.
4. Gifford, E.M. and Foster, A.S. 1998. Morphology and Evolution of Vascular Plants. W.H.freemen & Co., New York.
5. Singh, Gurucharan. 2012. Plant Systematics: Theory and Pactise. Oxford & IBH. New Delhi.
6. Heywood, V.H. and Moore, D.M. (Eds.).1984. Current Concepts in Plant taxonomy. Acad. Press, London.
7. Hutchinson, J. 1973. Families of Flowering Plants (3rd Ed.) oxoford Univ. Press, New York.
8. Jeffrey, E. 1982. An introduction to plant Taxonomy. Cambridge.
9. Jones, S.B. Jr. and Luchsinger, A.E. 1986. Plant systematics (2nd Ed.). Mc Graw Hill. Book Co., New York.
10. Mayr, E. 1942. Systematic and Origin of Species. Columbia Univ. Press, New York.
11. Pullaiah, T. 1997. Taxonomy of Angiosperms. Regency Publications, New Delhi.
12. Radford, A.E. 1986. Fundamentals of Plant Taxonomy. W. H. Freemen and Company, San Francisco.
13. Stebbins, G. L. 1974. Flowering plants Evolution above the Species level. Academic Press London.
14. APG III (2009) An update of the Angiosperm Phylogeny Group classification for the orders and families of flowering plants: APG III. Bot. J. Linnaean Soc. 161: 105-121.

MICROBIOLOGY

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BOT-103 : MICROBIOLOGY

Course Objectives

1. To impart the knowledge on basic principles and techniques of microbiology.
2. To provide understanding on antigen-antibody interactions and scope of vaccines.
3. To give an insight on Fungal/Bacterial and Viral diseases to plants.
4. To describe the structure and isolation of different Viruses.

HISTORY AND CLASSIFICATION OF MICROORGANISMS

Unit-1: Introduction to Microbiology, Haeckel's Three–Kingdom Concept, Whittaker's Five-Kingdom Concept, Three-domain Concept of Carl Woese.

Unit-2: Classification of Bacteria According to Bergey's Manual.

Unit-3: Fungi: Classification of Fungi based on Alexopoulos System-Characteristics of Fungi, Industrial Uses of Yeast and Moulds.

MICROSCOPY, STAINING TECHNIQUES, GROWTH AND PRESERVATION METHODS

Unit-4: Simple, Compound, Dark-Field, Phase Contrast, Fluorescent and Electron Microscopes. (SEM & TEM), Confocal Microscopy–Principles and their Applications.

Unit-5: Stains and Staining Techniques: Simple, Differential, Structural Staining Methods and Imaging Techniques.

Unit-6: Auxenic and Synchronous, Aerobic and Anaerobic, Culture Media and Nutritional Types, Growth Curve, Generation Time and Growth Kinetics. Factors Influencing Microbial Growth.

Unit-7: Preservation Methods of Microbes for Storage, Sterilization and Disinfection.

PROKARYOTIC AND EUKARYOTIC CELL STRUCTURE

Unit-8: Prokaryotic Cell Structure & Organization, Cell Membrane, Plasma Membrane, Cytoplasmic Matrix, Inclusion Bodies, Ribosome, Nucleiod, Prokaryotic Cell Wall, Capsule, Slime Layers, S Layers, Pili and Fimbriae, Flagella and Motility. Bacterial Endospores. Archaeal Cell Structures.

Unit-9: General Characters and Classification of Blue Green Algae (Cyanobacteria) Macroalgae-Biological and Economic Importance of Algae. Protozoa–Structural Characteristics, Classification and Reproduction.

Unit-10: Eukaryotic Cell Structure and Its Organelles. Lichens and Microalgae-Structural Organization and their Properties.

Course Outcomes

1. Develop the skill of isolation and identification of Pathogenic and Non-Pathogenic micro-organisms.
2. To prepare different media for cultivation of industrially important microorganisms.
3. Equip with the methods to control Plant Pathogens.
4. Understands the Ag-Ab mechanism.

Suggested Books

1. Alexopoulos, C.J., Mims, C.W. and Blackwel, M. 1996. Introductory mycology. John Wiley & Sons Inc.
2. Mandahar, C.L. 1978. Introduction to Plant viruses. Chand & Co., Ltd., Delhi.
3. Mehrotra, R.S. and Aneja, K.R. 1998. An introduction to mycology. New Age Internation al Press.
4. Mehrotra, R.S. 1980. Plant Pathology. Tata Mcgraw hill, India.
5. Sharma, P.D. 2000. Plant Pathology. Narosa Publishing House, India.

PLANT REPRODUCTION, PLANT DEVELOPMENT AND PLANTE TISSUE CULTURE

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CONTENTS

UNIT - I

UNIT - II

Chapter-6: Plant Reproduction

Chapter-7: Embryo

Chapter-8: Polyembryony

BOT-104 : PLANT REPRODUCTION, PLANT DEVELOPMENT AND PLANT TISSUE CULTURE

Unit I

PLANT REPRODUCTION

GAMETOPHYTES, PALYNOLOGY AND FERTILIZATION: Development and structure of anther wall, structure and function of anther tapetum; Microsporogenessis. Male gametophyte development. Palynology, NPC system, applied aspects of palynology. Ovule types, aril, arillode, sarcotesta, caruncle, hypostase, epistase, mamelon, Megasporogenesis. Development of Embryo sac. Ultra structure of embryo sac. Fertilization.

Unit II

PLANT REPRODUCTION

Endosperm development, Haustoria. Embryo development, Polyembryony, Types-Nucellar, integementary, synergid, zygotic suspensor and multiple polyembryony, Twins and triplets, causes of polyembryony. Apomixis- Apospory, Diplospory, Pseudogamy, semigamy parthenogenesis, polyploidy and apomixis, causes of apomixis,

UNIT III

PLANT DEVELOPMENT

Structure of xylem and phloem. Organisation of shoot Apical meristem, theories associated with Shoot Apical Meristem Primary and secondary grwoth of stem. Root apical Meristem-Theories. Root Development. Root Development and structure of Foliar Leaf. Anomalous secondary growth-Abnormal position and activity of cambium, intraxylary phloem, interxylary work, secondary growth in monocot stem and Dicot root.

Unit IV

PLANT TISSUE CULTURE

Laboratory organization; Media composition. and preparation; Methods of Sterilization, Cell Culture; somatic embryogenesis technique and utility; synthetic seeds Micropropagation of higher plants; Somaclonal Variations.

Unit V

PLANT TISSUE CULTURE

Haploid production Anther Culture, Pollen Culture,Gynogenesis, Application of haploids; Embryo and Endosperm Culture. Protoplast isolation and Culture, protoplast fusion, production of somatic hybrids and cybrids, hybrid selection and regeneration, application and limitations of protoplast research. Production of secondary metabolites through Tissue Culture, suspension Cultures Bioreactors, cell immobilization, hairy root Cultures.

Plant Physiology and Biochemistry

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CONTENTS

BOT-201: Plant Physiology and Biochemistry

Course Objectives

1. To study the method of respiration in plants
2. To study HMP pathway in plants
3. To study importance of growth regulators
4. To study the fat metabolism in plants

PLANT-WATER RELATIONS

Unit-1: Water transport process, diffusion, osmosis, water potential, Chemical potential,

Unit-2: Absorption of water, water transport through trachieds and xylem.

Unit-3: Transpiration and its significance, factors affecting transpiration, mechanism of stomatal movement- Water stress on crop production.

PHOTOSYNTHESIS

Unit-4: Ultra structure of photosynthetic apparatus.

Unit-5: Photochemical reaction- electron transport pathway in chloroplast membranes, photophosphorylation.

Unit-6: C4 carbon cycle- Crassulacean acid metabolism Photorespiration.

RESPIRATION AND FLOW OF ENERGY

Unit-7: Glycolysis- TCA Cycle- electron transport in mitochondria.

Unit-8: Oxidative phosphorylation- pentose phosphate pathwaycyanide –resistant respiration.

Unit-9: Nutrient uptake and transport mechanism.

Unit-10: Biological nitrogen fixation, Nitrate and ammonia assimilation.

CHEMISTRY OF BIOMOLECULES

Unit-11: Carbohydrates - Classification, Structure of mono, di and polysaccharides, stereoisomers, enatiomers and epimers.

Unit-12: Amino acids and Proteins - Structure, characteristics and classification - amino acid synthesis - peptide bond and polypeptide chain - primary, secondary, tertiary and quaternary structure of proteins.

Unit-13: Enzymes - General aspects (Classification and structure), allosteric mechanism, regulatory and active sites, isoenzymes, enzymatic catalysis - Michaelis-Menton equation and its significance.

Unit-14: Lipids- Classification and structure, biosynthesis of fatty acids, Oxidation of fatty acids - Nucleic acids - Composition of nucleic acids and nucleotide synthesis.

Course Outcomes

1. Explain what a Plant Physiologists does.
2. Describe how cell, tissue and whole-plant structures are related to their function.
3. Describe the physiological processes in plants, with an emphasis on water, energy, and mineral relations in higher plants.
4. Understand the fundamental processes of metabolism in plants and describe how a plant obtains and uses energy. Understanding of the functioning of plants as organisms.

Suggested Books:

1. Buchanan, B.B. Grussem, W. and Jones, RL. 2000. Biochemistry and Molecular Biology of Plants. American Society of Plant Physiologists, Maryland, USA.
2. Dennis, D.T. Turpin, D.H., Lefebvre, D.D. and Layzell, D.B. (Eds.) 1997. Plant Metabolism (2nd Ed.) Longman, Essex, England.
3. Galston, A.W. 1989. Life Processes in Plants. Scientific American Library, Springer-Verlag. New York, USA.
4. Hooykaas, P.J.J., Hall, M.A. and Libbeng, K.R. (Eds.). 1999 Biochemsitry and Molecular biology of plant Hormones. Elsevier, Amsterdam, The Netherlands.
5. Hopkins, W.G. 1995. Introduction to Plant Physiology. John Wiley & Sons, New York, USA.
6. Lodish, H., Berk, A., Zipursky, SL., Matsudaira, P., Baltimore, D. and Darnell, J. 2000. Molecular Cell Biology (4tt Ed.). W.H. Freeman and Company, New York, USA.
7. Moore, T.C. 1989. Biochemistry and Physiology of plant Hormones (2nd Ed.). Springer-Verlag, New York, USA.
8. Nobel, P.S. 1999. Physiochemical and Environmental Plant Physiology (2 Ed.). Academic Press, San diego, USA.
9. Salisbury, F.B. and Ross, C.W. 1992. Plant Physiology (4thEd.). Wadswroth Publishing Co., California, USA.
10. Singhal, G.S., Renger, G., Sopory, S.K. lrrgang K.D. and Govindjee 1999. Concepts in Photobiology: Photosynthesis and Photomorphogenesis. Narosa Publishing Houses, New Delhi.
11. Taiz, L. and Zeigler, E. 1998.Plant Physiology (2nd Ed.). Sinauer Associates, Inc., Publishers, Massachusetts, USA.
12. Thomas, B. and Vince-Prue, D. 1997. Photoperiodism in plants (2nd Ed.). Academic Press, San Diego, USA
13. Westhoff, P. Jeske, H. Jurgens, G. Kloppstech, K. Link, G. 1998. Molecular Plant Development: From Gene to Plant. Oxford University Press, Oxford, UK.

ECOLOGY AND BIODIVERSITY

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CONTENTS

UNIT - I

UNIT - II

UNIT - III

UNIT - IV

Laboratory Manual

UNIT - I

I. Analysis of Environmental Variables

1. Determination of soil texture.
2. Estimation of organic matter in soil samples.
3. Determination of salinity in water samples.
4. Estimation of dissolved oxygen in water samples.

UNIT - II

II. Community Ecology

5. Sampling inventory of plants of the study area.
6. Determination of minimum size of the quadrate to analyze a plant community.
7. Determination of minimum number of quadrates to analyze a plant community.
8. Determination of quantitative characters of species in a plant community.
9. Determination of Importance Value Index of species in a plant community.
10. Determination of Simpson index of a plant community.
11. Determination of Shannon-Weiner index of a plant community.

UNIT - III

III. Study of Endemic and Threatened Plants

12. Study of selected endemic and threatened plant species of Andhra Pradesh.

UNIT - IV

IV. Experiments in Remote Sensing

13. Acquaintance with Remote Sensing Technology.
14. Measurement of scale of aerial photographs.
15. Study of satellite imagery.
16. Working with Global Positioning System.

BOT-202: ECOLOGY AND BIODIVERSITY

UNIT I: ECOSYSTEMS

Ecology and its domain; ecosystem-structure and functions; plant life and climatic factors; edaphic factor-physical and chemical properties of soils; energy flow in ecosystems-productivity; types of food chains; energy flow modeling; principles of biogeochemical cycling, global carbon cycle; major ecosystems of the world-forests, grasslands, deserts, freshwater and marine.

UNIT II: COMMUNITIES AND POPULATIONS

Characteristics of plant communities-analytic and synthetic characters (Raunkiaers life forms, Qualitative and Quantitative characters, Species dominance and species diversity); community succession-process, types and attributes. Characteristics of plant populations-Density and Dispersion, Natality, Mortality and Survival, Age structure and Biotic potential; population growth-exponential and logistic; life history strategies-*r* and K selection; species interactions: plant-plant (competition) and plant-animal (ecology of pollination).

UNIT III: NATURAL RESOURCES AND ENVIRONMENTAL POLLUTION

Classification of natural resources; non-conventional energy resources; atmospheric pollution-types and sources; global warming-green house gases, impact on global environment; ozone layer depletion; Water pollution-sources and control; soil pollution-sources and control; concept of bioremediation.

UNIT IV: BIODIVERSITY AND ITS CONSERVATION

Nature of biodiversity; values of biodiversity; global biodiversity hotspots; agro diversity-centers of origin of crop plants; threats to biodiversity and process of extinction; IUCN threat categories and threatened plants of India; *in situ* conservation of biodiversity-biosphere reserves, wildlife sanctuaries, national parks and sacred groves; *ex situ* conservation-botanical gardens and gene banks.

UNIT V: CONCEPTS IN BIODIVERSITY CONSERVATION AND MANAGEMENT

Remote sensing technology and its applications to plant resources conservation; Intellectual Property Rights (IPR) and Patents; Participatory Rural Appraisals and Biodiversity Registers; Environmental Impact Assessment (EIA); Concept of Sustainable Development.

PLANT MOLECULAR BIOLOGY AND GENETIC ENGINEERING

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Prof. Nagalakshmidevamma
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CONTENTS

UNIT - I

UNIT - II

UNIT - VI

BOT-203: PLANT MOLECULAR BIOLOGY AND GENETIC ENGINEERING

UNIT I: DNA REPLICATION (DNA SYNTHESIS)

Introduction to Central Dogma. Modes of DNA replication. Experimental evidences for semi-conservative mode of replication- Meselson-Stahl, and Cairns experiments. Enzymes and proteins in replication – Single strand DNA binding Proteins (SSB), Helicases, Topoisomerase, DNA ligases. Priming by RNA polymerase and promase. DNA polymerases – E.coli DNA polymerase I, II and III, and Eukaryotic DNA Polymerases. DNA damage and Repair: Photoreactivation, exsicion repair, recombination repair, SOS repair.

UNIT II: TRANSCRIPTION (RNA BIOSYNTHESIS)

Polynucleotide phosphorylase. RNA polymerases – structure of E.coli RNA polymerase, and nature of eukaryotic RNA polymerases. Promoters and their characterization. Initiation, elongation and termination of RNA.synthesis. Moncistronic and polycistronic RNAs. Post transcriptional modification –Capping, methylation, polyadenylation. RNA splicing and splicing mechanisms. Splicing of nuclear pre-tRNA, group I and group II introns, and pre-mRNA splicing.

UNIT III: TRANSLATION (PROTEIN SYNTHESIS)

Elucidation of the genetic code. General features of genetic code, codon degeneracy and universality. tRNA role in protein synthesis. Amino acyl-tRNA synthetases, wobble hypothesis. Protein synthesis: Mechanism of initiation, elongation and termination.

Regulation of gene expression: House keeping genes, constitutive genes and regulatory genes. Regulatory proteins–DNA–binding motif of regulatory proteins.Negative regulation and positive regulation. Lac operon. Regulation of gene expression in prokaryotic operons.

UNIT IV: PLANT GENETIC ENGINEERING

Principles of recombinant DNA technology and out lines of gene cloning. DNA cutting and joining. Restriction and modification enzymes. Restriction mapping. DNA ligases, polynucleotide kinase, alkaline phoshatases, SI nuclease, terminal transferase, Bal31 nuclease. Polymerase chain reaction-principle and applications. Outlines of sequencing methods. Cloning vectors. Characteristics of Plasmids, bacteriophages, cosmids, BACs and YACs.

UNIT V: GENE LIBRARIES, GENE TRANSFORMATION AND TRANSGENIC CROPS

Genomic and cDNA libraries. Screening recombinants. Recombinant DNA into host cells. Methods of gene transfer into plants cells. Outlines of physical methods and Agrobacterium mediated transformation. Transgenic crops for biotic and abotic stress resistance and important agronomic traits. Molecular markers: RFLP. RAPD, AFLP and SSR.

BIOSYSTEMATICS, ETHNOBOTANY AND PHARMACOGNOSY

I - M.Sc(Botany) / II - Semester

Choice Based Credit System(CBCS)

- By

Prof. N. Savithramma

Prof. Nagalakshmidevamma

Department of Botany

Sri Venkateswara University

Tirupati-517502, Andhra Pradesh, India.

Centre for Distance and Online Education

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326/C, Surneni Nilayam
Near B K Guda Park, S R Nagar
Hyderabad - 500 038 TS
P.No:+91 40 23710657, 238000657, 23810657
Cell:+91 94405 75657, 93925 75657, 93935 75657
Reg. Off.: 5-68, Pedda Gorpadu, Pakala, Tirupathi - 517 112 AP
mail: studentshelpline.in@gmail.com

for

Director

Centre for Distance and Online Education
Sri Venkateswara University
Tirupathi, AP -517 502
mail : directorddesvu@gmail.com
Cell: +91 877-2289380
www.svudde.in

CONTENTS

UNIT - I

UNIT - II

UNIT - III

UNIT - IV

BOT-204: BIOSYSTEMATICS, ETHNOBOTANY AND PHARMACOGNOSY

UNIT I: BIOSYSTEMATIC STUDIES

Introduction, history, scope, objectives and importance of Biosystematics. Phenotype, genotype, biotype, plasticity of phenotypes, role of biosystematics in understanding evolution.

Ecotypes-nature, origin and their significance, phenecotype and genecotype; factors affecting phenotype variations.

Methods in biosystematic studies: Growth in uniform environment, growth in varied environments and cytogenetic analysis.

Biosystematic categories: Ecotype and ecospecies, sub-species, coenospecies, comparium and infra specific variations.

UNIT II: CONCEPT OF CHARACTER, BREEDING SYSTEMS AND SPECIATION

Concept of population: population – a unit for biosystematic studies. Concept of character: Definition of character, Different types of characters: analytic and synthetic; qualitative and quantitative, consistent and variable characters.

Breeding systems- role of breeding systems in sexual and asexual population.

Mechanism of speciation, Allopatry, parapatry and Sympatry.

Sources of taxonomic characters; Systematics -a synthetic discipline; Alfa taxonomy and Omega taxonomy.

UNIT III: EXPERIMENTAL TAXONOMY AND TAXIMETRICS

Anatomy and role of anatomical evidences in plant taxonomy

Embryology in relation to taxonomy.

Palynotaxonomy and Cytotaxonomy.

Chemosystematics, Serology in relation to taxonomy and Molecular Taxonomy.

Numerical taxonomy: Phenetics and Cladistics. Adansonian principles. Methods of sampling, construction of groups, summerizing the data. Merits and demerits of numerical taxonomy.

UNIT IV: ETHNOBOTANY

Ethnobotany: Introduction, history, scope and importance of ethnobotany.

Different aspects related to tribes; Ethnobotany an interdisciplinary subject.

Ethno-medico-botany; wild medicinal plant resources with special reference to the forests of Andhra Pradesh.

Different systems of traditional and Indigenous Medicine

UNIT V: PHARMACOGNOSY

Introduction, Scope and applications of Pharmacognosy.

General account of phytochemicals present in medicinal plants

Pharmacognosy, adulteration of drugs and Economic potential of phytomedicine

Potential drug yielding plants under cultivation in Andhra Pradesh.