SRI DURGA MALLESWARA SIDDHARTHA MAHILA KALASALA: VIJAYAWADA-10
An autonomous college in the jurisdiction of Krishna University

DEPARTMENT OF BOTANY

BOTANY	BOTT11A	2020-21	B.Sc., BZC

I- SEMESTER

COURSE - 1
No. of. Credits: 4

FUNDAMENTALS OF MICROBES AND NON-VASCULAR PLANTS (NEW SYLLABUS)

(VIRUSES, BACTERIA, FUNGI, LICHENS, ALGAE AND BRYOPHYTES)

UNIT – 1:ORIGIN OF LIFE AND VIRUSES 12HRS.

1. Origin of life, concept of primary Abiogenesis; Miller and Urey experiment. Five kingdom classification of R.H. Whittaker 2H ON LINE

2. Discovery of microorganisms, Pasteur experiments, germ theory of diseases. 1H ON LINE

3. Shape and symmetry of viruses; structure of TMV and Gemini virus; multiplication of TMV; A brief account of Prions and Viroids.3H ON LINE

4. A general account on symptoms of plant diseases caused by Viruses. Transmission of plant viruses and their control. 1H ON LINE, 1H OFF LINE

5. Significance of viruses in vaccine production, bio-pesticides 4H ON LINE

UNIT – 2: SPECIAL GROUPS OF BACTERIA AND EUBACTERIA 12HRS.

1. Brief account of Archaebacteria, Actinomycetes and Cyanobacteria. 2H OFF LINE

2. Cell structure and nutrition of Eubacteria. 3H OFF LINE
3. Reproduction- Asexual (Binary fission and endospores) and bacterial recombination (Conjugation, Transformation, Transduction). .3H ON LINE

4. Economic importance of Bacteria with reference to their role in Agriculture and industry (fermentation and medicine). 3H OFF LINE

5. A general account on symptoms of plant diseases caused by Bacteria; Citrus canker . 1H OFFLINE

Unit – 3: Fungi & Lichens 12 Hrs.

1. General characteristics of fungi and Ainsworth classification (upto classes). 1H OFF LINE

2. Structure, reproduction and life history of

(a) ***Rhizopus*** (Zygomycota) 2 OFF LINE and (b) ***Puccinia*** (Basidiomycota).) 2H ON LINE

3. Economic uses of fungi in food industry, pharmacy and agriculture. 2H OFF LINE

4. A general account on symptoms of plant diseases caused by Fungi; Blast of Rice. 1H

OFF LINE

5. Lichens- structure and reproduction. 2H OFF LINE +2 ON LINE

UNIT – 4: ALGAE 12 HRS.

1.General characteristics of Algae (pigments, flagella and reserve food material); Fritsch classification (upto classes). 1H OFF LINE

2. Thallus organization and life cycles in Algae. 3H ON LINE

3. Occurrence, structure, reproduction and life cycle of

(a) ***Spirogyra*** *3*(Chlorophyceae) 3H ONLINE and (b) ***Polysiphonia*** (Rhodophyceae). 3H OFF LINE

4. Economic importance of Algae. 2H OFF LINE

UNIT – 5:BRYOPHYTES **12 HRS.**

1. General characteristics of Bryophytes; classification up to classes . 2 H OFF LINE

2. Occurrence, morphology, anatomy, reproduction (developmental details are not needed) and life cycle of (a) ***Marchantia*** (Hepaticopsida) 4H ON LINE

and

(b) ***Funaria***(Bryopsida). 4H ON LINE

3. General account on evolution of sporophytes in Bryophytea. 2 H ON LINE

TEXT BOOKS:

- Botany – I (Vrukshasastram-I) : Telugu Akademi, Hyderabad
- Pandey, B.P. (2013) *College Botany, Volume-I,* S. Chand Publishing, New Delhi
- Hait,G., K.Bhattacharya&A.K.Ghosh (2011) *A Text Book of Botany, Volume-I,* New Central Book Agency Pvt. Ltd., Kolkata
- Bhattacharjee, R.N., (2017) *Introduction to Microbiology and Microbial Diversity,* Kalyani Publishers, New Delhi.

BOOKS FOR REFERENCE:

- Dubey, R.C. &D.K.Maheswari (2013) *A Text Book of Microbiology,*S.Chand& Company Ltd., New Delhi
- Pelczar Jr., M.J., E.C.N. Chan &N.R.Krieg (2001)*Microbiology*, Tata McGraw-Hill Co, New Delhi
- Presscott, L. Harley, J. and Klein, D. (2005)*Microbiology, 6th edition*, Tata McGraw –Hill Co. New Delhi.
- Alexopoulos, C.J., C.W.Mims&M.Blackwell (2007) *Introductory Mycology,*Wiley& Sons, Inc., New York
- Mehrotra, R.S. & K. R. Aneja (1990)*An Introduction to Mycology*. New Age International Publishers, New Delhi
- Kevin Kavanagh (2005) *Fungi ; Biology and Applications* John Wiley & Sons, Ltd.,West Sussex, England
- John Webster & R. W. S. Weber (2007) *Introduction to Fungi,*Cambridge University Press, New York
- Fritsch, F.E. (1945)*The Structure & Reproduction of Algae (Vol. I & Vol. II)*Cambridge UniversityPress Cambridge, U.K..

SRI DURGA MALLESWARA SIDDHARTHA MAHILA KALASALA : VIJAYAWADA-10

An autonomous college in the jurisdiction of Krishna University : Machilipatnam

BOTANY	BOTP11A	2020-21	B.Sc., BZC

SEMESTER – I

Practical : I

No. of Credits:1

FUNDAMENTALS OF MICROBES AND NON-VASCULAR PLANTS LAB(NEW SYLLABUS)

(Viruses, Bacteria, Fungi, Lichens, Algae and Bryophytes)

Practical Syllabus:

1. Knowledge of Microbiology laboratory practices and safety rules.
2. Knowledge of different equipment for Microbiology laboratory (Spirit lamp, Inoculation loop, Hot-air oven, Autoclave/Pressure cooker, laminar air flow chamber and Incubator) and their working principles. (In case of the non-availability of the laboratory equipment the students can be taken to the local college/clinical lab. with required infrastructural facilities or they can enter a linkage with the college/lab for future developments and it will fetch credits during the accreditation by NAAC).
3. Demonstration of Gram's staining technique for Bacteria.
4. Study of Viruses (Corona, Gemini and TMV) using electron micrographs/ models.
5. Study of Archaebacteria and Actinomycetes using permanent slides/ electron micrographs/diagrams.
6. Study of *Anabaena* and *Oscillatoria* using permanent/temporary slides.
7. Study of different bacteria (Cocci, Bacillus, Vibrio and Spirillum) using permanent or temporary slides/ electron micrographs/ diagrams.
8. Study/ microscopic observation of vegetative, sectional/anatomical and reproductive structures of the following using temporary or permanent slides/ specimens/ mounts :
    a. Fungi : *Rhizopus,* and *Puccinia*
    b. Lichens: Crustose, foliose and fruticose
    c. Algae : *Spirogyra*,*Ectocarpus* and *Polysiphonia*
    d. Bryophyta : *Marchantia* and *Funaria*
9. Study of specimens of Tobacco mosaic disease, Citrus canker and Blast of Rice.

SRI DURGA MALLESWARA SIDDHARTHA MAHILA KALASALA : VIJAYAWADA-10
An autonomous college in the jurisdiction of Krishna University : Machilipatnam

BOTANY	BOTT21A	2020-21	B.Sc., BZC

SEMESTER- II **Course: II**

No. of Credits: 4

BASICS OF VASCULAR PLANTS AND PHYTOGEOGRAPHY (NEW SYLLABUS)

(Pteridophytes, Gymnosperms,Taxonomy of Angiosperms and Phytogeography)

UNIT – 1:PTERIDOPHYTES **12 HRS.**

1. General characteristics of Pteridophyta; classification of Smith (1955) upto divisions. 1 H OFF LINE
2. Occurrence, morphology, anatomy, reproduction (developmental details are not needed) and life history of (a) *Lycopodium* 3H ON LINE (Lycopsida) and (b) *Marsilea* 4H ON LINE (Filicopsida).
3. Stelar evolution in Pteridophytes; 2H ON LINE
4. Heterospory and seed habit. 2H ON LINE

UNIT – 2:GYMNOSPERMS **14 HRS.**

1. General characteristics of Gymnosperms; Sporne classification up to classes. 1H OFF LINE
2. Occurrence, morphology, anatomy, reproduction (developmental details are not needed) and life history of (a) *Cycas* (Cycadopsida) 4H ON LINE and (b) *Gnetum* (Gnetopsida). 5H ON LINE
3. Outlines of geological time scale. 2 H ON LINE
4. A brief account on *Cycadeoidea.* 2H ON LINE

UNIT – 3: BASIC ASPECTS OF TAXONOMY **13HRS.**

1. Aim and scope of taxonomy; Species concept: Taxonomic hierarchy, species, genus and family.2 H OFF LINE
2. Plant nomenclature: Binomial system, ICN- rules for nomenclature.3 H ON LINE
3. Herbarium Methodology, BSI herbarium and Kew herbarium; concept of digital herbaria. 3 H ON LINE
4. Bentham and Hooker system of classification; 2H ON LINE

UNIT – 4: SYSTEMATIC TAXONOMY **13 HRS.**

1.Systematic description and economic importance of the following families:
(a) Asteraceae (b) Asclepiadaceae (c) Amaranthaceae (d) Euphorbiaceae
(e) Arecaceae and (f) Poaceae 12H off LINE
2. Systematic description and economic importance of the following families: OFF LINE
Annonaceae (b) Curcurbitaceae c) Orchidaceae 1H+2 H OFF LINE
3. Outlines of Angiosperm Phylogeny Group (APG IV). 1H OFF LINE

UNIT – 5: PHYTOGEOGRAPHY **08 HRS.**

1.Principles of Phytogeography, Distribution (wides, endemic, discontinuous species) 3 H ON LINE
2. Endemism – types and causes. 1H ON LINE
3. Phytogeographic regions of World. 1H ON LINE
4. Phytogeographic regions of India. 2 H ON LINE
5. Vegetation types in Andhra Pradesh 1H ON LINE

TEXT BOOKS:

1. Botany – I (Vrukshasastram-I) : Telugu Akademi, Hyderabad
2. Botany – II (Vrukshasastram-II) : Telugu Akademi, Hyderabad
3. Acharya, B.C., (2019) *Archchegoniates,* Kalyani Publishers, New Delhi
4. Bhattacharya, K., G. Hait&Ghosh, A. K., (2011) *A Text Book of Botany, Volume-II,* New Central Book Agency Pvt. Ltd., Kolkata

5. Hait,G., K.Bhattacharya&A.K.Ghosh (2011) *A Text Book of Botany, Volume-I,* New Central Book Agency Pvt. Ltd., Kolkata
6. Pandey, B.P. (2013)*College Botany, Volume-I,* S. Chand Publishing, New Delhi
7. Pandey, B.P. (2013)*College Botany, Volume-II,* S. Chand Publishing, New Delhi

BOOKS FOR REFERENCE:

1. Smith, G.M. (1971)*CryptogamicBotanyVol. II*., Tata McGraw Hill, New Delhi
2. Sharma,O.P.(2012)Pteridophyta. Tata McGraw-Hill, New Delhi
3. Kramer, K.U.&P. S. Green (1990) *The Families and Genera of Vascular Plants, Volume –I*: *Pteridophytes and Gymnosperms*(Ed.K.Kubitzki) Springe-Verlag, New York
4. Bhatnagar, S.P. &AlokMoitra (1996)*Gymnosperms*. New Age International, New Delhi
5. Coulter, J.M. &C.J.Chamberlain(1910) *Morphology of Gymnosperms,*The University of Chicago Press, Chicago, Illinois
6. Govil, C.M. (2007)*Gymnosperms : Extinct and Extant*. KRISHNA Prakashan Media (P) Ltd.Meerut& Delhi
7. Sporne, K.R.(1971)*The Morphology of Gymnosperms.*Hutchinsons Co. Ltd., London
8. Arnold, C.A., (1947) *An introduction to Paleobotany*McGraw –Hill Book Company,INC, New York
9. Stewart,W.N., and G.W.Rothwell (2005) *Paleobotany and the evolution of plants* Cambridge University Press, New York
10. Lawrence, George H.M. (1951) *Taxonomy of Vascular Plants.* The McMillan Co., New York
11. Heywood, V. H. and D. M. Moore (1984)*Current Concepts in Plant Taxonomy.* Academic Press, London.
12. Jeffrey, C. (1982)*An Introduction to Plant Taxonomy.* Cambridge University Press, Cambridge. London.
13. Sambamurty, A.V.S.S. (2005)*Taxonomy of Angiosperms* I. K .International Pvt. Ltd., New Delhi
14. Singh, G. (2012*). Plant Systematics: Theory and Practice.*Oxford & IBH Pvt. Ltd., NewDelhi.
15. Simpson, M.G. (2006). *Plant Systematics.* Elsevier Academic Press, San Diego, CA,U.S.A.
16. Cain, S.A . (1944)*Foundations of Plant Geography*Harper & Brothers, N.Y.
17. Good, R. (1997)*The Geography of flowering Plants (2nd Edn.)*Longmans, Green &
18. Co., Inc., London & Allied Science Publishers, New Delhi
19. Mani, M.S (1974)*Ecology & Biogeography of India*Dr. W. Junk Publishers, TheHaque

SRI DURGA MALLESWARA SIDDHARTHA MAHILA KALASALA : VIJAYAWADA-10
An autonomous college in the jurisdiction of Krishna University : Machilipatnam

BOTANY	BOTP21A	2020-21	B.Sc., BZC

Semester – II

Practical : II

No. of Credits:1

BASICS OF VASCULAR PLANTS AND PHYTOGEOGRAPHY LAB (NEW SYLLABUS)

(Pteridophytes, Gymnosperms,Taxonomy of Angiosperms and Phytogeography

Total hours of laboratory exercises 30 Hrs. @ 02 Hrs. /Week)

PRACTICAL SYLLABUS:

1. Study/ microscopic observation of vegetative, sectional/anatomical and reproductive structures of the following using temporary or permanent slides/ specimens/ mounts :
a. Pteridophyta : *Lycopodium* and *Marselia*
b. Gymnosperms : *Cycas*and *Gnetum*
2. Study of fossil specimens of *Cycadeoidea* and *Pentoxylon*(photographs /diagrams can be shown if specimens are not available).
3. Demonstration of herbarium techniques.
4. Systematic / taxonomicstudy of locally available plants (1 from each family) belonging to the families prescribed in theory syllabus. (Submission of 30 number of Herbarium sheets of wild plants with the standard system is mandatory).
5. Mapping of phytogeographical regions of the globe and India.

SRI DURGA MALLESWARA SIDDHARTHA MAHILA KALASALA, VIJAYAWADA-520010

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

II-BZC	BOTANY-III	SEM-III	BOT T31A	2021-22	No. of Credits: 4	No. of hrs/week:4

ANATOMY AND EMBRYOLOGY OF ANGIOSPERMS, PLANT ECOLOGY AND BIODIVERSITY

(NEW SYLLABUS)

Unit – 1: Anatomy of Angiosperms 12 Hrs.

1. Organization of apical meristems: Tunica-carpus theory and Histogen theory.
2. Tissue systems–Epidermal, ground and vascular
3. Anomalous secondary growth in *Boerhaavia* and *Dracaena.*
4. Study of timbers of economic importance - Teak, Red sanders and Rosewood -

Unit – 2: Embryology of Angiosperms 12 Hrs.

1. History of embryology, Structure of anther, types of tapetum. Microsporogenesis and development of male gametophyte.
2. Structure of ovule, megasporogenesis; monosporic (*Polygonum*), bi sporic (*Allium*) nd tetra sporic (*Peperomia*) types of embryo sacs.
3. Outlines of pollination, pollen – pistil interaction and fertilization.
4. Endosperm - Types and biological importance - Free nuclear, cellular, helobialand ruminate.
5. Development of Dicot (*Capsella bursa-pastoris*) embryo.

Unit – 3: Basics of Ecology 12 Hrs.

1. Ecology: definition, branches and significance of ecology.
2. Ecosystem: Concept and components, energy flow, food chain, food web, ecologicalpyramids.
3. Plants and environment: Climatic (light and temperature), edaphic and biotic factors.
4. Ecological succession:Hydrosere and Xerosere.

Unit – 4:Population, Community and Production Ecology 12 Hrs.

1. Population ecology: Natality, mortality, growth curves, ecotypes, ecads
2. Community ecology: Frequency, density, cover, life forms, biological spectrum
3. Concepts of productivity: GPP, NPP and Community Respiration
4. Secondary production, P/R ratio.

Unit – 5:Basics of Biodiversity 12 Hrs.

1. Biodiversity: Basic concepts, Convention on Biodiversity - Earth Summit.
2. Value of Biodiversity; types and levels of biodiversity and Threats to biodiversity
3. Biodiversity Hot spots in India.Biodiversity in Eastern Ghats and Western Ghats.
4. Principles of conservation: IUCN threat-categories, RED data book
5. Role of NBPGR and NBA in the conservation of Biodiversity.

Text books:

- Botany – III (Vrukshasastram-I) : Telugu Akademi, Hyderabad
- Botany – IV (Vrukshasastram-II) : Telugu Akademi, Hyderabad
- Pandey, B.P. (2013) *College Botany, Volume-II,* S. Chand Publishing, New Delhi
- Pandey, B.P. (2013) *College Botany, Volume-III,* S. Chand Publishing, New Delhi

Books for Reference:

- Esau, K. (1971)*Anatomy of Seed Plants.* John Wiley and Son, USA.
- Fahn, A. (1990)*Plant Anatomy*, Pergamon Press, Oxford.
- Cutler, D.F., T. Botha & D. Wm. Stevenson (2008)*Plant Anatomy: An Applied Approach,* Wiley, USA.
- Paula Rudall (1987)*Anatomy of Flowering Plants: An Introduction to Structure and Development.* Cambridge University Press, London

Practical syllabus of BotanyCore Course – 3 **BOT P31A**

SEMESTER – III Anatomy and Embryology of Angiosperms, Plant Ecology and Biodiversity (NEW SYLLABUS)

credits:1

Practical Syllabus

1. Tissue organization in root and shoot apices using permanent slides.
2. Anomalous secondary growth in stems of *Boerhavia* and *Dracaena*.
3. Study of anther and ovules using permanent slides/photographs.
4. Study of pollen germination and pollen viability.
5. Dissection and observation of Embryo sac haustoria in *Santalum* or *Argemone.*
6. Structure of endosperm (nuclear and cellular) using permanent slides / Photographs.
7. Dissection and observation of Endosperm haustoria in *Crotalaria* or *Coccinia*.
8. Developmental stages of dicot and monocot embryos using permanent slides / photographs.
9. Study of instruments used to measure microclimatic variables; soil thermometer, maximum and minimum thermometer, anemometer, rain gauze, and lux meter. (visit to the nearest/local meteorology station where the data is being collected regularly and record the field visit summary for the submission in the practical).
10. Study of morphological and anatomical adaptations of hydrophytes and xerophytes (02 each).
11. Quantitative analysis of herbaceous vegetation in the college campus for frequency, density and abundance.
12. Identification of vegetation/various plants in college campus and comparison with Raunkiaer's frequency distribution law.
13. Find out the alpha-diversity of plants in the area

II-BZC	BOTANY-V	SEM-IV	BOT-T41A	2021-22	No. of Credits: 4	No. of hrs/week:4

CELL BIOLOGY, GENETICS AND PLANT BREEDING (NEW SYLLABUS)

(Total hours of teaching – 60 @ 04 Hrs./Week)

Unit – 1: The Cell **12 Hrs.**

1. Cell theory; prokaryotic vs eukaryotic cell; animal vs plant cell; a brief account on ultra-structure of a plant cell.
2. Ultra-structure of cell wall.
3. Ultra-structure of plasma membrane and various theories on its organization.
4. Polymorphic cell organelles (Plastids); ultrastructure of chloroplast. Plastid DNA.

Unit – 2: Chromosomes **12 Hrs.**

1. Prokaryotic vs eukaryotic chromosome. Morphology of a eukayotic chromosome.
2. Euchromatin and Heterochromatin; Karyotype and idiogram.
3. Brief account of chromosomal aberrations - structural and numerical changes
4. Organization of DNA in a chromosome (solenoid and nucleosome models).

Unit – 3: Mendelian and Non-Mendelian genetics **14Hrs.**

1. Mendel's laws of inheritance. Incomplete dominance and co-dominance; Multiple allelism.
2. Complementary, supplementary and duplicate gene interactions (plant based examples are to be dealt).
3. A brief account of linkage and crossing over; Chromosomal mapping - 2 point and 3 point test cross.
4. Concept of maternal inheritance (Corren's experiment on *Mirabilis jalapa*); Mitochondrial DNA.

Unit – 4:Structure and functions of DNA **12 Hrs.**

1. Watson and Crick model of DNA. Brief account on DNA Replication (Semi-conservative method).
2. Brief account on Transcription, types and functions of RNA. Gene concept and genetic code and Translation.
3. Regulation of gene expression in prokaryotes - Lac Operon.

Unit – 5:Plant Breeding **12 Hrs**

1. Plant Breeding and its scope; Genetic basis for plant breeding. Plant Introduction and acclimatization.
2. Definition, procedure; applications and uses; advantages and limitations of :(a) Mass selection, (b) Pure line selection and (c) Clonal selection.
3. Hybridization – schemes, and technique; Heterosis(hybrid vigour).
4. A brief account on Molecular breeding – DNA markers in plant breeding. RAPD, RFLP.

TEXTBOOKS

- Botany – III (Vrukshasastram-I) : Telugu Akademi, Hyderabad
- Pandey, B.P. (2013) *College Botany, Volume-III,* S. Chand Publishing, New Delhi
- Ghosh, A.K., K. Bhattacharya &G. Hait (2011) *A Text Book of Botany, Volume-III,* New Central Book Agency Pvt. Ltd., Kolkata

Books for Reference:

- S. C. Rastogi (2008)*Cell Biology,*New Age International (P) Ltd. Publishers, New Delhi
- P. K. Gupta (2002)*Cell and Molecular biology,*Rastogi Publications, New Delhi

SRI DURGA MALLESWARA SIDDHARTHA MAHILA KALASALA,VIJAYAWADA-10

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

II-BZC	BOTANY-V	SEM-IV	BOT-P41A	2021-22	No. of Credits: 1	No. of hrs/week:2

NEW SYLLABUS

Practical Syllabus of Botany Core Course

Cell Biology, Genetics and Plant Breeding

Practical Syllabus:

1. Study of ultra structure of plant cell and its organelles using Electron microscopic Photographs/models.
2. Demonstration of Mitosis in *Allium cepa*/*Aloe vera* roots using squash technique;
3. observation of various stages of mitosis in permanent slides.
4. Demonstration of Meiosis in P.M.C.s of *Allium cepa* flower buds using squash technique; observation of various stages of meiosis in permanent slides.
5. Study of structure of DNA and RNA molecules using models.
6. Solving problems monohybrid, dihybrid, back and test crosses.
7. .Solving problems on gene interactions (at least one problem for each of the gene interactions in the syllabus).
8. Chromosome mapping using 3- point test cross data.
9. Demonstration of emasculation, bagging, artificial pollination techniques for hybridization.

II-BZC	BOTANY-III	SEM-IV	BOT TO1	2021-22	No. of Credits: 4	No. of hrs/week:4

PLANT PHYSIOLOGY AND METABOLISM (NEW SYLLABUS)

Unit – 1: Plant-Water relations **10 Hrs.**

1. Importance of water to plant life, physical properties of water, diffusion, imbibition, osmosis. water potential, osmotic potential, pressure potential.
2. Absorption and lateral transport of water; Ascent of sap
3. Transpiration: stomata structure and mechanism of stomatal movements (K+ ion flux).
4. Mechanism of phloem transport; source-sink relationships.

plants; symptoms of mineral deficiency

2. Absorption of mineral ions; passive and active processes.
3. Characteristics, nomenclature and classification of Enzymes. Mechanism of enzyme action, enzyme kinetics.
4. Respiration: Aerobic and Anaerobic; Glycolysis, Krebs cycle; electron transport system, Mechanism of oxidative phosphorylation, Pentose Phosphate Pathway (HMP shunt).

Unit – 3: Photosynthesis and Photorespiration **12 Hrs.**

1. Photosynthesis: Photosynthetic pigments, absorption and action spectra; Red drop and Emerson enhancement effect
2. Concept of two photosystems; mechanism of photosynthetic electron transport and evolution of oxygen; photophosphorylation
3. Carbon assimilation pathways (C3,C4 and CAM);
4. Photorespiration - C2 pathway

Unit – 4: Nitrogen and lipid metabolism **12 Hrs.**

1. Nitrogen metabolism: Biological nitrogen fixation – asymbiotic and symbiotic nitrogen fixing organisms. Nitrogenase enzyme system.
2. Lipid metabolism: Classification of Plant lipids, saturated and unsaturated fatty acids.
3. Anabolism of triglycerides, β-oxidation of fatty acids, Glyoxylate cycle.

Unit – 5: Plant growth - development and stress physiology **12 Hrs.**

1. Growth and Development: Definition, phases and kinetics of growth.
2. Physiological effects of Plant Growth Regulators (PGRs) - Auxins, Gibberellins, Cytokinins, ABA, Ethylene andBbrassino steroids.
3. Physiology of flowering: Photoperiodism, role of phytochrome in flowering.
4. Seed germination and senescence; physiological changes.

Text books:

- Botany – IV (Vrukshasastram-II) : Telugu Akademi, Hyderabad
- Pandey, B.P. (2013) *College Botany, Volume-III,* S. Chand Publishing, New Delhi

Books for Reference:

- Aravind Kumar & S.S. Purohit (1998) *Plant Physiology – Fundamentals and Applications* ,Agro Botanica, Bikaner
- Datta, S.C. (2007) *Plant Physiology,* New Age International (P) Ltd., Publishers, New Delhi

BOT PO1 Practical Syllabus of Botany Core Course – 4 /

Semester – IV

Plant Physiology and Metabolism
credits:1

(Total hours of laboratory exercises 30 Hrs. @ 02 Hrs. /Week)

Practical Syllabus

1. Determination of osmotic potential of plant cell sap by plasmolytic method using *Rhoeo*/ *Tradescantia* leaves.
2. Calculation of stomatal index and stomatal frequency of a mesophyte and a xerophyte.

3. Determination of rate of transpiration using Cobalt chloride method / Ganong's potometer (at least for a dicot and a monocot).

4. Effect of Temperature on membrane permeability by colorimetric method.

5. Study of mineral deficiency symptoms using plant material/photographs.

6. Demonstration of amylase enzyme activity and study the effect of substrate and Enzyme concentration.

7. Separation of chloroplast pigments using paper chromatography technique.

8. Demonstration of Polyphenol oxidase enzyme activity (Potato tuber or Apple fruit)

9. Anatomy of C3, C4 and CAM leaves

10. Estimation of protein by biuret method/Lowry method

11. Minor experiments – Osmosis, Arc-auxonometer, ascent of sap through xylem, cytoplasmic streaming.

Sri Durga Malleswara Siddhartha Mahila Kalasala,Vijayawada-10

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

II-BZC	BOTANY-V	SEM-V	BOT-T51	2021-22	No. of Credits: 4	No. of hrs/week:4

CELL BIOLOGY, GENETICS AND PLANT BREEDING (NEW SYLLABUS)

(Total hours of teaching – 60 @ 04 Hrs./Week)

On successful completion of this course, the students will be able to;

Co1: Distinguish prokaryotic and eukaryotic cells and design the model of a cell.

Co2: Explain the organization of a eukaryotic chromosome and the structure of genetic material.

Co3 : Discuss the basics of Mendelian genetics, its variations and interpret inheritance of traits in living beings and elucidate the role of extra-chromosomal genetic material for inheritance of characters.

C o 4 : Evaluate the structure, function and regulation of genetic material.

C o 5 : Understand the application of principles and modern techniques in plant breeding and explain the procedures of selection and hybridization for improvement of crops.

Unit – 1: The Cell **12 Hrs.**

1. Cell theory; prokaryotic vs eukaryotic cell; animal vs plant cell; a brief account on ultra-structure of a plant cell.
2. Ultra-structure of cell wall.
3. Ultra-structure of plasma membrane and various theories on its organization.
4. Polymorphic cell organelles (Plastids); ultrastructure of chloroplast. Plastid DNA.

Unit – 2: Chromosomes **12 Hrs.**

1. Prokaryotic vs eukaryotic chromosome. Morphology of a eukayotic chromosome.
2. Euchromatin and Heterochromatin; Karyotype and idiogram.
3. Brief account of chromosomal aberrations - structural and numerical changes
4. Organization of DNA in a chromosome (solenoid and nucleosome models).

Unit – 3: Mendelian and Non-Mendelian genetics **14Hrs.**

1. Mendel's laws of inheritance. Incomplete dominance and co-dominance; Multiple allelism.
2. Complementary, supplementary and duplicate gene interactions (plant based examples are to be dealt).
3. A brief account of linkage and crossing over; Chromosomal mapping - 2 point and 3 point test cross.
4. Concept of maternal inheritance (Corren's experiment on *Mirabilis jalapa*); Mitochondrial DNA.

Unit – 4:Structure and functions of DNA **12 Hrs.**

1. Watson and Crick model of DNA. Brief account on DNA Replication (Semi-conservative method).
2. Brief account on Transcription, types and functions of RNA. Gene concept and genetic code and Translation.
3. Regulation of gene expression in prokaryotes - Lac Operon.

Unit – 5:Plant Breeding **12 Hrs.**

1. Plant Breeding and its scope; Genetic basis for plant breeding. Plant Introduction and acclimatization.
2. Definition, procedure; applications and uses; advantages and limitations of :(a) Mass selection, (b) Pure line selection and (c) Clonal selection.
3. Hybridization – schemes, and technique; Heterosis(hybrid vigour).
4. A brief account on Molecular breeding – DNA markers in plant breeding. RAPD, RFLP.

TEXTBOOKS

- Botany – III (Vrukshasastram-I) : Telugu Akademi, Hyderabad
- Pandey, B.P. (2013) *College Botany, Volume-III,* S. Chand Publishing, New Delhi

- Ghosh, A.K., K. Bhattacharya &G. Hait (2011) *A Text Book of Botany, Volume-III,* New Central Book Agency Pvt. Ltd., Kolkata

Books for Reference:

- S. C. Rastogi (2008)*Cell Biology,*New Age International (P) Ltd. Publishers, New Delhi
- P. K. Gupta (2002)*Cell and Molecular biology,*Rastogi Publications, New Delhi

SRI DURGA MALLESWARA SIDDHARTHA MAHILA KALASALA,VIJAYAWADA-10

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

II-BZC	BOTANY-V	SEM-V	BOT-P51	2021-22	No. of Credits: 1	No. of hrs/week:2

NEW SYLLABUS

Practical Syllabus of Botany Core Course

Cell Biology, Genetics and Plant Breeding

Course Outcomes: After successful completion of this practical course the student shall be able to:

- Show the understanding of techniques of demonstrating Mitosis and Meiosis in the laboratory and identify different stages of cell division.
- Identify and explain with diagram the cellular parts of a cell from a model or picture and prepare models
- Solve the problems related to crosses and gene interactions.
- Demonstrate plant breeding techniques such as emasculation and bagging

Practical Syllabus:

10. Study of ultra-structure of plant cell and its organelles using Electron microscopic Photographs/models.
11. Demonstration of Mitosis in *Allium cepa*/*Aloe vera* roots using squash technique;
12. observation of various stages of mitosis in permanent slides.
13. Demonstration of Meiosis in P.M.C.s of *Allium cepa* flower buds using squash technique; observation of various stages of meiosis in permanent slides.
14. Study of structure of DNA and RNA molecules using models.
15. Solving problems monohybrid, dihybrid, back and test crosses.
16. .Solving problems on gene interactions (at least one problem for each of the gene interactions in the syllabus).
17. Chromosome mapping using 3- point test cross data.
18. Demonstration of emasculation, bagging, artificial pollination techniques for hybridization.

Sri Durga Malleswara Siddhartha Mahila Kalasala,Vijayawada-10

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

III B. Sc - SEMESTER- V: BOTANY

III-BZC	BOTANY-VI	SEM-V	BOT-T52	No. of Credits: 3	No. of hrs/week:4

Title of the Paper**: PLANT ECOLOGY& PHYTOGEOGRAPHY**

UNIT – I. Elements of Ecology **(12 hrs)**

1.1 Ecology:

1.1.1 Definition 1.1.2 Branches and significance of ecology.

1.2 Climatic Factors:

1.2.1 Light 1.2.2 Temperature

1.3 Edaphic Factor:

1.3.1 Origin, formation 1.3.2 Composition and soil profile.

1.4 Biotic Factor: Interactions between plants and animals.

UNIT– II. Ecosystem Ecology **(12 hrs)**

2.1 Ecosystem:

2.1.1 Concept and components 2.1.2 Energy flow

2.1.3 Food chain and Food web 2.1.4 Ecological pyramids.

2.2 Productivity of ecosystem-Primary, Secondary and Net productivity.

2.3 Biogeochemical cycles- 2.3.1Carbon 2.3.2 Nitrogen 2.3.3 Phosphorous.

UNIT – III Population &Community Ecology **(12 hrs)**

3.1 Population – 3.1.1 Definition 3.1.2 Characteristics and importance, outlines –ecotypes.

3.2 Plant communities- 3.2.1 Characters of a community, outlines – Frequency, density, cover, life forms and competition.

3.3 Interaction between plants growing in a community.

UNIT – IV Phytogeography **(12 hrs)**

4.1 Principles of Phytogeography, Distribution (wides, endemic, discontinuous species)

4.2 Phytogeographic regions of India.

4.3 Phytogeographic regions of World (out lines)

4.4 Endemism – types and causes

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

5.1 Definition, levels of biodiversity-genetic, species and ecosystem.

5.2 Biodiversity hotspots- Criteria, Biodiversity hotspots of India.

5.3 Loss of biodiversity – causes and conservation (*In-situ* and *ex-situ* methods).

5.4 Seed banks - conservation of genetic resources and their importance

Reference Books:

1. Daubenmire, R.F. ( ): Plants & Environment (2nd Edn.,) John Wiley & Sons., New York
2. Puri, .G.S. (1960): Indian Forest Ecology (Vol.I& II) Oxford Book Co., New Delhi & Calcutta.
3. Billings, W.B. (1965): Plants and the Ecosystem Wadsworth Publishing Co., Inc., Belmont.
4. Misra, R. (1968): The Ecology work Book Oxford & INH Publishing Co., Calcutta
5. Kochhar, P.L. (1975): Plant Ecology. (9th Edn.,) New Delhi, Bombay, Calcutta-226pp.,
6. Kumar, H.D. (1992): Modern Concepts of Ecology (7th Edn.,) Vikas Publishing Co., New Delhi.
7. Newman, E.I. (2000): Applied Ecology Blackwell Scientific Publisher, U.K.
8. Chapman, J.L&M.J. Reiss (1992): ecology (Principles & Applications). Cambridge University Press, U.K.

9. Mani, M.S (1974): Ecology & Biogeography of India Dr. W. Junk Publishers, The Haque
10. Good, R. (1997): The Geography of flowering Plants (2nd Edn.) Longmans, Green & Co., Inc., London & Allied Science Publishers, New Delhi

Sri Durga Malleswara Siddhartha Mahila Kalasala,Vijayawada-10

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

III B. Sc - SEMESTER- V: BOTANY PRACTICAL

PRACTICAL PAPER-VI: PLANT ECOLOGY& PHYTOGEOGRAPHY

---

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. 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, phytogeographical regions and distribution of endemic plants in the map of India.

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

SRI DURGA MALLESWARA SIDDHARTHA MAHILA KALASALA

VIJAYAWADA – 520 010

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

DEPARTMENT OF BOTANY

III-BZC	BOTANY-VII	SEM-VI	BOT TEL61A	2019-2020	No. of Credits: 3	No. of hrs/week:4

Title of the Course**: PLANT TISSUE CULTURE AND ITS BIOTECHNOLOGICAL APPLICATIONS**

Unit I: PLANT TISSUE CULTURE-1: **(12Hrs)**

1.1 History of Plant tissue culture research
1.2 Basic principles of plant tissue culture- Totipotency, differentiation and dedifferentiation.
1.3 Methods of sterilization-physical and chemical methods
1.4 Murashige and Skoog's medium, phytohormones.
1.5 Callus culture and Meristem culture
1.6 Somatic embryogenesis and Synthetic seeds

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

2.1 Endosperm culture
2.2 Embryo culture, Embryo rescue technique
2.3 Production of secondary metabolites.
2.4 Cryopreservation
2.5 Germplasm conservation.

UNIT -III: RECOMBINANT DNA TECHNOLOGY: **(12 Hrs)**

3.1 r-DNA technology-procedure
3.2 Cloning Vectors: p^{UC18} and p^{BR322}
3.3 Restriction Endonucleases-Types
3.4 DNA Libraries- Genomic and cDNA libraries,
3.5. Screening of recombinants-Direct selection, Insertional inactivation, Blue white selection and Colony hybridization.

UNIT-IV: METHODS OF GENE TRANSFER: **(12Hrs)**

4.1 Agrobacterium-mediated gene transfer
4.2 Direct gene transfer
4.2.1 Electroporation
4.2.3 Microinjection
4.2.4 Micro projectile bombardment.
4.3 Selection of transgenics– selectable marker and reporter genes (Luciferase, GUS, GFP).

UNIT V: APPLICATIONS OF BIOTECHNOLOGY: **(12 Hrs)**

5.1 Applications of Plant Genetic Engineering
5.2 Transgenic plants for pest resistant (Bt-cotton)
5.3 Herbicide resistance (Round up Ready soybean)
5.4 Improved agronomic traits Flavr-Savr tomato and Golden rice
5.5 Improved horticultural varieties (Moon dust Carnations)

Reference Books:

1. Pullaiah. T. and M.V.Subba Rao. 2009. Plant Tissue culture. Scientific Publishers, New Delhi.
2. Bhojwani, S.S. and Razdan, M.K., (1996). Plant Tissue Culture: Theory and Practice. Elsevier Science Amsterdam. The Netherlands.

Glick, B.R., Pasternak, J.J. (2003). Molecular Biotechnology- Principles and Applications ofrecombinant DNA. ASM Press, Washington.

3Bhojwani, S.S. and Bhatnagar, S.P. (2011). The Embryology of Angiosperms. VikasPublicationHouse Pvt. Ltd., New Delhi. 5th edition.

4Snustad, D.P. and Simmons, M.J. (2010). Principles of Genetics. John Wiley and Sons, U.K. 5th edition.
5. Stewart, C.N. Jr. (2008). Plant Biotechnology & Genetics: Principles, Techniques and Applications. John Wiley & Sons Inc. U.S.A.

SRI DURGA MALLESWARA SIDDHARTHA MAHILA KALASALA

VIJAYAWADA – 520 010

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

DEPARTMENT OF BOTANY

III B. Sc - BOTANY SYLLABUS SEMESTER- VI

Course – VII-(C) Elective COURCE CODE-BOT PEl61

Practical Course VII-(C): Plant Tissue Culture &Plant Biotechnology

Total hours of teaching 30hrs @ 2hrs 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. Construction of restriction map of circular and linear DNA from the data provided.

4. Study of methods of gene transfer through photographs: Agrobacterium-mediated, direct gene
transfer by electroporation, microinjection and micro projectile bombardment.

5. Different steps involved in genetic engineering for production of Bt. Cotton, Golden rice, Flavr- savr tomato through photographs.

6. Isolation of plasmid DNA.

7. Gel electrophoresis of DNA (optional).
8. Field visit to a lab involved in tissue culture.

9. Study project under supervision of lecturer – tissue culture/ genetic engineering.

SRI DURGA MALLESWARA SIDDHARTHA MAHILA KALASALA VIJAYAWADA – 520 010

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

DEPARTMENT OF BOTANY

III-BZC	BOTANY-VIIIA	SEM-VI	BOTTCL61A	2019-2020	No. of Credits: 3	No. of hrs/week:4

Title of the Course: PLANT DIVERSITY AND HUMAN WELFARE

UNIT- I: PLANT DIVERSITY AND ITS SCOPE: **(12HRS)**
1.1 Genetic diversity, Species diversity and Ecosystem diversity
1.2 Agro biodiversity-Centre of Origin
1.3 Ethical and aesthetic values of Biodiversity
1.4 Methodologies for valuation of Biodiversity-Contingent valuation, Changes in productivity, Hedonic pricing and
Travel cost method
1.5 Uses of plants.

UNIT -II: LOSS OF BIODIVERSITY: **(12HRS)**
2.1 Loss of biodiversity at different levels, Loss of agro biodiversity.
2.2 Organizations associated with biodiversity management – 2.2.1 IUCN 2.2.2 UNEP 2.2.3 UNESCO 2.2.4 WWF 2.2.5 NBPGR
2.3 Biodiversity legislation and conventions-CBD, CITES and Ramsar convention
2.4 Biodiversity information management and communication- Libraries, Periodicals, Databases and Bibliographies

UNIT-III: CONTEMPORARY PRACTICES IN RESOURCE MANAGEMENT: **(12HRS)**
3.1 Environmental Impact Assessment (EIA)
3.2 Geographical Information System (GIS)
3.3 Ecological footprint with emphasis on carbon footprint
3.4 Solid waste management
3.5 Liquid waste management

UNIT -IV: CONSERVATION OF BIODIVERSITY: (12HRS)
4.1 Conservation of genetic diversity, species diversity and ecosystem diversity.
*4.*2 In situ conservation-National Parks, Wildlife sanctuaries and Biosphere reserves.
4.3 Ex situ conservation-Seed banks, Gene banks, Botanical garden and Cryopreservation
4.4 Social approaches to conservation-Sacred groves (Out lines) and Sthalavrikshas.

UNIT- V: ROLE OF PLANTS IN RELATION TO HUMAN WELFARE: (12HRS)
5.1 Importance of forestry and its utilization
5.2 Avenue trees
5.3 Ornamental plants of India
5.4 Alcoholic beverages through ages.
5.5 Important fruit crops and their commercial importance
5.6 Wood and fiber yielding plants and their uses.

Reference Books:

1. Krishnamurthy, K.V. (2004). An Advanced Text Book of Biodiversity - Principles and Practices. Oxford and IBH Publications Co. Pvt. Ltd. New Delhi.

Singh, J. S., Singh, S.P. and Gupta, S. (2006). Ecology, Environment and Resource Conservation.

SRI DURGA MALLESWARA SIDDHARTHA MAHILA KALASALAVIJAYAWADA – 520 010

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

DEPARTMENT OF BOTANY

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

III-BZC	BOTANY-VIIIA	SEM-VI	BOTPCL61A	2019-2020	No. of Credits: 2	No. of hrs/week:2

Title of the Course: PLANT DIVERSITY AND HUMAN WELFARE

1) Study of exotic species- Identification and morphological characteristics.(*Ageratum, Argemone, Antigonon* and *Croton bonplandianum*)

2) Identification of forest trees through bark (*Terminalia & Diospyros*), wood (*Dalbergia & Terminalia*), flowers(*Cassia & Butea*) and fruits(*Oroxylum* & *Strychnos*).

3) Maceration-Study of wood (Tracheary elements, fibres).

4) Preparation of Jam.

5) Preparation of Sauce.

6) Preservation of fruits (Salting and sugaring)

7) Economic and commercial importance of any four plants(*Oryza, Cajanus, Camelia* and *Cocos*)

8) Study of plant diversity (flowering plants).

SRI DURGA MALLESWARA SIDDHARTHA MAHILA KALASALA VIJAYAWADA – 520 010

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

DEPARTMENT OF BOTANY

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

III-BZC	BOTANY-VIIIB	SEM-VI	BOTTCL62A	2019-2020	No. of Credits: 3	No. of hrs/week:4

Title of the Course**: ETHNOBOTANY AND MEDICINAL BOTANY**

UNIT –I: **ETHNOBOTANY**: **(12HRS)**

1.1.1 Introduction, concept, scope and objectives
1.1.2 Ethnobotany as interdisciplinary science.
1.1.3 The relevance of Ethnobotany in the present context
1.2 Major and minor ethnic groups or Tribals of India and their life styles.
1.3 Plants used by the tribal populations:
a) Food plants b) Intoxicants and beverages c) Resins and oils

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

2.1 Role of ethnobotany in modern medicine with special examples
2.1.1 *Rauwolfia serpentina* 2.1.2 *Trichopus zeylanicus* 2.1.3 *Withania somnifera*
2.2 Medico-ethnobotanical sources in India
2.3 Significance of the following plants in ethno botanical practices (along with their habitat and morphology)
2.3.1 *Vitex negundo* 2.3.2 *Gloriosa superba* 2.3.3 *Tribulus terrestris*

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

(12HRS)

3.1 Sharing of wealth concept with few examples from India.
3.2 Biopiracy, Patent, Intellectual Property Rights and Traditional Knowledge.

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

(12HRS)

4.1 **Ayurveda**: History, origin, panchamahabhutas, saptadhatu and tridosha concepts, plants used in ayurvedic treatments.
4.2 **Siddha**: Origin of Siddha medicinal systems, Basis of Siddha system, plants used in Siddha medicine.
4.3 **Unani**: History, concept: Umoor-e- tabiya, polyherbal formulations (in brief).

UNIT -V: CONSERVATION OF ENDANGERED AND ENDEMIC MEDICINAL PLANTS: **(12HRS)**

5.1 Definition: Endemic and endangered medicinal plants
5.2 Red list criteria
5.3 *In situ* conservation: Biosphere reserves, sacred groves, National Parks
5.4 *Ex situ* conservation: Botanical Gardens

Reference Books:

1. S.K. Jain, Manual of Ethnobotany, Scientific Publishers, Jodhpur, 1995.
2. Glimpses of Indian. Ethnobotany, 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. Rama Ro, N and A.N. Henry (1996). The Ethnobotany of Eastern Ghats in Andhra Pradesh, India.Botanical Survey of India. Howrah
6. Trivedi P C, 2006. Medicinal Plants: Ethnobotanical Approach, Agrobios, India.
7. Purohit and Vyas, 2008. Medicinal Plant Cultivation: A Scientific Approach, 2nd edn. Agrobios, India.
8. Pal, D.C. & Jain, S.K., 1998. Tribal Medicine. Naya Prakash Publishers, Calcutta
9. Raychudhuri, S.P., 1991. (Ed.) Recent advances in Medicinal aromatic and spice crops. Vol.1, Today& Tomorrow's printers and publishers, New Delhi.

SRI DURGA MALLESWARA SIDDHARTHA MAHILA KALASALA

VIJAYAWADA – 520 010

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

DEPARTMENT OF BOTANY

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

III-BZC	BOTANY-VIIIB	SEM-VI	BOTPCL62A	2019-20	No. of Credits: 2	No. of hrs/week:2

Title of the Course: **ETHNOBOTANY AND MEDICINAL BOTANY**

1. Ethnobotany of *Rauvolfia serpentina* , *Trichopus zeylanicus* , *Withania somnifera*, *Vitex negundo*, *Gloriosa superba* and *Tribulus terrestris*

2. Detailed morphological and anatomical study of *Allium sativum* (Clove), *Adhatoda vasica* (Leaf), *Zingiber officinale* (Rhizome), *Vinca rosea* (Leaf), *Curcuma longa* (Rhizome), *Eugenia caryophyllus* (Clove) , *Ocimum sanctum* (Leaf), *Datura stramonium* (Leaf)

3. Field visits to identify and collect ethno medicinal plants used by local tribes/folklore.

SRI DURGA MALLESWARA SIDDHARTHA MAHILA KALASALA VIJAYAWADA – 520 010

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

DEPARTMENT OF BOTANY

III-BZC	BOTANY-VIIIC	SEM-VI	BOTTCL63A	2019-2020	No. of Credits: 3	No. of hrs/week:4

Title of the Course: PHARMACOGNOSY AND PHYTOCHEMISTRY

UNIT-I: PHARMACOGNOSY:(12 Hrs)

1.1 Definition 1.2 Importance
1.3 Classification of drugs - Chemical and Pharmacological classification
1.4 Drug evaluation methods-Organoleptic and Microscopic methods

UNIT –II: ORGANOLEPTIC AND MICROSCOPIC STUDIES: (12 Hrs)

2.1 Organoleptic and microscopic studies with reference to nature of active principles and common adulterants of
2.1.1 *Alstonia scholaris* (bark) 2.1.2 *Adhatoda vasica* (leaf) 2.1.3 *Strychnos nux-vomica* (seed)
2.1.4 R*auwolfia serpentina* (root) 2.15 *Zingiber officinale* (Rhizome)

UNIT-III: SECONDARY METABOLITES: (12 Hrs)

3.1 Definition of primary and secondary metabolites and their differences
3.2 A brief idea about extraction of alkaloids
3.3 Origin of secondary metabolites
3.4 Detailed account of Acetate pathway, Mevalonate pathway and Shikimate pathway

UNIT-IV: PHYTOCHEMISTRY: (12 Hrs)

4.1 Alkaloids: Different groups, biological significance
4.2 Terpenoids-classification and their significance
4.3 Phenols, Glycosides and steroids
4.4 Volatile oils

UNIT-V: ENZYMES, PROTEINS AND AMINO ACIDS AS DRUGS:(12 HRS)

5.1 Vaccines –types
5.2 Antibiotics-Classification, chemical nature and mode of action of Penicillin and Streptomycin
5.3 Vitamins-Classification
5.4 Pharmacological action of plant drugs – tumor inhibitors, antioxidants and phytoestrogens.

REFERENCE BOOKS:

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

SRI DURGA MALLESWARA SIDDHARTHA MAHILA KALASALAVIJAYAWADA – 520 010

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

DEPARTMENT OF BOTANY

III-BZC	BOTANY-VIIIC	SEM-VI	BOTPCL63A	2019-2020	No. of Credits: 2	No. of hrs/week:2

Title of the Course: PHARMACOGNOSY AND PHYTOCHEMISTRY

1. Physical and chemical tests for evaluation of unorganized drugs- Asafoetida, Honey, Castor oil and 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 – *Aloe, Vinca*, Punarnava
6. Identification of Plant drugs
7. Collection of locally available plant crude drugs from local venders (minimum of 3)

1.2 .1- No. Of new courses introduced during the academic year

Nil

1.2.2 - No. Of programmes offered through CBCS/ Elective course system

Syllabus 1-4, 5

Use dummy 6 th sem

1.3.2- N o.of value added courses and life skills offered by the department

SRI DURGA MALLESWARA SIDDHARTHA MAHILA KALASALA, VIJAYAWADA- 10
(An Autonomous college in the jurisdiction of Krishna University : Machilipatnam)

Skill Development Courses	**BOT SDC PO1**	**2020-21**	**2 CREDITS**

PLANT NURSERY

Learning Outcomes :

On successful completion of this course students will be able to;

1. *Understand the importance of a plant nursery and basic infrastructure toestablish it.*
2. *Explain the basic material, tools and techniques required for nursery.*
3. *Demonstrate expertise related to various practices in a nursery.*
4. *Comprehend knowledge and skills to get an employment or to become an entrepreneur in plant nursery sector.*

Unit-1 :Introduction to plant nursery **06 Hrs.**

1. Plant nursery: Definition, importance.
2. Different types of nurseries –on the basis of duration, plants produced, structure used.
3. Basic facilities for a nursery; layout and components of a good nursery.
4. Plant propagation structuresin brief.
5. Bureau of Indian Standards (BIS-2008) related to nursery.

Unit- 2 :Necessities for nursery **09 Hrs.**

1. Nursery beds – types and precautions to be taken during preparation.
2. Growing media, nursery tools and implements, and containers for plant nursery, in brief.
3. Seeds and other vegetative material used to raise nursery.in brief.
4. Outlines of vegetative propagation techniques to produce planting material.
5. Sowing methods of seeds and planting material.

Unit-3 :Management of nursery **09 Hrs.**

1. Seasonal activities and routine operations in a nursery.
2. Nursery management – watering, weeding and nutrients; pests and diseases.
3. Common possible errors in nursery activities.
4. Economics of nursery development, pricing and record maintenance.
5. Online nursery information and sales systems.

PRACTICAL SYLLABUS 6 Hours

1.Demonstration of Nursery bed making of propagation media.
2. Demonstration of preparation of media for nursery
3.Hands on training on vegetative propagation techniques
4.Hands on training on showing methods of seeds and other material
5.visit to an agriculture/horticulture /forest nursery.
6.case study on establishment and success of a plant nursery.

Suggested Co-curricular activities (6 Hrs.)

1.Assignments/group discussions/quiz/model

2.Invited lecture cum demonstration by local expert

3.Watching videos on routine practices in plant nurseries

Suggested text books/reference books :

1. Ratha Krishnan, M., et.al. (2014) *Plant nursery management : Principles and practices,* Central Arid Zone Research Institute (ICAR), Jodhpur, Rjasthan
2. Kumar, N., (1997) *Introduction to Horticulture*, Rajalakshmi Publications, Nagercoil.
3. KumarMishra, K., N.K. Mishra and Satish Chand (1994) *Plant Propagation*, John Wiley & Sons, New Jersey.

Add on Course

HERBARIUM METHODOLOGY

COURS.CODE: AOC T14

Hours: 30 **Credits:2**

I. **Herbarium :** Introduction, Historical Development and Etymology of Herbarium, Importance of, Herbarium, Functions of Herbarium, Role of herbarium in teaching and Research, Largest Herbarium in the World, Major Herbaria In India

II. Collection : Kinds of Field Works, Laws of Ethics of Collection, Collection of Special Groups

Collection of Algae, Collection of Sea weeds, Collection of Fungi, Collection of Lichens, Collection of Bryophytes, Collection of Pteridophytes, Collection of Gymnosperms, Numbering and Tagging

III. Processing of Specimens : Poising-Mercuric chloride, Lauryl pentachlorophenate, Formalin, Blotting materials

Special preservation, Pressing of Aquatic plants, Drying, Mounting, Poising the plant on the sheet and stitching, Strapping, Labeling, Nomenclature, Accessioning, Bar Coding Herbarium Digitalization, Retrieval using DBMS, Incorporation /Filling

IV. Maintenance of Herbarium : Systematic arrangement of Families, Genus Covers, Species Covers, Determinants, Dummy folders, Herbarium Cupboards, Temperature and Humidity, Fire precautions, Pest and insect treatments, Methods of decontamination, Specimen maintenance, Photographs, Drawings, Maps, Record keeping and Retrieval systems, Receipt of specimens in the Herbarium, Loan to other Institutions

V. Handling of Specimens : Herbarium Guide

References: 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- Lucknow, Ajmer, Allahabad, Delhi.