



**GOVERNMENT DEGREE COLLEGE, NAGARI(A),
CHITTOOR DT**

(Accredited by NAAC with A+ Grade, CGPA: 3.28)

Department of Botany

B.Sc., I Year (Semester -I - w.e.f 2024-25)

Course- I: INTRODUCTION TO CLASSICAL BIOLOGY



Paper Code: I-03-BOT-ICB01-R24

Periods: 60

Max.Marks:100

(5hrs/week)

Unit 1: Introduction to systematics, taxonomy and ecology.

- 1.1 Systematics – Definition and concept, Taxonomy – Definition and hierarchy.
- 1.2 Nomenclature – ICBN and ICZN, Binomial and trinomial nomenclature.
- 1.3 Ecology – Concept of ecosystem, Biodiversity and conservation.
- 1.4 Pollution and climate change.

Unit 2: Essentials of Botany.

- 2.1 The classification of plant kingdom: Basic concepts and characteristics of plants upto division
- 2.2 Plant physiological processes Basic concepts: water relations, Mineral nutrition, Photosynthesis, Respiration, Transpiration, phytohormones.
- 2.3 Parts of the flowers, protandry, Protogyny, pollination, fertilization and structure and types of anthers.
- 2.4 Economic botany: Cereals: Rice, pulses: Green gram, oils: Sunflower, fibre: Jute, medicinal: Aswagandha

Unit 3: Essentials of Zoology

- 3.1. The classification of Kingdom Animalia and Chordata.
- 3.2 Heart, lung, kidney, Organ Systems & their functions in Humans; Hormones and Disorders
- 3.3 Developmental Biology – Basic process of development (Gametogenesis, Fertilization, Cleavage and Organogenesis)
- 3.4 Economic Zoology – Sericulture, Apiculture, Aquaculture

Unit 4: Cell biology, Genetics and Evolution

- 4.1 Cell theory, Ultrastructure of prokaryotic cell (typical bacterial cell) and eukaryotic cell (Plant cell)
- 4.2 Chromosomes and heredity – Structure of chromosomes, concept of gene.
- 4.3 Cell Cycle, Mitosis & Meiosis.
- 4.4. Mendel's laws & Darwin theory of evolution.

Unit 5: Essentials of chemistry

- 5.1 Definition and scope of Chemistry, applications of Chemistry in daily life. Branches of Chemistry.
- 5.2. Chemical bonds – ionic, covalent, noncovalent – Vander Waals, hydrophobic, hydrogen bonds.
- 5.3. Green chemistry principles, prevention of waste, prevention of hazardous components,
- 5.4. Green synthesis of catechol, accident prevention & safety measures



**GOVERNMENT DEGREE COLLEGE, NAGARI(A),
CHITTOOR DT**

(Accredited by NAAC with A+ Grade, CGPA: 3.28)

Department of Botany

B.Sc., I Year (Semester -I - w.e.f 2024-25)

Course- I: INTRODUCTION TO APPLIED BIOLOGY

Paper Code: I-03-BOT-IABO2-R24

Periods: 60

Max.Marks:100



(5hrs/week)

Unit 1: Essentials of Microbiology and Immunology

- 1.1. History and Major Milestones of Microbiology; Contributions of Edward Jenner, Louis Pasteur, Robert Koch.
- 1.2. Groups of prokaryotic microbes – Bacteria (Structure, and Types), Outlines of archaeobacteria, Mycoplasma; Eukaryotic Microbes
- 1.3. Applications of microorganisms in – Food, Agriculture, Environment, and Industry.
- 1.4. Viruses : plant virus: Structure and Disease Symptoms of TMV; Outlines of Structure and Reproduction Animal virus: – polio virus & Bacteriophage

Unit 2: Essentials of Biochemistry

- 2.1. Biomolecules I Introduction of carbohydrates & classification – mono di and Polysaccharides. Lipids. Introduction, Structure & types – Biological importance.
- 2.2. Biomolecules II Amino acids – classification, properties, structure & functions. Proteins – classification, properties, structure & functions.
- 2.3. Biomolecules III DNA – Structure & Types RNA – Structure & Types
- 2.4. Immune System – Immunity, types of Immunity, cells & organs of Immune Systems.

Unit 3: Essentials of Biotechnology

- 3.1 History, scope, and significance of biotechnology. Applications of biotechnology in Plant, Animal, Industrial and Pharmaceutical sciences.
- 3.2 Environmental Biotechnology – Bioremediation and Biofuels, Biofertilizers and Biopesticides.
- 3.3 Genetic engineering – Gene manipulation using restriction enzymes and cloning vectors; Physical, chemical, and biological methods of gene transfer.
- 3.4 Transgenic plants – Stress tolerant plants (biotic stress – BT cotton, abiotic stress – salt tolerance). Transgenic animals – Animal and disease models.

Unit 4: Analytical Tools and techniques in biology – Applications

- 4.1 Microscopy – Simple, compound Microscopes, Electrophoresis
- 4.2 UV Visible spectrophotometry, principles of chromatography (TLC, COLUMN)
- 4.3 Monoclonal antibodies – Applications in diagnosis and therapy.
- 4.4 Blotting techniques,

Unit 5: Biostatistics and Bioinformatics

- 5.1 Measures of central tendency – Mean, Median, Mode.
- 5.2 Measures of dispersion – range, standard deviation and variance.
- 5.3 Outlines of Genomics & Outlines of Proteomics, biological databases- NCBI
- 5.4 Fasta sequencing, PDB, BLAST



**GOVERNMENT DEGREE COLLEGE, NAGARI(A),
CHITTOOR DT**

(Accredited by NAAC with A+ Grade, CGPA: 3.28)

Department of Botany

B.Sc., I Year (Semester -II - w.e.f 2024-25)



Course 3: Non-Vascular Plants (Algae, Fungi, Lichens and Bryophytes)

Periods: 60

Unit-1: Introduction to Algae

8Hrs.

1. General Characteristics of algae Occurrence and distribution, cell structure, pigments, flagella and reserve food material.
2. Classification of algae upto division:: F.E.Fritsch (1935)
3. Thallus organization ; life cycles in algae.
4. Economic importance of algae.

Unit-2: Biology of selected Algae 10Hrs.

1. Occurrence, structure, reproduction and life cycle of:
(a) Chlorophyceae: Spirogyra (b) Phaeophyceae: Ectocarpus
(c) Xanthophyceae: Vaucheria (d) Rhodophyceae: Polysiphonia
2. Culture and cultivation of *Chlorella*(SCP) & *Gelidium* (Agar)

Unit-3: Introduction to Fungi 8Hrs.

1. General characteristics of fungi and Ainsworth (1973) classification.
2. Thallus organization in fungi
3. Reproduction in fungi: asexual and sexual; Heterothallism, and Fungal fruit bodies
4. Economic importance of fungi.

Unit-4: Biology of selected Fungi 10Hrs.

1. Occurrence, structure, reproduction and life cycle of:
(a) Mastigomycotina: *Phytophthora* (b) Zygomycotina: *Rhizopus*
(c) Ascomycotina: *Penicillium* (d) Basidiomycotina: *Puccinia*
2. Occurrence, structure and reproduction of lichens; ecological and economic importance of lichens.

Unit-5: Biology of Bryophytes 9Hrs.

1. General characteristics of Bryophytes; latest classification up to divisions
2. Occurrence, morphology, anatomy, reproduction (developmental details are not needed) and life cycle of
(a) Hepaticopsida: *Marchantia* (b) Anthocerotopsida: *Anthoceros*
(c) Bryopsida: *Funaria*
3. General account on evolution of sporophytes in Bryophyta.



**GOVERNMENT DEGREE COLLEGE, NAGARI(A),
CHITTOOR DT**

(Accredited by NAAC with A+ Grade, CGPA: 3.28)

Department of Botany

B.Sc., I Year (Semester -II - w.e.f 2024-25)

Course 4: Origin of Life and Diversity of Microbes



Unit-1: Origin of life and Viruses

10 Hrs.

1. Origin of life: concept of primary Abiogenesis; Miller and Urey experiment.; Pasteur experiments, germ theory of diseases.(Koch Postulates)
2. Five kingdom classification of R.H. Whittaker
3. Viruses; Shapes, symmetry & structure (TMV and Gemini virus.)
4. A brief account of prions, viroids and virusoids; Transmission of plant viruses and their control.
5. Significance of viruses in vaccine production, bio-pesticides and as cloning vectors.

Unit-2: Special groups of Bacteria

7 Hrs.

1. General characteristics, outline classification and economic importance of following special groups of bacteria:
 - a) Archaeobacteria
 - b) Chlamydiae
 - c) Actinomycetes
 - d) Mycoplasma
 - e) Phytoplasma
 - f) Cyanobacteria
2. Culture and cultivation of *Spirulina* and *Azolla*

Unit-3: Eubacteria

8 Hrs

1. Occurrence, distribution and cell structure of eubacteria.
2. Types of nutrition in eubacteria
3. Reproduction- Asexual (Binary fission and endospores) and bacterial recombination (Conjugation, Transformation, Transduction).
4. Economic importance of Eubacteria with reference to their role in Agriculture, industry, fermentation and medicine.

Unit-4: Soil microbes – interactions

10Hrs.

1. Distribution of soil microorganisms.
2. Role of microorganisms in soil fertility.
3. Microbial interactions: mutualism, commensalism, competition, amensalism, parasitism, predation.
4. Microorganisms of rhizosphere, phosphate solubilizers

Unit-5: Microbes in agriculture

10 Hrs.

1. Mass production, mode of applications, advantages and limitations of bacterial inoculants (*Rhizobium*, *Azotobacter*, *Azospirillum*, *Nostoc*).
2. Role of Frankia and VAM in soil fertility.
3. Microbial biocontrol: Biopesticide, trichoderma



**GOVERNMENT DEGREE COLLEGE, NAGARI(A),
CHITTOOR DT**

(Accredited by NAAC with A+ Grade, CGPA: 3.28)

Department of Botany

B.Sc., Honours in BOTANY: MAJOR

w.e.f AY 2023-24 onwards

III Semester

Course 5 : Vascular Plants

(Pteridophytes, Gymnosperms and Taxonomy of Angiosperms) Periods: 60



Unit-1: Pteridophytes 10Hrs.

1. General characteristics of Pteridophyta; Smith (1955) classification.
2. Occurrence, morphology, anatomy, reproduction (developmental details are not needed) and life history of: (a) Lycopside: *Lycopodium* and (b) Filicopsida: *Marsilea*
3. Stelar evolution in Pteridophytes; Heterospory and seed habit.
4. Ecological and economic importance of Pteridophytes.

Unit-2: Gymnosperms 10Hrs.

1. General characteristics of Gymnosperms; Sporne (1965) classification.
2. Occurrence, morphology, anatomy, reproduction (developmental details are not needed) and life history of: (a) Cycadopsida: *Cycas* and (b) Gnetopsida: *Gnetum*
4. Ecological and economic importance of Gymnosperms.

Unit-3: Principles of Plant Taxonomy 10 Hrs.

1. Aim and scope of taxonomy, species concept, taxonomic hierarchy-major and minor categories.
2. Plant nomenclature: Binomial system, ICBN- rules for nomenclature.
3. Herbarium and its techniques, BSI herbarium and Kew herbarium; concept of digital herbaria.
4. Bentham and Hooker system of classification.
5. Phylogenetic systematics: primitive and advanced, homology and analogy, parallelism and convergence, monophyly, paraphyly, polyphyly, clades. synapomorphy, symplesiomorphy, apomorphy. APG-IV classification.

Unit-4: Descriptive Plant Taxonomy 8 Hrs.

Systematic description and economic importance of the following families:

1. Polypetalae: (a) Annonaceae (b) Curcubitaceae
2. Gamopetalae: (a) Asteraceae (b) Asclepiadaceae
3. Monochlamydae: (a) Amaranthaceae (b) Euphorbiaceae
4. Monocotyledonae: (a) Arecaceae (b) Poaceae

Unit-5: Evidences for Plant systematics 7Hrs.

1. Anatomy and embryology in relation to plant systematics.
2. Cytology and cytogenetics in relation to plant systematics.
3. Phytochemistry in relation to plant systematics.
4. Numerical taxonomy
5. Origin and evolution of angiosperm



**GOVERNMENT DEGREE COLLEGE, NAGARI(A),
CHITTOOR DT**

(Accredited by NAAC with A+ Grade, CGPA: 3.28)

Department of Botany

B.Sc., Honours in BOTANY: MAJOR

w.e.f AY 2023-24 onwards

III Semester

Course 6: Plant Pathology and Plant Diseases :: Periods: 60



Unit-1: Plant pathogens, survival and dispersal 8 Hrs.

1. Plant pathology: definition, importance of plant diseases, important famines in world; scope and objectives of plant pathology.
2. Important plant pathogenic organisms with examples of diseases caused by them.
3. Classification of plant diseases based on important criteria.
4. A brief account on survival of plant pathogens.
5. Dispersal of plant pathogens – active and passive processes.

Unit-2: Infection and pathogenesis in plants 8 Hrs.

1. Infection process – pre-penetration, penetration and post-penetration.
2. Role of enzymes in plant pathogenesis.
3. Role of toxins in plant pathogenesis.
4. Role of growth regulators in plant pathogenesis.
5. Defense mechanisms in plants against pathogens.

Unit-3: Plant disease management 8 Hrs.

1. Plant disease epidemiology; plant disease forecasting; remote sensing in plant pathology.
2. General principles of plant diseases management.
3. Regulatory methods, cultural methods; biological control and PGPR.
4. Physical methods, chemical methods; host plant resistance.
5. Integrated plant disease management (IDM) – Concept, advantages and importance.

Unit-4: Diseases of field crops 12 Hrs.

Symptoms, etiology, disease cycle and management of major diseases of following crops:

- a) Rice: Blast of rice, bacterial blight and Tungro
- b) Bajra: Downy mildew and Ergot
- c) Pigeon-pea: Phytophthora blight, wilt and sterility mosaic
- d) Groundnut: Tikka leaf spot, rust and root rot

Unit-4: Diseases of horticultural crops 9 Hrs.

Symptoms, etiology, disease cycle and management of major diseases of following crops:

- a) Brinjal: Phomopsis blight and Little leaf
- b) Okra: Powdery mildew and Yellow vein mosaic
- c) Pomegranate: Alternaria fruit spot and Anthracnose
- d) Coconut: Bud rot and Basal stem rot



**GOVERNMENT DEGREE COLLEGE, NAGARI(A),
CHITTOOR DT**

(Accredited by NAAC with A+ Grade, CGPA: 3.28)

Department of Botany

B.Sc., Honours in BOTANY: MAJOR

w.e.f AY 2023-24 onwards

III Semester

Course 7: Plant Breeding

Periods: 60



Unit-1: Basic concepts of plant breeding 8 Hrs.

1. Definition, aim, objectives and scope of plant breeding; concepts in plant breeding: genetic variation, heritability, and selection.
2. Advantages and disadvantages of asexual and sexual reproduction; apomixis: definition, types and significance.
3. A brief account of self and cross-pollination, their genetic consequences and significance; classification of crop plants based on mode of pollination and mode of reproduction.

Unit-2: Contrivances for cross pollination 7 Hrs.

1. Self-incompatibility in plants – Definition, heteromorphic and homomorphic systems; exploitation of self-incompatibility in hybrid production.
2. Male sterility- Genetic, cytoplasmic and cytoplasmic-genetic, utilization in plant breeding.
3. Domestication of plants, centres of origin of crop plants.

Unit-3: Breeding methods in plants 9 Hrs.

1. Plant introduction – types, objectives, plant introduction agencies in India, procedure, merits and demerits; germplasm collections, genetic erosion, gene sanctuaries.
2. Selection – natural and artificial selection – basic principles of selection.
3. Self-pollinated crops: pure line selection method – procedure, advantages and disadvantages, achievements.
4. Vegetatively propagated crops: Clonal selection - procedure, advantages and disadvantages, achievements.

Unit-4: Breeding methods in cross-pollinated plants 12 Hrs.

1. Hybridization – objectives, types, procedure, advantages and disadvantages, achievements.
2. Cross-pollinated crops: back cross method - procedure, advantages and disadvantages, Achievements
3. Heterosis: definition, genetic bases of heterosis – dominance, over dominance and epistasis hypotheses; physiological bases of heterosis – commercial utilization.
4. Synthetics and composites – production procedures – merits, demerits and achievements.

Unit-5: Modern methods in plant breeding 9 Hrs.

1. Mutation breeding: spontaneous and induced mutations – characteristic features of mutations – procedure of mutation breeding – applications – advantages, limitations and achievements.
2. Polyploidy breeding: auto-polyploids and allopolyploids – applications in crop improvement and limitations.
3. DNA markers and their applications in plant breeding: RFLP, SSR, and SNP
4. Marker Assisted Selection (MAS) and its applications in plant breeding



**GOVERNMENT DEGREE COLLEGE, NAGARI(A),
CHITTOOR DT**

(Accredited by NAAC with A+ Grade, CGPA: 3.28)

Department of Botany

B.Sc., Honours in BOTANY: MAJOR

w.e.f AY 2023-24 onwards

III Semester

Course 8: Plant Biotechnology

Periods: 60



UNIT-1: Basic techniques in plant tissue culture 10 Hrs.

1. Plant tissue culture: Definition, scope and significance; infrastructure and equipment required to establish a tissue culture laboratory.
2. Sterilization techniques; formulation of media for plant tissue culture.
3. Concept of totipotency, initiation and maintenance of callus cultures; induction of morphogenesis in vitro.
4. Somatic embryogenesis and organogenesis; factors affecting somatic embryogenesis and organogenesis synthetic seeds and their applications.

UNIT-2: Organ and haploid culture techniques 8 Hrs.

1. Importance and applications of meristem culture, zygotic embryo culture, endosperm culture.
2. Micropropagation and its uses, commercial exploitation of micropropagation.
3. Production of haploids using anther, pollen and unfertilized ovule cultures - characterization and applications.

UNIT-3: Cell and protoplast cultures 12 Hrs.

1. Cell suspensions – continuous and batch cultures; mass cultivation of plant cells using bioreactors.
2. Production of secondary metabolites from cell cultures, strategies used for enhanced production of secondary metabolites. Biotransformation using plant cell cultures.
3. Isolation, purification and culture of protoplasts; methods used for protoplast fusion.
4. Somatic hybridization/cybridization –selection systems for somatic hybrids/cybrids, their characterization and applications.

UNIT-4: Transgenic plants 8 Hrs.

1. Transgenic plants – definition, biosafety and ethical issues associated with transgenic plants.
2. Herbicide resistance (glyphosphate), insect resistance (alpha amylase inhibitor).
3. Virus resistance (coat protein mediated, nucleocapsid gene), disease resistance (antifungal proteins, PR proteins).
4. Quality improvement (Golden rice), Shelf-life enhancement (Flavr savr tomato).

UNIT-5: Advances in plant biotechnology 7 Hrs.

1. Plant synthetic biology and its applications; plant-based vaccines and therapeutics.
2. Biofortification and genetically modified foods.
3. Biodegradable plastics, polyhydroxybutyrate.
4. Applications of plant biotechnology in bioenergy production and environmental remediation.



**GOVERNMENT DEGREE COLLEGE, NAGARI(A),
CHITTOOR DT**

(Accredited by NAAC with A+ Grade, CGPA: 3.28)

Department of Botany

B.Sc., Honours in BOTANY: MAJOR

w.e.f AY 2023-24 onwards

IV Semester

Course 9: Anatomy and Embryology of Angiosperms :: Periods: 60



Unit – 1: Tissues in plants 8 Hrs.

1. Meristematic tissues: Definition, classification, structure and functions.
2. Apical meristems: Generalised structure of shoot apex, theories on organization of Shoot Apical Meristem (SAM) - Apical cell theory, Tunica-Corpus theory and Histogen theory.
3. Permanent tissues (simple and complex).
4. A brief account of plant secretory tissues/cells.

Unit-2: Anomalous growth in plants 10Hrs.

1. Tissue systems–Epidermal, ground and vascular.
2. Anomalous secondary growth in root of *Beta vulgaris*
3. Anomalous secondary growth in stems of *Boerhaavia* and *Dracaena*
4. Study of timbers of economic importance - Teak, Red-sanders and Rosewood.
5. Applications of anatomy in plant systematics, forensics and pharmacognosy.

Unit-3: Anther and pollen 10Hrs.

1. Anther: Structure and functions of anther wall, micro-sporogenesis, callose deposition and its significance.
2. Pollen wall structure, MGU (male germ unit) structure, NPC system; a brief account of Palynology and its scope; development of male gametophyte.
3. Pollen wall proteins; Pollen viability, storage and germination; Abnormal features: pseudomonads, polyads, massulae, pollinia.

Unit-4: Ovules, fertilization and endosperm 10Hrs.

1. Structure and types of ovules, megasporogenesis; monosporic (*Polygonum*), bisporic (*Allium*) and tetrasporic (*Peperomia*) types of embryo sacs.
2. Outlines of pollination; self-incompatibility- basic concepts; methods to overcome self incompatibility (mixed pollination, bud pollination, stub pollination).
3. Double fertilization in angiosperms – process and consequences.
4. Perisperm; endosperm – types (free nuclear, cellular, helobial and ruminant) and biological importance.

Unit-5: Embryogeny and seeds 7Hrs.

1. Embryogeny in dicot (*Capsella bursa-pastoris*)
2. Embryogeny in monocot (*Sagittariasagittifolia*).
3. Seed structure in monocot and dicot.
4. Importance of seed and seed dispersal mechanisms.
5. Polyembryony and apomixes: Introduction, classification, causes and applications.



**GOVERNMENT DEGREE COLLEGE, NAGARI(A),
CHITTOOR DT**

(Accredited by NAAC with A+ Grade, CGPA: 3.28)

Department of Botany

B.Sc., Honours in BOTANY: MAJOR

w.e.f AY 2023-24 onwards

IV Semester

Course 10: Plant Ecology, Biodiversity and Phylogeography :: Periods: 60



Unit-1: Basic concepts in ecology 10 Hrs.

1. Ecology: definition, branches and significance; relation with other sciences.
2. Structure and functions of ecosystems- abiotic and biotic components; flow of energy.
3. Cycling of materials: water, carbon, nitrogen and phosphorus; trophic pyramids, food chains and food webs.
4. Plants and environment: Climatic (light and temperature) and edaphic.
5. Interactions among plants; interactions between plants and animals.

Unit-2: Population and community ecology 10Hrs.

1. Population ecology: definition, characteristics -natality, mortality, growth curves, ecotypes, ecads.
2. Community ecology: characteristics -frequency, density, cover, life forms, competition, biological spectrum.
3. Ecological succession: Hydrosere and Xerosere.
4. Concepts of productivity: GPP, NPP and Community Respiration
5. Secondary production, P/R ratio and Ecosystems.

Unit-3: Climate change-impacts 8Hrs.

1. Soil degradation – causes, consequences and management strategies.
2. Deforestation, forest fires – causes, consequences and management strategies.
3. Global warming, ozone layer depletion, acid rains, ocean acidification – causes and effects.
4. Carbon foot prints and carbon credits; The Montreal and the Kyoto protocol.
5. Plant indicators and their role in environmental monitoring.

Unit-4: Concepts of Biodiversity 10Hrs

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: North Eastern Himalayas and Western Ghats.
4. Principles of conservation: IUCN threat-categories, RED data book
5. Role of NBPGR and NBA in the conservation of Biodiversity.

Unit-5: Phylogeography 7 Hrs.

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



**GOVERNMENT DEGREE COLLEGE, NAGARI(A),
CHITTOOR DT**

(Accredited by NAAC with A+ Grade, CGPA: 3.28)

Department of Botany

B.Sc., Honours in BOTANY: MAJOR

w.e.f AY 2023-24 onwards

IV Semester

Course 11: Plant Resources and Utilization :: Periods: 60



UNIT-1: Food plants 10 Hrs.

1. Centres of diversity of plants, origin of crop plants.
2. Domestication and introduction of crop plants; concepts of sustainable development.
3. Cultivation, production, and uses of cereals (rice and wheat), major (jowar and bajra) and minor millets (finger millet, fox tail millet), pulse crops (red gram and black gram) and sugarcane.

UNIT-2: Other economic plant products 8 Hrs.

1. A general account of oil seed crops and vegetable oils.
2. A general account of fruit and vegetable yielding plants.
3. Plant sources and economic importance of rubber, latex, gums, resins, dyes, alkaloids and tannins.
4. A general account of major fibre crops in India; textile production from plant fibres.

UNIT-3: Commercial plant products 8 Hrs.

1. A general account and economic potential of spices and condiments.
2. Plant sources and economic importance of flavouring products, beverages, fumitories and masticatories and narcotics.
3. Utilization of some important ornamentals, flowering plants and orchids.

UNIT-4: Medicinal and aromatic plant products 10 Hrs.

1. Traditional and modern uses of some medicinal plants of India.
2. Active compounds in medicinal plants and their pharmacological effects.
3. Essential oils and their uses; aromatic plants in perfumery and cosmetics.
4. Phytochemicals and their potential health benefits.

UNIT-5: Timber products and energy crops 9 Hrs.

1. Important timber yielding plants of India; wood as a construction and manufacturing material.
2. Other uses of wood products, such as paper and fuel.
3. Energy crops, biofuels and bioplastics.
4. Bamboos, *Eucalyptus*, *Casuarina* - generation of paper industry raw material.



**GOVERNMENT DEGREE COLLEGE, NAGARI(A),
CHITTOOR DT**

(Accredited by NAAC with A+ Grade, CGPA: 3.28)

Department of Botany

(A.P. State Council of Higher Education

Semester-wise Revised Syllabus under CBCS, 2020-21)

Four-year B.Sc. (Hons)

IV Year B. Sc. (Hons) – Semester – V Semester

Course-6A: Plant Propagation



Unit – 1: Basic concepts of propagation (10h)

1. Propagation: Definition, need and potentialities for plant multiplication; asexual and sexual methods of propagation - advantages and disadvantages.
2. Propagation facilities: Mist chamber, humidifiers, greenhouses, glasshouses, cold frames, hot beds, poly-houses, phytotrons nursery - tools and implements.
3. Identification and propagation by division and separation: Bulbs, pseudobulbs, corms, tubers and rhizomes; runners, stolons, suckers and offsets.

Unit – 2: Apomictics in plant propagation (10h)

1. Apomixis: Definition, facultative and obligate; types – recurrent, non-recurrent, adventitious and vegetative; advantages and disadvantages.
2. Polyembryony: Definition, classification, horticultural significance; chimera and bud sport.
3. Propagation of mango, *Citrus* and *Allium* using apomictic embryos.

Unit – 3: Propagation by cuttings (10h)

1. Cuttings: Definition, different methods of cuttings; root and leaf cuttings.
2. Stem cuttings: Definition of stem tip and section cuttings; plant propagation by herbaceous, soft wood, semi hard wood, hard wood and coniferous stem cuttings.
3. Physiological and bio chemical basis of rooting; factors influencing rooting of cuttings; Use of plant growth regulators in rooting of cuttings.

Unit – 4: Propagation by layering (10h)

1. Layering: Definition, principle and factors influencing layering.
2. Plant propagation by layering: Ground layering – tip layering, simple layering, trench layering, mound (stool) layering and compound (serpentine layering).
3. Air layering technique – application in woody trees.

Unit – 5: Propagation by grafting and budding (10h)

1. Grafting: Definition, principle, types, graft incompatibility, collection of scion wood stick, scion-stock relationship, and their influences, bud wood certification; micrografting.
2. Propagation by veneer, whip, cleft, side and bark grafting techniques.
3. Budding: Definition; techniques of ‘T’, inverted ‘T’, patch and chip budding.



**GOVERNMENT DEGREE COLLEGE, NAGARI(A),
CHITTOOR DT**

(Accredited by NAAC with A+ Grade, CGPA: 3.28)

Department of Botany

(A.P. State Council of Higher Education

Semester-wise Revised Syllabus under CBCS, 2020-21)

Four-year B.Sc. (Hons)

IV Year B. Sc. (Hons) – Semester – V Semester

Course-7A: Seed Technology



Unit - 1: Seed dormancy (10h)

1. Seed and grain: Definitions, importance of seed; structure of Dicot and Monocot seed.
2. Role and goals of seed technology; characteristics of quality seed material.
3. Dormancy: Definition, causes for seed dormancy; methods to break seed dormancy.

Unit – 2: Seed processing and storage (10h)

1. Principles of seed processing: seed pre-cleaning, precuring, drying, seed extraction; cleaning, grading, pre-storage treatments; bagging and labelling, safety precautions during processing.
2. Seed storage; orthodox and recalcitrant seeds, natural longevity of seeds.
3. Factors affecting longevity in storage; storage conditions, methods and containers.

Unit – 3: Seed testing (10h)

1. Definition of seed vigour, viability and longevity; seed sampling and equipment; physical purity analysis.
2. Seed moisture – importance – methods of moisture determination.
3. Seed germination tests using paper, sand or soil – standard germination test; TZ test to determine seed viability; seed health testing.

Unit – 4: Seed borne diseases (10h)

1. A brief account of different seed borne diseases and their transmission.
2. Different seed health testing methods for detecting microorganisms.
3. Management of seed borne diseases; seed treatment methods: spraying and dusting.

Unit – 5: Seed certification (10h)

1. Objectives - Indian seed Act; seed rules and seed order; new seed policy (1988).
2. Seed Inspector: Duties and responsibilities; classes of seeds, phases of certification standards (i.e., Land requirement, isolation distance) etc.
3. Issue of certificates, tags and sealing; pre and post control check: Genetic purity verification, certification, records and reporting