D.K.GOVT.COLLEGE FOR WOMEN (AUTONOMOUS), NELLORE

BOARD OF STUDIES

2018-2019

BOTANY

D K (A) GOVT. DEGREE COLLEGE, NELLORE

B.Sc., BOTANY SEMESTER-WISE SYLLABUS
THEORY, PRACTICALS AND MODEL QUESTION PAPERS
(AS PER CBCS AND SEMESTER SYSTEM)
I YEAR
I B.Sc - SEMESTER- I: BOTANY SYLLABUS

PAPER- I: MICROBIAL DIVERSITY, ALGAE AND FUNGI & PHYTOPATHOLOGY £m & TM

Total hours of teaching 60hrs @ 4 hrs per week

UNIT- I: MICROBIAL WORLD - **(12hrs)**

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

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

1. Viruses- Discovery, general account, structure, replication, transmission and control.
2. Bacteria, General characteristics, cell structure and nutrition, Reproduction-
Economic importance of Bacteria.

UNIT- III: PHYTOPATHOLOGY **(12hrs)**

1. Symptomology& Disease control
2. Plant diseases caused by viruses– Study of Tobacco Mosaic, Bhendi Vein clearing.
3. Plant diseases caused byBacteria,Citrus canker.
4. Plant diseases caused by Fungi – Tikka disease of Groundnut, Red rot of sugarcane.
5.

UNIT IV: ALGAE **(12hrs)**

1. Cyno Bacteria , General account and economic importance
2. General account - thallus organization
Fritsch classification of Algae (up to classes only) and economic importance.
3. Structure, reproduction and life history of *Oedogonium, and Ectocarpus*

UNIT –V FUNGI **(12hrs)**

1. General characteristics and outlines of classification (Ainsworth), Economic Importance of Fungi
2. Structure, reproduction and life history ofAlbugo,*Penicillium* and *Puccinia* ..
3. Lichens-Structure and economic importance

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

D.K.W (A) GOVT DEGREE COLLEGE,NELLORE.

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

Paper –II : Diversity of Archaegoniates, Palaentology &Plant Anatomy E m & Tm

Total hours of teaching 60hrs @ 4 hrs per week

UNIT – I: BRYOPHYTES & PTERIDOPHYTES **(12hrs)**

1. Bryophytes: General characters, Classification (up to classes)
2. Structure, reproduction and Life history of *Marchantia*, and *Funaria.*
3. Pteridophytes: General characters, classification (up to Classes)
4. Structure, reproduction and life history of *Rhynia* and *Lycopodium,*

UNIT - II: EVOLUTIONARY TRENDS AND PALAENTOLOGY **(12 hrs)**

1. Evolution of Sporophyte in Bryophytes
2. Heterospory and seed habit.
3. Evolution of stele in Pteridophytes
4. Palaentology- fossil formation and types of fossils

UNIT – III: GYMNOSPERMS **(12 hrs)**

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

UNIT –I V: PLANT ANATOMY **(10 hrs)**

1. Tissues – Meristematic and permanent tissues (simple, complex, Special)
2. Tissue systems–Epidermal, ground and vascular.

UNIT – V. Secondary growth **(14 hrs)**

1.Anomalous secondary growth in , *Boerhaavia, Bignonia* and *Dracaena.*

2. Wood structure- general study and local timbers of economic importance-Teak, Rosewood, Red sanders and Termenalia sps.

Suggested activity: Collection of *Marsilea* sporocarp, *Pinus* needles, male and female cones, study of *Pinus* pollen grains, collection of locally available economically useful timbers.

D. K. W (A) GOVT DEGREE COLLEGE, NELLORE.

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

Paper-III : Plant Taxonomy and Embryology) EM & TM

Total hours of teaching 60hrs @ 4 hrs per week

UNIT – I: INTRODUCTION TO PLANT TAXONOMY (10hrs)

1.Fundamental components of taxonomy : Identification, Nomenclature(ICBN)Types of classification, Author citation, Valid Publication.
2. Taxonomic resources: Herbarium- functions& importance of Herbaria.
3. Botanical Gardens, Flora, Keys- single access and multi-access.

UNIT – II: CLASSIFICATION (10 hrs)

1. Bentham & Hooker's system of classification- merits and demerits.
2. Current concepts in taxonomy – Chemo taxonomy , Numerical taxonomy.
3. Phylogeny – origin and evolution (APG classification).

UNIT –III: SYSTEMATIC TAXONOMY-1 (14 hrs)

Systematic study and economic importance of the following families:
Annonaceae , Brassicaceae , Curcurbitaceae, Apiaceae and Asteraceae.

UNIT –IV: SYSTEMATIC TAXONOMY-2 (14 hrs)

Systematic study and economic importance of the following families:

Asclepiadaceae, Lamiaceae, Euphorbiaceae , Arecaceae and Poaceae

UNIT – V: EMBRYOLOGY (12hrs)

1. Anther structure, microsporogenesis and development of male gametophyte.
2. Ovule structure and types; Megasporogenesis, development & Structure of Embryo sac.[Monosporic Embr
3. Pollination and Fertilization (out lines) Endosperm , . Structure of Dicot and Monocot embryos, Polyembry

Suggested activity:

1. Collection of locally available plants of medicinal importance
2. observing pollen grains in Honey.
3. Aero palynology-collection of pollen from air using glycerin strips in different seasons.
4. Field trips for collection of local plants.

D.K.W (A) GOVT DEGREE COLLEGE, NELLORE.

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

PAPER –IV: Plant Physiology and Metabolism

Total hours of teaching 60hrs @ 4 hrs per week

EM & TM

UNIT – I Plant – Water relations (10 hrs)

1. Physical properties of water, and its Importance ,
. Diffusion, Imbibition and Osmosis; concept & components of Water Potential.and
2 Mechanism of Ascent of Sap.
3. Transpiration –Definition, types of Transpiration, structure and opening and closing mechanism of Stomata.

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

1. Mineral Nutrition. Mineral Ion uptake (Active and Passive transport).
2. Nitrogen metabolism- biological nitrogen fixation in *Rhizobium*, outlines of protein synthesis (transcription and translation).
3. Enzymes: General characteristics, mechanism of Enzyme action and factors regulating Enzyme action.

UNIT –III: PHOTOSYNTHESIS (14 hrs)

1. Photosynthesis: Photosynthetic pigments, Photosynthetic Light Phase ,Photophosphorylation
2 Dark Phase.Carbon Assimilation Pathways: C_3, C_4, and CAM
3. Translocation of Organic Solutes: Munchs Mass Flow Hypothesis.

. UNIT – IV: RESPIRATION & PLANT METABOLISM (12 hrs)

1. Aerobic Respiration: Glycolysis, , TCA cycle, Electron Transport System.
2. Anaerobic Respiration

UNIT –V: GROWTH AND DEVELOPMENT (12hrs)

1. Physiological effects of phytohormones - Auxins, Gibberellins, Cytokinins, ABA, Ethylene and Brassinosteroids.
2. Physiology of flowering Plants –Photoperiodism, Phytochrome , Vernalization.

Suggested activity: Seminars, Quiz, Debate, Question and Answer sessions, observing animations of protein biosynthesis in you tube

RIVISED SYLLABUS

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MODEL QUESTION PAPER

AFTER

BOARD OF STUDIES MEETING

12-04-2018-19

D K (A) GOVT. DEGREE COLLEGE, NELLORE

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PAPER- I : MICROBIAL DIVERSITY, ALGAE AND FUNGI & PHYTOPATHOLOGY Tm & Em

Total hours of teaching 60hrs @ 4 hrs per week

UNIT- I: MICROBIAL WORLD - **(12hrs)**

1.Discovery of microorganisms, **Brief account of** origin of life, spontaneous, biogenesis, Pasteur experiments, germ theory of disease.

2.Classification of microorganisms – R.H. Whittaker's five kingdom concept, Carl Woese's- Domain syst
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3.Brief account of special groups of bacteria- Archaebacteria, Mycoplasma,Actinomycetes (12hrs)
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4. Cyno Bacteria , General account and economic importance

UNIT- II VIRUSES&: BACTERIA

1. Viruses- Discovery, general account, structure, replication. **Viroids and Prions.**
2.Bacteria, General characteristics, cell structure and nutrition,,Reproduction-
Economic importance of Bacteria.

UNIT- III: PHYTOPATHOLOGY **(12hrs)**

6. Symptomology& Disease control
7. Plant diseases caused by viruses– Study of Tobacco Mosaic, Bhendi Vein clearing.
8. Plant diseases caused byBacteria,Citrus canker.
9. Plant diseases caused by Fungi – Tikka disease of Groundnut, Red rot of sugarcane.

UNIT IV: ALGAE **(12hrs)**

5. Cyno Bacteria , General account and economic imporatance
6. General account - thallus organization
Fritsch classification of Algae (up to classes only) and economic importance.
7. Structure, reproduction and life history of *Oedogonium, and Ectocarpus*

UNIT –V FUNGI **(12hrs)**

4. General characteristics and outlines of classification (Ainsworth), Economic Importance of Fungi
5. Structure, reproduction and life history ofAlbugo and *Puccinia* ..
6. Lichens-Structure and economic importance

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

D.K.W (A) GOVT DEGREE COLLEGE,NELLORE
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3. Evolution of Sporophyte in Bryophytes.

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

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

UNIT – III: GYMNOSPERMS **(12hrs)**

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

UNIT –I V: Tissues and Tissue systems **(12hrs)** 1. Meristems

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

UNIT – V. Secondary growth **(12hrs)**

1. Normal secondary growth
2. Anomalous secondary growth in **Bignonia** and *Dracaena.*
3. Study of local timbers of economic importance-Teak, Rosewood, Red sanders and Arjun (Tella maddi).

Suggested activity: Collection of *Marsilea* sporocarp, *Pinus* needles, male and female conestudy of *Pinus* po grains, collection of locally available economically useful timbers.

D. K. W (A) GOVT DEGREE COLLEGE, NELLORE.

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

Paper-III : Plant Taxonomy and Embryology)

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Systematic study and economic importance of the following families:

Asclepiadaceae, Lamiaceae, Euphorbiaceae , **Orchidaceae** and Poaceae

UNIT – V: EMBRYOLOGY (12hrs)

1. Anther structure, microsporogenesis and development of male gametophyte.
2. Ovule structure and types; Megasporogenesis, development & Structure of Embryo sac.[Monosporic Embryo
3. Pollination and Fertilization (out lines) Endosperm , . Structure of Dicot and Monocot embryos, Polyembryon and **Apomixis.**

Suggested activity:

5. Collection of locally available plants of medicinal importance
6. observing pollen grains in Honey.
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8. Field trips for collection of local plants.

D.K.W (A) GOVT DEGREE COLLEGE, NELLORE.

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2 Mechanism of Ascent of Sap.
3. Transpiration –Definition, types of Transpiration, structure and opening and closing mechanism of Stomata.

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

3. Mineral Nutrition. Mineral Ion uptake (Active and Passive transport).
4. Nitrogen metabolism- biological nitrogen fixation in *Rhizobium*, outlines of protein synthesis (transcription and translation).
3. Enzymes: General characteristics, mechanism of Enzyme action and factors regulating Enzyme action.

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1. Photosynthesis: Photosynthetic pigments, Photosynthetic Light Phase ,Photophosphorylation
2 Dark Phase.Carbon Assimilation Pathways: C_3, C_4, and CAM
3. Translocation of Organic Solutes: Munchs Mass Flow Hypothesis.

. UNIT – IV: RESPIRATION & PLANT METABOLISM (12 hrs)

3. Aerobic Respiration: Glycolysis, , TCA cycle, Electron Transport System.
4. Anaerobic Respiration

UNIT –V: GROWTH AND DEVELOPMENT (12hrs)

1. Physiological effects of phytohormones - Auxins, Gibberellins, Cytokinins, ABA, Ethylene.
2. Physiology of flowering Plants –Photoperiodism, Phytochrome , Vernalization.

Suggested activity: Seminars, Quiz, Debate, Question and Answer sessions, observing animations of protein biosynthesis in you tube

D.K.W (A) GOVT DEGREE COLLEGE,NELLORE.

III B. Sc - SEMESTER- V: BOTANY SYLLABUS

THEORY PAPER – V

Paper-V: Cell Biology, Genetics and Plant Breeding TM & EM

Total hours of teaching 60 hrs @ 3 hrs per week

UNIT – I Cell Biology: **(12hrs)**

1. Cell, the unit of life- Cell theory, Prokaryotic and eukaryotic cells; Eukaryotic cell components.
2. Ultra structure and functions of cell wall, cell membranes and **cell division.**
3. Chromosomes: morphology, organization of DNA in a chromosome (nucleosome model), Euchromatin and heterochromatin.

UNIT – II Genetic Material: **(12hrs)**

1. DNA as the genetic material: Griffith's and Avery's transformation experiment, Hershey – Chase bacteriophage experiment.
2. DNA structure (Watson & Crick model) and replication of DNA (semi-conservative)
3. Types of RNA (mRNA, tRNA, rRNA), their structure and function.

UNIT – III Mendelian Inheritance: **(12 hrs)**

1. Mendel's laws of Inheritance (Mono- and Di- hybrid crosses); backcross and test cross.
2. Chromosome theory of Inheritance.
3. Linkage: concept, complete and incomplete linkage, coupling and repulsion; linkage maps based on two and three factor crosses.
5. Crossing Over: concept & significance.

UNIT – IV Plant Breeding: **(12 hrs)**

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

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

1. Role of mutations in crop improvement.
2. Role of somaclonal variations in crop improvement.
3. Tissue culture technique and its applications.

Suggested activity: Seminar, Debate, Quiz, observation of live cells and nucleus in Onion peels, observation of Meiotic nuclei in Maize pollen. Solving Genetics problems.

D.K.W (A) GOVT DEGREE COLLEGE,NELLORE.

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

PAPER-VI: PLANT ECOLOGY& PHYTOGEOGRAPHY

Tm & Em

Total hours of teaching 60 hrs @ 3 hrs per week

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

1. Ecology: definition, branches and significance of ecology.
2. **Abiotic** Factors: Light, Temperature, Origin, formation, soil profile only.
3. Biotic Factor: Interactions between plants and animals.

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

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

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

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

UNIT – IV Phytogeography **(12 hrs)**

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

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

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

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

D.K.W (A) GOVT DEGREE COLLEGE,NELLORE.

III B. Sc - BOTANY SYLLABUS SEMESTER- VI

PAPER – VII – ELECTIVE

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

TM & EM

Total hours of teaching 60hrs @ 3hrs per week

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

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

Unit II: Gardening **(12 hrs.)**

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

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

1. Sowing/raising of seeds and seedlings, transplanting of seedlings.
2. Air-layering, cutting, selection of cutting, propagule collecting season treatment of cutting rooting medium and planting of cuttings – Hardening of plants.
3. Propagation of ornamental plants by rhizomes, corms tubers, bulbs and bulbils.
4. .Green house - mist chamber, shed root, shade house and glass house for propagation.

Unit IV: Floriculture: **(12 hrs.)**

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

Unit V: Commercial Floriculture **(12 hrs.)**

1. Factors affecting flower production; Production and packaging of cut flowers; Flower arrangements; Methods to prolong vase life of flowers

2. Cultivation of Important cut flowers (Carnation, Aster, Dahlia, Gerbera, Anthuriams, Gladiolous, Marigold, Rose, Lilium)

3. Management of pests, diseases and harvesting.

4. Methods of harvesting.

Books for Reference:

1. Bose T.K. & Mukherjee, D., 1972, Gardening in India, Oxford & IBH Publishing Co., New Delhi.

2. Sandhu, M.K., 1989, Plant Propagation, Wile Eastern Ltd., Bangalore, Madras.

3. Kumar, N., 1997, Introduction to Horticulture, Rajalakshmi Publications, Nagercoil.

institution)

4.Randhawa, G.S. and Mukhopadhyay, A. 1986. Floriculture in India. Allied Publishers.

Suggested Activities: Raising a nursery, managing it, studying and drawing various land scaping designs, practicing layering methods, using shade nets to protect horticultural crops, practicing indoor gardening techniques, visiting florists and recording their methods of prolonging vase life of commercial cut flowers.