BOTANY -II YEAR SYLLABUS(III&IV SEMESTERS)

K.V.R. Govt. COLLEGE FOR WOMEN {AUTONOMOUS}, KURNOOL

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

(Paper – III: Plant Taxonomy and Embryology)

UNIT – I: INTRODUCTION TO PLANT TAXONOMY (12hrs)

1. Fundamental components of taxonomy (identification, nomenclature, and classification)
2. Taxonomic resources: Herbarium – methodology and important herbariain world(RBG, KEW) and India(BSI & Calcatta), Botanical gardens.
3. Botanical Nomenclature – Principles and rules of ICBN(ranks and names: Principle of priority, Binomial system; type method, author citation and valid publication)

UNIT – II: CLASSIFICATION (12hrs)

1. Types of classification – Artificial, Natural and Phylogenetic.
2. Benthom & Hooker's system of classification – Merits and demerits.
3. Engler & Prantle's system of classification – Merits and limitations.

UNIT – III: Taxonomy of Angiosperms -I (12hrs)

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

UNIT-IV: TAXONOMY OF ANGIOSPERMS-II (12hrs)

2. Systematic study and economic importance of the following families: Asteraceae, Asclepiadaceae, Lamiaceae, Euphorbiaceae & Poaceae.

UNIT –IV: EMBRYOLOGY - I (12hrs)

1. Anther structure, Microsporogenesis and development of male gametophyte
2. Ovule structure and types: Megasporogenesis, development of Monosporic, Bisporic & Tetrasporic types (Peperomia, Drusa and Adoxa) of embryo sacs.
3. Fertilization(out line), Endosperm Types.
4. Development of Dicot and Monocot embryos, Polyembryony.

Suggested activity: Collection of locally available plants of medicinal importance, observing pollen grains in honey, Aero palynology-collection of pollen from air using glycerin strips in different seasons.

Books for Reference:

1. Porter, C.L. ( ): Taxonomy of flowering Plants, Eurasia Publishing House, New Delhi.
1. 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.
5. Maheswari,P(1963) :Recent Advances in the Embryology of Angiosperms(Ed.,) International Society of Plant Morphologists- University of Delhi.
6. Swamy. B.G.L. & Krishnamoorthy. K.V.(1980):From flower to fruit Tata McGraw Hill Publishing Co., Ltd., New Delhi.

1. Maheswari, P.(1985):An Introduction to the Embryology of Angiosperms Tata McGraw Hill Publishing Co.,Ltd., New Delhi.
8. Bhojwani, S.S. & Bhatnagar, S.P. (2000) : The Embryology of Angiosperms (4th Edition) Vikas Publishing House(P)Ltd., UBS Publisher's Distributors, New Delhi.

II B.Sc BOTANY - SEMESTER-III
Paper-III: PRACTICAL
Plant Taxonomy and Embryology
Total hours of laboratory Exercises 30hrs @ 2 per week

Suggested Laboratory Exercises:

1. Systematic study of locally available plants belonging to the families prescribed in theory syllabus.
2. Demonstration of herbarium techniques.
3. Structure of pollen grains using whole mounts (*Hibiscus, Acacia*, Grass).
4. Demonstration of Pollen viability test using *in- vitro* germination (*Catharanthus*).
5. Study of ovule types and developmental stages of embryo sac using permanent slides /Photographs.
6. Structure of endosperm (nuclear and cellular); Developmental stages of dicot and monocot Embryos using permanent slides / Photographs
7. Isolation and mounting of embryo (using *Symopsis / Senna* / *Crotalaria*)
8. Field visits .
9. Study of local flora and submission of Field Note Book

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III B.Sc., SEMESTER: V

Paper: IV – PLANT PHYSIOLOGY AND METABOLIS

Total hours of teaching 60hrs @ 4 hrs per week

UNIT – I: Plant – Water relations (12 hrs)

1. Physical properties of water,in relation to plant life.
2. Diffusion-imbibition and osmosis, concept & components of Water potential.
3. Absorption and transport of water and ascent of sap.
4. Transpiration –Definition, types of transpiration, structure and opening and closing Mechanism of stomataand Anti transpirants

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

1.Mineral Nutrition**:** Essential elements (macro and micronutrients) and their role in plant metabolism, deficiency symptoms.
2. Mineral ion uptake (active and passive transport).
3 Enzymes**:** General characteristics, mechanism of enzyme action and factors regulating enzyme action.

UNIT –III: PHOTOSYNTHESIS (12 hrs)

1. Photosynthesis: Photosynthetic pigments, photosynthetic light reactions, photo-phosphorylation, carbon assimilation pathways: C_3, C_4, and CAM and their differences.
2. Photorespiration and its significance.
3. Translocation of organic solutes: mechanism of phloem transport, source-sink relationships.

UNIT – IV: PLANT METABOLISM (12 hrs)

1. Respiration: Glycolysis, anaerobic respiration, TCA cycle, electron transport system. Mechanism of oxidative phosphorylation.
2. Nitrogen metabolism- biological nitrogen fixation in *Rhizobium*, outlines of protein Synthesis (transcription and translation).
3 Lipid Metabolism**:** Types of lipids, Beta-oxidation.

UNIT –V: GROWTH AND DEVELOPMENT(12hrs)

1. Growth and development: definition, phases and kinetics of growth.
2. Physiological effects of phytohormones - Auxins, Gibberellins, Cytokinins, ABA, Ethylene and Brassinosteroids.
3 Physiology of flowering -photoperiodism, role of phytochrome in flowering; Vernalization.
4. Applications of growth regulators in Agriculture and Horticulture.

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

Books for Reference:

1. Steward. F.C (1964): Plants at Work (A summary of Plant Physiology) Addison-Wesley Publishing Co., Inc. Reading, Massachusetts, Palo alto, London.
2. Devlin, R.M. (1969) : Plant Physiology, Holt, Rinehart & Winston & Affiliated

East West Press (P) Ltd., New Delhi .
3. Noggle, R.& Fritz (1989):Introductory Plant Physiology Prentice Hall of India.
4. Lawlor.D.W. (1989): Photosynthesis, metabolism, Control & Physiology ELBS/Longmans-London.
5. Mayer, Anderson & Bonning(1965): Introduction to Plant Physiology D.Van Nostrand . Publishing Co., N.Y.
6. Mukherjee, S. A.K. Ghosh(1998) Plant Physiology ,Tata McGraw Hill Publishers(P) Ltd., New Delhi.
7. Salisbury, F.B & C.W. Ross (1999): Plant Physiology CBS Publishers and Printers, New Delhi.
2. Plummer, D.(1989) Biochemistry–the Chemistry of life ,McGraw Hill Book Co., London, N.Y. New Delhi, Paris, Singapore, Tokyo.
9. Day, P.M.& Harborne, J.B. (Eds.,) (2000): Plant Biochemistry. . Harcourt Asia (P) Ltd., India & Academic Press, Singapore.

II B. Sc BOTANY SEMESTRE- IV, Paper–IV: PRACTICAL SYLLABUS

PAPER-IV: Plant Physiology and Metabolism

Total hours of laboratory Exercises 30 hrs @ 2 per week

Suggested Laboratory Exercises:

1. Osmosis – by potato osmoscope experiment
2. Determination of osmotic potential of plant cell sap by plasmolytic method using leaves of *Rhoeo / Tradescantia*.
3. Structure of stomata (dicot & monocot)
4. Determination of rate of transpiration using cobalt chloride method.
5. Demonstration of transpiration by Ganongs' photometer
6. Demonstration of ascent of sap/Transpiration pull.
6. Effect of Temperature on membrane permeability by colorimetric method.
7. Study of mineral deficiency symptoms using plant material/photographs.
8. Separation of chloroplast pigments using paper chromatography technique.
9. Rate of photosynthesis under varying Co_2 concentrations.
10. Effect of light intensity on oxygen evolution in photosynthesis using Wilmott' bubbler.