B.Sc., BOTANY SEMESTER-WISE SYLLABUS AND MODEL QUESTION PAPERS OF THEORY AND PRACTICALS

(AS PER CBCS AND SEMESTER SYSTEM) w.e.f. 2015-16

(REVISED IN APRIL, 2016)

AP STATE COUNCIL OF HIGHER EDUCATION CBCS - PATTERN FOR BOTANY

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

(Paper-DSC IIA : Plant Taxonomy and Embryology)

Total hours of teaching 60hrs @ 4 hrs per week

UNIT – I: INTRODUCTION TO PLANT TAXONOMY

(12hrs)

- 1. Fundamental components of taxonomy (identification, nomenclature, classification)
- 2. Taxonomic resources: Herbarium- functions& important herbaria, Botanical gardens, Flora, Keys- single access and multi-access.
- 3. Botanical Nomenclature- Principles and rules of ICBN (ranks and names; principle of priority, binomial system; type method, author citation, valid-publication).

UNIT – II: CLASSIFICATION

(12 hrs)

- 1. Types of classification- Artificial, Natural and Phylogenetic.
- 2. Bentham & Hooker's system of classification- merits and demerits.
- 3. Engler & Prantle's system of classification- merits and demerits
- 4. Phylogeny origin and evolution of Angiosperms

UNIT -III: SYSTEMATIC TAXONOMY-I

(12hrs)

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

UNIT -IV: SYSTEMATIC TAXONOMY-II

(12hrs)

1. Systematic study and economic importance of plants belonging to the following families: Asteraceae, Asclepiadaceae, Lamiaceae, Ephorbiaceae, Arecaceae, and Poaceae.

UNIT - V: EMBRYOLOGY

(12hrs)

- 1. Anther structure, microsporogenesis and development of male gametophyte.
- **2.** Ovule structure and types; Megasporogenesis, development of Monosporic, Bisporic and Tetrasporic types (*Peperomia*, *Drusa*, *Adoxa*) of embryo sacs.
- **3.** Pollination and Fertilization (out lines) Endosperm development and 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:

- 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.
- 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 - SEMESTER-III BOTANY PRACTICAL – DSC IIA

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 (Catharanthus, 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.

II B.Sc., BOTANY- SEMESTER -III PRACTICAL MODEL PAPER III Plant Taxonomy and Embryology

1. Describe the given Plant specimens (A & B) in technical terms. Draw neat labeled diagrams of twig with inflorescence, L.S. of Flower, T.s. of Ovary and floral Diagram. Give floral formula. Identify the family.

2x 10 = 20 Marks

(Description- vegetative - 2 marks, floral - 4 marks; diagrams-3 marks, Identification-1 marks)

- 2. Derive the plant specimens C & D to their respective families 2x4 = 08 marks
- 3. Identification of spotters -D, E and F (Embryology) 3x4 = 12 marks
- 4. Record & Herbarium (submission compulsory) 10 marks

Total: 50 Marks

II B. Sc - SEMESTER- IV THEORY: BOTANY SYLLABUS PAPER – DSC IIB: Plant Physiology and Metabolism Total hours of teaching 60hrs @ 4 hrs per week

UNIT – I: Plant – Water relations

(12 hrs)

- 1. Physical properties of water, Importance of water 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 stomata.

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. Nitrogen metabolism- biological nitrogen fixation in *Rhizobium*, outlines of protein synthesis (transcription and translation).
- 4. Enzymes: General characteristics, mechanism of enzyme action and factors regulating enzyme action.

UNIT -III: PHOTOSYNTHESIS

(12 hrs)

- 1. Photosynthesis: Photosynthetic pigments, photosynthetic light reactions, photophorylation, carbon assimilation pathways: C₃, C₄, and CAM (brief account)
- 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. 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. Physiology of Scenescence and Ageing.

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.
- 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 SEMESTRE- IV. – BOTANY PRACTICAL SYLLABUS PAPER- DSC IIB - 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 Co₂ concentrations.
- 10. Effect of light intensity on oxygen evolution in photosynthesis using Wilmott' bubbler.

II B. Sc – SEMESTRE- IV. BOTANY PRACTICAL MODEL PAPER (PAPER- IV - Plant Physiology and Metabolism)

1.	Perform the Experiments A & B. Give the aim, principle, procedu Tabulate the results if any. Draw labeled diagram.	re and observation. 2 x 15 = 30 marks	
2.	Give the protocol of the experiments C & D	$2 \times 5 = 10 \text{ marks}$	
3.	Record & Viva	10 marks	
		50 marks	

B.Sc. Table-9: B.Sc., SEMESTER - III

SEMESTER - III

Sno	Course	Total Marks	Mid Sem Exam	Sem End Exam	Teaching Hours	Credits
1	First Language (Tel/Hin/Urdu/Sans)	100	25	75	4	3
2	Second Language English	100	25	75	4	3
3	Foundation Course - 5 ICT – II	50	0	50	2	2
4	Foundation course – 6 CSS – II	50	0	50	2	2
5	DSC 1 Paper-3 (Core)	100	25	75	4	3
6	DSC 1 Practical	50	0	50	2	2
7	DSC 2 Paper-3 (Core)	100	25	75	4	3
8	DSC 2 Practical	50	0	50	2	2
9	DSC 3 Paper-3 (Core)	100	25	75	4	3
10	DSC 3 Practical	50	0	50	2	2
	Total	750	-	-	30	25

<u>Table-10: B.Sc., SEMESTER – IV</u>

SEMESTER - IV

Sno	Course	Total Marks	Mid Sem Exam*	Sem End Exam	Teaching Hours**	Credits
1	Foundation Course – 7 CSS – 2	50	0	50	2	2
2	Foundation Course – 8 Analytical Skills	50	0	50	2	2
3	Foundation Course - 9 Entrepreneurship	50	0	50	2	2
4	Foundation course – 10 Leadership Education	50	0	50	2	2
5	DSC 1 Paper-4 (Core)	100	25	75	4	3
6	DSC 1 Lab Practical	50	0	50	2	2
7	DSC 2 Paper-4 (Core)	100	25	75	4	3
8	DSC 2 Lab Practical	50	0	50	2	2
9	DSC 3 Paper-4 (Core)	100	25	75	4	3
10	DSC 3 Lab Practical	50	0	50	2	2
	Total	750	-	-	30	23

^{*}Analytical Skills: To be taught by Maths/Stat Teachers (may be partly by English Teachers)

Entrepreneurship: To be taught by Commerce Teachers Leadership Education: To be taught by Telugu Teachers