ADIKAVI SRI MAHARSHI VALMIKI UNIVERSITY, RAICHUR

SYLLABUS

B.Sc Three Year Degree Program for the Subject

Botany

With Effect from 2024-25

DISCIPLINE SPECIFIC CORE COURSE (DSC) FOR SEM I-IV, SKILL ENHANCEMENT COURSE (SEC) FOR SEM IV/V/VI and ELECTIVE COURSES FOR SEM V AND VI

AS PER N E P (Revised): 2024

BSc

III Semester

CourseTitle: Plant Anatomy and Plant Embryology

Course Teaching objectives: This course covers two important topics Anatomy and Embryology. In Anatomy students learn anatomical characters, cell structure, tissue system, secondary growth and different theories on tissues' students also learn vascular bundles and wood anatomy. In Embryology the students help to understand the microsporogenesis and megasporogenesis, pollen maturation, pollination and fertilization, mechanism of fruit and seed dispersal and significance of Apomixis and Polyembryony.

Course Outcome: 1. It is important to the students to know the cell structure and simple and complex tissues. 2. The course will be benefit to the students to understand the anatomy of root, stem,leaf and wood, Development of Embryo sac, Embryo, endosperm and the significance of Double fertilization.

Unit	Content	Hours
I	**Plant cell, Tissue and Organ** Introduction, scope and importance of plant anatomy, contribution of Indian Anatomists-P. Jayaraman and Cell structure, Tissue systems- meristematic tissues (Primary and Secondary meristems) and its classification (Apical, Intercalary and Lateral), Permanent tissues and Secretary tissues. Tunica Corpus Theory and Histogen theory, Quiescent center, Root cap.	14
II	**Root, Stem and Leaf** Structureof Monocot Root, Stem and Leaf. (Maize/Grass) Structure of Dicot Root,Stem and Leaf. (Tridax/Sunflower) Normal Secondary growth in Tridax stem and anomalous secondary growth in Boerhaavia and Achyranthes (Dicot stem) and anomalous secondary growth in Dracaena (Monocot stem) Vascular Bundles: types of vascular bundles and vascular cambium Protective systems: Cuticle, Epidermis and Stomata. Wood Anatomy: General account, study of local timber-teak, Rose wood and Neem. Importance of wood.	14
III	**Structure and Organization of flower** Contribution of Indian Embryologists- P. Maheshwari, B.G.L. Swamy and M.S. Swaminathan. Microsporogenesis: structure of Anther and pollen Megasporogenesis:structure of typical ovule and types of ovules, ultrastructure of mature embryo sac and types of development of embryo sac. Pollination and Fertilization: significance of Double fertilization and post fertilization changes.	14
IV	**Embryo, Endosperm and Seed** Dicot and Monocot embryo; Endosperm- structure, types and functions; Embryo endosperm relationship. Structure of Dicot and Monocot seeds, Appendages and dispersal mechanisms of fruits and seeds Apomixis and Polyembryony; Definition, types and significance.	14

TextBooks

1. Pandey B.P. (1997). Plant Anatomy. S. Chand Publication, New Delhi.
2. Pandey S.N. (1997). Plant anatomy and Embryology.Vikas publication House New Delhi.
3. Mauseth J.D. (1988).Plant anatomy. Benjamin/cummings publisher, USA.
4. Fahn,A. (1992) plant anatomy.Pergamon Press, USA.
5. Esau, K. (1990) Plant anatomy.Wiley Eastern Pvt.Ltd. New Delhi.
6. Bhojwani and Bhatnagar. Introduction to Embryology of Angiosperm. Oxford & IBH Delhi.
7. Raghavan V. (2000)Developmental Biology of flowering plants. Springer, Netherland.
8. Saxena M.R. Palynology- A Treatise, oxford and IBH, New Delhi.

References

1. Bhojwani, S.S. and Bhatnagar, S.P. (2011) Embryology of Angiosperms. Vikas Publication House Pvt. Ltd. New Delhi, 5th Edition.
2. P.C. Vashishta (1984). Plant Anatomy. Pradeep publication Jalandhar, 11th Edition.
3. B.P. Pandey (2012) Plant Anatomy. S. Chand Publication New Delhi.
4. V.Singh, Pandey and Jain. Embryology of Angiosperms. Rastogi Publication Meerut.
5. Maheshwari. P. (1950). In introduction to embryology of angiosperms.McGraw-Hill,New York.
6. Nair, P.K.K.. Pollen morphology of Angiosperms. Scholar Publishing House, Lucknow.
7. Evert, R.F.,(2006)Plant anatomy: meristem, cell and tissue of the plant body, their structure, function and development. John Wiley and sons, Inc.

List of Practical's /Experiments to be conducted

Sl.No	Experiments
1	**Study of Tissues:** Meristems, Parenchyma, Collenchyma, Sclerenchyma, Xylem and Phloem (Permanent slides/ Photographs)
2	**Study of Root, Stem and Leaf:**Monocot (*Maize*/ Grass), Dicot(Tridax/ Sunflower)
3	**Study of secondary growth:** Normal secondary in Dicot stem (Tridax/Sunflower) and anomalous secondary growth in Dicot stem (Boerhaavia/ Aristolochia)
4	**Study of Maceration Technique:**Xylem elements (Tridax stem)
5	**Study of Trichomes and stomata:** Any three types using local plants
6	**Study of Pollen grains and Pollinia:** Mounting of Pollen grains (Hibiscus) and Pollinia (Calotropis)
7	**Study of pollen germination and calculate percentage of Pollen germination** (by Hanging drop method)
8	**Mounting of Embryo and Endosperm:** Embryo (Tridax) and Endosperm (Cucumis/ Croton)
9	**Study of Permanent slides/ Photographs:**Mature anther, Tapetum (amoeboid and Secretary); Embryo sac (4 Nucleoted and 8 Nucleoted); Ovules (Anatropous, Orthotropus, Circinotropusand Campylotropus), Placentation (Axile, Marginal and Parietal)
10	**Study of placentation of different flowers:** Hibiscus, Datura, Vinca, Cucumis
11	**Study of histochemical localization of proteins/carbohydrates**
12	**Fieldvisit/Project work**