CLUSTER UNIVERSITY SRINAGAR

SYLLABUS (FYUP UNDER NEP 2020)

Offered By Department Of BOTANY

Semester 2nd (Major Course)

Course Title: Anatomy of Angiosperms

Course Code: UGBOT22J201 **Max. Marks 100**
Credits: 4 (Theory: 3, Practical: 1) **Theory External: 60; Min Marks: 24**
Contact Hrs: 75 (Theory: 45, Practical: 30) **Theory Internal (Continuous Assessment): 15 Marks, Min Marks: 06**
Practical Experimental Basis= 15, Min. Marks: 06
Practical Experimental (Continuous assessment) = 10, Min. Marks: 04

Objective: Course is designed to make students aware about basic concepts, familiarize them with nature and differentiation of plant systems responsible for formations and growth in plants.

Learning Outcomes:
After the completion of the course students will have a clear insight of internal architecture, Cyto- histological zonation, formation of plant organs their cellular composition and can correlate important functions performed by different plant parts.

Unit-I: Plant Tissues and Tissue systems **(15 hours)**

Brief idea about Plant.
Tissue-Classification and Types of Meristems.
Permanent Tissue-Simple permanent tissue. Modifications in Parenchyma; types and distribution of Collenchyma and Sclerenchyma in plant organs.
Complex Permanent Tissue -Xylem and Phloem
Xylem- Structure and functions of treachery elements.
Phloem- Structure and functions of sieve tube elements and companion cells
Secretory Tissues -Glandular and Laticiferous Tissue, Functions of different types of tissues. Idea of Pits and Plasmodesmata
Tissue-systems: Epidermal tissue system types (Types of stomata, cuticle, epicuticular wax), Ground tissue system and Vascular tissue system

Unit-II: Organization of Apical Meristems and Organ Anatomy **(15 hours)**

Organization of Shoot Apical Meristem,
(Histogen theory and Tunica Corpus theory)
Organization of Root Apical Meristem
(Histogen theory and Korper-Kappe theory), Quiescent centre
Structure of Typical Monocot and Dicot -Root, Stem and Leaf,
Kranz Anatomy,
Origin of Lateral Roots

Unit-III: Secondary Growth and Adaptations **(15 hours)**

Secondary Growth: Cambium-types, structure and function
Secondary Growth in a typical Dicot Root and Stem (sunflower)
General account of wood structure: Heart wood and Sapwood, Ring Porous wood and Diffuse Porous wood. Soft wood and Hard wood, Early wood and Late wood.
Periderm and Lenticels- structure and functions.
Dendrochronology –Definition and importance.
General account of anatomical adaptations in Xerophytes and Hydrophytes

PRACTICAL (Lab Work) **(30 hours)**

1. Study tissue types of Parenchyma, collenchyma and sclerenchyma through permanent slides and photographs.
2. Macerated xylary and Phloem elements (Permanent slides, photographs)
3. Study of Root and Shoot Apical Meristem through permanent slides/bio-visual aids
4. Root Anatomy: Monocot (*Zea mays)* and Dicot (*Helianthus)-Permanent slides*
5. Stem Anatomy: Monocot, Dicot, Primary and Secondary growth
6. Leaf Anatomy: Monocot, Dicot and Kranz anatomy
7. Adaptive anatomy: Xerophytes *Nerium* leaf); Hydrophytes (*Hydrilla* stem)

Literature recommended:

1. Bendre, A. and Kumar, A. (2012). **A Text Book of Practical Botany** Volume- II. Rastogi Publications Meerut.
2. Cutler D.F., Bother, C.E.G. and Stevenson, D.W. (2011). **Plant Anatomy**: An Applied Approach. Blackwell Publishing, USA.
3. Crang, Richard. (2018). **Plant Anatomy**. Springer, Switzerland.
4. Dickison, W. C. (2014). **Integrative Plant Anatomy**. Academic Press, Amsterdam.
5. Evert, et al. (2017). **Esau's Plant Anatomy**. 3rd ed. Wiley, USA.
6. Fahn, A. (1982). **Plant Anatomy.** 3rd Edn. Pergamon Press, Oxford.
7. Fosket, D.E. (1994). **Plant Growth and Development:** A Molecular Approach. Academic Press, San Diego.
8. Howell, S.H. (1998). Molecular Genetics of Plant Development. Cambridge University Press, Cambridge.
9. Mauseth, J.D. (1988). **Plant Anatomy**. The Benjamin/Cummings Publisher, USA.
10. Murphy, T.H. and Thompson, W.F. (1988). **Molecular Plant Development**. Prentice Hall, New Jersey.
11. Neelam Dhand. (2019). Plant Anatomy and Families of Angiosperms. Trueman's Publications. Trueman Book Company, Jalandhar
12. Pandey, B.P. (2001). **Plant Anatomy**. S. Chand and Company, New Delhi.
13. Steeves, T.A. and Sussex, I.M. (1989). **Patterns in Plant Development**. 2nd Edn. Cambridge University Press, Cambridge.
14. Steeves, T. A. and Sawhney, V. K. (2017). **Essentials of Developmental Plant Anatomy**. Oxford University Press, USA.