

Title of the Course: BOTA-112 Plant Systematics, Anatomy and Development/Embryology
Credit Hours 4 (3+1)

Specific Objectives of course:

To understand 1. various systems of classification, identification and nomenclature of Angiosperms. 2. Structures and functions of tissues and organs at embryonic level

Course Outline:

a) Plant systematics

1. Introduction to Plant Systematics: aims, objectives and importance.
2. Classification: brief history of various systems of classification with emphasis on Takhtajan.
3. Brief introduction to nomenclature, importance of Latin names and binomial system with an introduction to International Code of Botanical Nomenclature (ICBN) Vienna code
4. Morphology: a detailed account of various morphological characters root, stem, leaf, inflorescence, flower, placentation and fruit types.
5. Diagnostic characters, economic importance and distribution pattern of the following families:
 - i. Brassicaceae (Cruciferae)
 - ii. Rosaceae
 - iii. Cucurbitaceae
 - iv. Asteraceae (Compositae)
 - v. Poaceae

b) Anatomy

1. Cell wall: structure and chemical composition
2. Concept, structure and function of various tissues like:
 - i. Parenchyma
 - ii. Collenchyma
 - iii. Sclerenchyma
 - iv. Phloem Epidermis (including stomata and trichomes)
 - v. Xylem
3. Meristem: types, stem and root apices
4. Vascular cambium
5. Primary and secondary growth of dicot stem, periderm
6. Characteristics of wood: diffuse porous and ring porous, sap and heart wood, soft and hard wood, annual rings.

c) Development/Embryology

Early development of plant body:
General development.

1. *Capsella bursa-pastoris*

2. Structure of Microgametophyte.
3. Structure of Megagametophyte
4. Parthenocarpy
5. Polyembryony

Lab Outline:

Plant Systematics

1. Identification of families given in syllabus with the help of keys.
2. Technical description of common flowering plants belonging to families mentioned in theory.
3. Field trips shall be undertaken to study and collect local plants (25 plants atleast).
4. Students shall submit 40 fully identified herbarium specimens.

Anatomy and Embryology

1. Study of stomata and epidermis.
2. Tissues of primary body of plant.
3. T. S of angiosperm stem and leaf.
4. Anatomy of germinating seeds
5. Study of pollens

Recommended Books:

1. Mauseth, J. D. 1998. An Introduction to Plant Biology: Multimedia Enhanced. Jones and Bartlett Pub. UK
2. Moore, R. C., W. D. Clarke and Vodopich, D. S. 1998. Botany. McGraw Hill Company, U.S.A.
3. Raven, P. H., Evert, R. E. and Eichhorn, S. E. 1999. Biology of Plants. W. H. Freeman and Company Worth Publishers.
5. Stuessy, T. F. 1990. Plant Taxonomy. Columbia University Press, USA.
6. Lawrence, G. H. M. 1951 Taxonomy of Vascular Plants. MacMillan & Co. New York.
7. Panday, B. P. 2004. A textbook of Botany (Angiosperms). S. Chand and Co New Delhi.
8. Raymond E, S. E. Eichhorn. 2005. Esau's Plant Anatomy. Meristems cells and tissues of the plant body, 3rd Ed. John Wiley & Sons. Inc.
9. Fahn, A. 1990. Plant Anatomy. Pergamon Press, Oxford.
10. Esau, K. 1960. Anatomy of Seed Plants. John Wiley, New York.
11. Maheshwari, P. 1971. Embryology of Angiosperms. McGraw-Hill. New York.
12. Eames A. J. and L. H Mac Daniels. 2002. An Introduction to Plant Anatomy. Tata-Mac Graw-Hill Publishing Company, Limited, New Delhi.
13. Pullaiah, T. 2007. Taxonomy of Angiosperms. 3rd Edition, Regency Publications, New Delhi
14. Naik, V. N. 2005 Taxonomy of Angiosperms. 20th Reprint. TataMacGraw-Hill Publishing Company, Limited New Delhi.
15. Rajput, M. T., S. S. Hassney and K. M. Khan. 1996. Plant Taxonomy. New Trends Computer Service, Hyderabad, Sindh, Pakistan.