ST. JOSEPH’S COLLEGE FOR WOMEN (AUTONOMOUS) VISAKHAPATNAM

III SEMESTER **BOTANY** TIME:4HRS/WEEK **ANATOMY AND EMBRYOLOGY OF ANGIOSPERMS, PLANT ECOLOGY AND BIODIVERSITY**

B 3102 (3) **SYLLABUS** MARKS: 100

w.e.f.20-21 admitted batch-“20AH”

**OBJECTIVES:** To enable the students to -

* Understand the plant anatomy like tissue, tissue systems in the plant body
* Get an insight into various aspects of embryology of Plants
* Learn basic concepts of Ecology and environment.
* Gain knowledge in various aspects of Population, Community and Production Ecology.
* Know the importance and value of Bio diversity

**COURSE OUTCOMES:** On successful completion of this course, the students will be able to:

CO 1: Understand on the organization of tissues and tissue systems in plants.

CO 2: Illustrate and interpret various aspects of embryology.

CO 3: Discuss the basic concepts of plant ecology, andevaluate the effects of environmental and biotic factors on plant communities.

CO 4: Appraise various qualitative and quantitative parameters to study the population and community ecology.

CO 5: Correlate the importance of biodiversity and consequences due to its loss.

CO 6: Enlistthe endemic/endangered flora and fauna from two biodiversity hot spots in India and assess strategies fortheirconservation.

# UNIT–I:ANATOMY OF ANGIOSPERMS :

1. Organization of apical meristems:Tunica-carpus theory and Histogen theory.
2. Tissue systems–Epidermal, ground and vascular.
3. Anomalous secondary growth in Boerhaavia and Dracaena.
4. Study of timbers of economic importance-Teak, Red sanders and Rosewood.

# UNIT–II: EMBRYOLOGY OF ANGIOSPERMS:

1. Structure of anther, anther wall, types of tapetum. Microsporogenesis and development of male gametophyte.
2. Structure of ovule, mega sporogenesis; monosporic (Polygonum), bisporic (Allium)and tetrasporic (Peperomia) types of embryo sacs.
3. Outlines of pollination, pollen–pistilinteraction and fertilization.
4. Endosperm - Types and biological importance - Free nuclear, cellular, helobial and ruminate.
5. Development of Dicot (Capsellabursa-pastoris)embryo.

# UNIT–III: BASICS OF ECOLOGY:

1. Ecology: definition, branches and significance of ecology.
2. Ecosystem: Concept and components, energy flow, food chain, food web, ecological pyramids.
3. Plants and environment: Climatic (light and temperature), edaphic and bioticfactors.
4. Ecological succession : Hydrosere and Xerosere.

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# UNIT–IV: POPULATION, COMMUNITY AND PRODUCTION ECOLOGY :

1. Population ecology: Natality, mortality, growth curves, ecotypes, ecads
2. Communityecology: Frequency, density, cover, lifeforms, biological spectrum
3. Concepts of productivity: GPP,NPP and Community Respiration
4. Secondary production, P/R ratio and Ecosystems.

# UNIT–V: BASICS OF BIODIVERSITY :

1. Biodiversity: Basic concepts, Conventionon Biodiversity-Earth Summit.
2. Value of Biodiversity; types and levels of biodiversity and Threats to biodiversity
3. Biodiversity Hot spots in India.Biodiversity in North Eastern Himalayas and Western Ghats.
4. Principles of conservation: IUCN threat-categories, RED databook
5. Role of NBPGR and NBA in the conservation of Biodiversity.

# TEXTBOOKS:

* Pandey,B.P.(2013)College Botany,VolumeII,S.Chand Publishing, NewDelhi
* Pandey,B.P.(2013)College Botany, Volume III, S.Chand Publishing, NewDelhi Bhattacharya, K.,G.Hait & Ghosh, A.K.,(2011)A Text Book of Botany, Volume-II, New Central Book Agency Pvt. Ltd., Kolkata

# BOOKS FOR REFERENCE:

* Esau,K. (1971) Anatomy of Seed Plants. John Wiley and Son, USA.
* Fahn,A. (1990) Plant Anatomy, Pergamon Press, Oxford.
* Cutler, D.F., T. Botha & D. Wm. Stevenson (2008) Plant Anatomy: An Applied Approach,Wiley, USA.
* Bhojwani,S.S. and S.P.Bhatnagar (2000)The Embryology of Angiosperms(4thEd.), Vikas Publishing House, Delhi.
* Pandey,A.K.(2000)Introduction to Embryology of Angiosperms. CBS Publishers & Distributors Pvt.Ltd., New Delhi
* Maheswari,P.(1971) An Introduction to Embryology of Angiosperms. McGraw Hill Book Co.,London.
* Johri,B.M.(2011)Embryology of Angio sperms. Springer-Verlag, Berlin Pandey, B.P.(2013)College Botany, Volume-III, S.Chand Publishing, New Delhi
* Bhattacharya, K., A.K.Ghosh, & G.Hait (2011)A Text Book of Botany, Volume-IV, New Central Book Agency Pvt. Ltd., Kolkata
* Kormondy, Edward J. (1996) Concepts of Ecology,Prentice-Hall of India PrivateLimited,NewDelhi
* EugeneP.Odum(1996) Fundamentals of Ecology, Natraj Publishers, Dehradun
* Sharma, P.D. (2012) Ecology and Environment. Rastogi Publications, Meerut,India.
* Kumar,H.D.(1992)Modern Concepts of Ecology(7thEdn.,)Vikas Publishing Co.,NewDelhi.
* Newman,E.I. (2000):Applied Ecology Blackwell Scientific Publisher,U.K.
* Chapman, J.L & M.J.Reiss (1992):Ecology-Principles & Applications. Cambridge University Press, U.K.
* U.Kumar (2007) Biodiversity: Principles & Conservation, Agrobios(India), Jodhpur

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ST. JOSEPH’S COLLEGE FOR WOMEN (AUTONOMOUS) VISAKHAPATNAM

III SEMESTER **BOTANY** TIME: 2Hrs/WEEK

B 3152 (2) MARKS: 50

**ANATOMY AND EMBRYOLOGY OF ANGIOSPERMS, PLANT ECOLOGY AND BIODIVERSITY**

w.e.f.20-21 admitted batch-“20AH”

**PRACTICAL SYLLABUS**

**OBJECTIVES:** Student is able to -

* Acquire and practice the laboratory techniques of section cutting, slide preparation etc.
* To make the students understand and identify the different stages in reproduction leading to seed formation in angiosperms.
* Learn the quantitative aspects of a plant community by quadrat method
* Study various aspects of plant communities.
* Acquire knowledge of the Phytogeography and biodiversity of the region

**COURSE OUTCOMES:** On successful completion of this practical course students shall be able to:

CO1:Get familiarized with techniques of section making, staining and microscopic study of vegetative, anatomical and reproductive structure of plants.

CO2:Observe externally and under microscope, identify and draw exact diagrams of the materialin the lab.

CO3:Demonstrate application of methods in plant ecology and conservation of biodiversity and qualitative and quantitative aspects related to populations and communities of plants.

# PRACTICAL SYLLABUS:

1. Tissue organization in root and shoot apices using permanent slides.
2. Anomalous secondary growth in stems of Boerhavia and Dracaena.
3. Study of anther and ovule using permanent slides/photographs.
4. Study of pollen germination and pollen viability.
5. Dissection and observation of Embryo sac haustoria in Santalum or Argemone.
6. Structure of endosperm (nuclear and cellular) using permanent slides /Photographs.
7. Dissection and observation of Endosperm haustoria in Crotalaria or Coccinia.
8. Developmental stages of dicot and monocot embryos using permanent slides /photographs.
9. Study of instruments used to measure microclimatic variables; soil thermometer,maximum and minimum thermometer, anemometer, rain gauze, and lux meter.(visit to the nearest/local meteorology station where the data is being collected regularly and record the field visit summary for the submission in the practical).
10. Study of morphological and an atomical adaptations of hydrophytes and xerophytes (02each).
11. Quantitative analysis of herbaceous vegetation in the college campus for frequency, density and abundance.
12. Identification of vegetation/various plants in college campus and comparison with Raunkiaer’s frequency distribution law.
13. Find out the alpha-diversity of plants in the area
14. Mapping of biodiversity hotspots of the world and India.

**REFERENCE BOOKS:**

* + - Text book of Practical Botany (Vol .II) – Ashok Bendra& Kumar, Rastogi Publications, Meerut – 2001-2002
    - Practical Botany (Vol.II) – H.N. Srivastava, Pradeep Publications, Jallandhar – 200.
    - Modern Practical Botany – B.P.Pandey – S.Chand& Co., New Delhi – 1988.
    - College Botany Practical (Vol.1) – S. C. Santra, T. P. Chatterjee & A. P. Das; New Central Book Agency (P) Ltd, Kolkata, India.
    - Practical Book of Botany (BSc-Second Year) – Dr. M. Raghuram & M. V. Rao; Technical Publishers (P) Ltd.;Guntur, India; 2010.
    - Practical Book of Botany (BSc-Third Year) – Dr. M. Raghuram & M. V. Rao; Technical Publishers (P) Ltd.;Guntur, India; 2010.

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