



P.B. SIDDHARTHA COLLEGE OF ARTS & SCIENCE

Siddhartha Nagar, Vijayawada – 520 010

Autonomous -ISO 9001 – 2015 Certified

Title of the Paper

(Anatomy and Embryology of Angiosperms, Plant Ecology and Biodiversity)

Offered to: BSc. BZC with Programme code **US03**

Course Type: Core (TH)

Year of Introduction: 2021-2022

Year of Revision:

Percentage of Revision:

Semester: III

Credits: 04

Hours Taught: 60 hrs. per Semester

Max. Time: 3 Hours

Course Prerequisites: Knowledge of Anatomy and Embryology of angiosperms, Plant Ecology and Biodiversity at +2 level.

Course Description: This course will provide one with a basic and comprehensive understanding of anatomical structure and functions. Enable the student with depth of topics and helps them to gain an appreciation in the embryology of Angiosperms. On the other hand, importance of understanding plant ecology and biodiversity provides an extensive knowledge to the student.

Course Objectives:

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

1. To understand the Anatomy of Angiosperms.
2. To understand the Embryology of Angiosperms.
3. To understand the Basics of Ecology.
4. To understand the Population Community and Production Ecology.
5. To understand the Basics of Biodiversity.

Course Outcomes: At the end of this course, students should be able to:

CO1: Understand on the organization of tissues and tissue systems in plants.

CO2: Illustrate and interpret various aspects of embryology.

CO3: Discuss the basic concepts of plant ecology, and evaluate the effects of environmental and biotic factors on plant communities.

CO4: Appraise various qualitative and quantitative parameters to study the population and community ecology.

CO5: Correlate the importance of biodiversity and consequences due to its loss and enlist the endemic/endangered flora and fauna from two biodiversity hot spots in India and assess strategies for their conservation.

Syllabus

Course Details

Unit	Learning Units	Lecture Hours
I	<p>Anatomy of Angiosperms</p> <p>1. Organization of apical meristems: Tunica-carpus theory and Histogen theory.</p> <p>2. Tissue systems—Epidermal, ground and vascular.</p> <p>3. Anomalous secondary growth in <i>Boerhavia</i> and <i>Dracaena</i>.</p> <p>4. Study of timbers of economic importance—Teak, Red sanders and Rosewood.</p>	12
II	<p>Embryology of Angiosperms</p> <p>1. History of embryology, Structure of anther, types of tapetum. Microsporogenesis and development of male gametophyte.</p>	12

	<p>2. Structure of ovule, megasporogenesis; monosporic (<i>Polygonum</i>), bi sporic (<i>Allium</i>) and tetra sporic (<i>Peperomia</i>) types of embryo sacs.</p> <p>3. Outlines of pollination, pollen– pistil interaction and fertilization.</p> <p>4. Endosperm - Types and biological importance - Free nuclear, cellular, helobial and ruminant.</p> <p>5. Development of Dicot (<i>Capsella bursa-pastoris</i>) embryo.</p>	
III	<p>Basics of Ecology</p> <p>1. Ecology: definition, branches and significance of ecology.</p> <p>2. Ecosystem: Concept and components, energy flow, food chain, food web, ecological pyramids.</p> <p>3. Plants and environment: Climatic (light and temperature), edaphic and biotic factors.</p> <p>4. Ecological succession: Hydrosere and Xerosere.</p>	12
IV	<p>Population, Community and Production Ecology</p> <p>1. Population ecology: Natality, mortality, growth curves, ecotypes, ecads.</p> <p>2. Community ecology: Frequency, density, cover, life forms, biological spectrum.</p> <p>3. Concepts of productivity: GPP, NPP and Community Respiration.</p> <p>4. Secondary production, P/R ratio.</p>	12
V	<p>Basics of Biodiversity</p> <p>1. Biodiversity: Basic concepts, Convention on Biodiversity-Earth Summit.</p> <p>2. Value of Biodiversity; types and levels of biodiversity and Threats</p>	12

	<p>to biodiversity.</p> <p>3. Biodiversity Hot spots in India. Biodiversity in Eastern Ghats and Western Ghats.</p> <p>4. Principles of conservation: IUCN threat-categories, RED data book.</p> <p>5. Role of NBPGR and NBA in the conservation of Biodiversity.</p>	
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Textbook:

- Botany–III (Vrukshasastram-I) : Telugu Akademi, Hyderabad
- Botany–IV (Vrukshasastram-II) : Telugu Akademi, Hyderabad
- Pandey, B.P. (2013) *College Botany, Volume-II*, S. Chand Publishing, New Delhi
- Pandey, B.P. (2013) *College Botany, Volume-III*, S. Chand Publishing, New Delhi

Recommended Reference book:

- 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.
- Paula Rudall (1987) *Anatomy of Flowering Plants: An Introduction to Structure and Development*. Cambridge University Press, London.

Course Delivery method: Face-to-face / Blended.

Course has focus on: Foundation

Websites of Interest:

<https://byjus.com/biology/tissues-anatomy-of-angiosperms/>

https://onlinecourses.swayam2.ac.in/cec21_bt22/preview

<https://explore.naturalcommunities.org/ecology-basics#:~:text=Ecology%20is%20the%20science%20of,and%20with%20their%20physical%20environment.>

[https://en.wikipedia.org/wiki/Community_\(ecology\)](https://en.wikipedia.org/wiki/Community_(ecology))

https://ec.europa.eu/environment/basics/natural-capital/biodiversity/index_en.htm#:~:text=%22Biodiversity%22%20is%20a%20word%20we,their%20habitats%20and%20their%20genes.&text=Much%20food%20production%20is%20only,that%20pollinate%20plants%20and%20trees.

Co-curricular Activities:

Question and answer session at the end of class.

Observing animations.

Written assignments.

Preparation of models.

Making charts

Group Discussion (GD)/ Quiz.

Power Point Presentations.

Model Question Paper Structure for SEE

Max. Marks : 70

Max. Time : 3 Hrs

SECTION -A

Answer all Questions. (5 X 4 =20)

(Restrict to a maximum of 2 subdivisions)

1 (a) Explain the Tunica Corpus theory 4M L1

OR

(b) Describe the economic importance of Rose wood 4M L1

2 (a) Explain the Nemec Phenomenon 4M L2

OR

(b) Discuss about the Ruminant endosperm 4M L2

3 (a) Explain the Food chain & Food Web. 4M L2

OR

(b) Describe the Ecological pyramids 4M L2

4 (a) What are Ecads? Explain. 4M L3

OR

(b) Explain the Biological spectrum 4M L3

5 (a) Discuss about the Earth Summit. 4M L3

OR

(b) Identify Biodiversity hotspots of India 4M L3

SECTION –B

Answer all Questions. (5 X 10 = 50)

(Restrict to a maximum of 2 subdivisions)

6. (a) Describe the epidermal tissue system. 10M L1

OR

(b) What is anomalous secondary growth? Describe the anomalous secondary growth in *Boerhavia* stem. 10M L1

7. (a) What is embryo sac? How many types are there? Explain the development of embryo sac studied by you. 10M L2

OR

(b) Explain the development of embryo CO₂L₂10M L2

8. (a) What is an ecosystem? Give an account of structure of an ecosystem studied by you. 10M L1

OR

(b) What is succession? Give account of xerosere. 10M L1

9. (a) What is population ecology? Explain characters of a population studied by you.
10M L2

OR

(b) List out the quantitative and qualitative characters of community. Explain qualitative characters of a plant community. 10M L2

10. (a) Explain and analyse main values of biodiversity. 10M L2

OR

(b) Explain the major threats to biodiversity. 10M L2
