

## **Government PG College, Ambala Cantt**

**Course File (Session 2023-24)**

**Name of Professor: Shilpa Dhiman**

**Class- B.Sc I/ 2<sup>nd</sup> Semester/Section A**

**Subject code and Name: B23-BOT-201 / Taxonomy and Ecology**

### **Syllabus**

**Maximum Marks: 70**

**External: 50**

**Time: 3 hours**

**Internal: 20**

**Note-** 1. Nine questions will be set in all. All questions will carry equal marks.

2. Question No.1 will be short answer type covering the entire syllabus and will be compulsory. The remaining eight questions will be set unit wise selecting two questions from each unit .

The candidate will be required to attempt question No. 1 and four more questions selecting one question from each unit

#### **UNIT – I**

Botanical nomenclature and major rules of ICBN and ICN; Keys to identification of plants.  
General introduction and importance of herbaria and botanical gardens.

Documentation of Floristic Diversity: Brief idea about floras, monographs and journals. Brief idea of taxonomic evidences.

Types of inflorescence, flower and parts of flower

#### **UNIT –II**

Artificial, natural and phylogenetic classifications.

Bentham and Hooker system of classification (upto series), Angiosperm Phylogeny Group- general account.

Diagnostic features and economic importance of the following families: Ranunculaceae, Brassicaceae, Malvaceae, Euphorbiaceae, Rutaceae, Leguminosae, Apocynaceae, Lamiaceae, Solanaceae, Asteraceae, Poaceae and Orchideaceae

#### **UNIT – III**

Ecology: Definition; scope and importance; levels of organization. Environmental factors- climatic factors, edaphic factors, topographic; and Biotic factors.

Population Ecology: Basic concept; characteristics; biotic potential, growth curves; ecotypes and ecads. Community Ecology: Concepts; characteristics (qualitative and quantitative-analytical and synthetic); methods of analysis; ecological succession.

#### UNIT – IV

Ecosystem: Structure and functions (trophic levels, food chains, food webs, ecological pyramids and energy flow). Phyto-geography: Phyto-geographical regions of India; vegetation types of India (forests). Environmental Pollution: Sources, types and control of air and water pollution. Global Change: Greenhouse effect and greenhouse gases; impacts of global warming; carbon trading. Biodiversity: levels, types, significance, threats and conservation

#### REFERENCE BOOKS:

- Jai Singh, G. (2021). Plant Systematics: An Integrated Approach, CRC Press.
- Levetin, E & McMahon, K. 2015. Plants and Society, McGraw-Hill Education. 7th edition.
- Smith, T.M. & Smith, R.L. 2014. Elements of Ecology. Pearson. 9th edition. Gangulee, Das and Datta (2011). College Botany Volume 1, New Central Book Agency
- Gangulee, Das and Datta (2011). College Botany Volume 2, New Central Book Agency
- Vashishta, P.C., Sinha, A.K., Kumar, A., (2010). Gymnosperms, S. Chand.
- Taylor, E.L., Taylor, T.N., Krings, M. (2009). Paleobotany: The Biology and Evolution of Fossil Plants, Academic Press.
- Pandey, B.P. (2001). A Textbook of Botany-Angiosperms, Chand
- A.O'Brien, "Management Information Systems", Tata McGraw-Hill.
- James A. Senn, "Analysis & Design of Information Systems", Second edition, McGraw Hill.
- Robert G. Murdick & Joel E. Ross & James R. Claggett, "Information Systems for Modern Management", PHI.

## COURSE OBJECTIVES:

- Provide a method for identification and communication
- Produce a coherent and universal system of classification
- Demonstrate the evolutionary implications of plant diversity
- Identify characteristics of undiscovered species by comparing with known species
- Specify characteristics of recently discovered species

## COURSE OUTCOMES

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

1. Students will gain knowledge about taxonomy, including the rules of nomenclature and other essential aspects.
2. Students will acquire a conceptual understanding of angiosperm classification systems and the diversity of families within them.
3. Students will gain knowledge about Ecology and Environmental interactions.
4. Students will acquire a conceptual understanding of ecosystem structure, environmental pollution and biodiversity conservation.

Week	Scheduled Dates	Topics to be covered
1	1-6January	Botanical Nomenclature and major rules of ICBN keys to identification of plants, Introduction and importance of Herbaria, botanical gardens
2	8-13January	Documentation of floristic Diversity: brief idea of Floras, monographs, and journals. Brief idea of Taxonomic evidences
3	15-20January	Types of inflorescence, flower and parts of flower, Artificial, natural and Phylogenetic systems of classification
4	22-27January	Bentham and Hooker system of classification, Angiosperm Phylogeny groups
5	29-3February	Diagnostic features and economic importance of Ranunculaceae, Brassicaceae and Malvaceae, Euphorbiaceae and Rutaceae
6	5-10February	Diagnostic features and economic importance of Leguminosae, Apocynaceae, Lamiaceae, Solanaceae and Poaceae
7	12-17February	Ecology :definitions, scope and importance, Levels of organization, Climatic and Edaphic factors

8	19-24February	Class test Topographic and Biotic factors , Population Ecology: concept, biotic potential, growth curves, ecotypes and ecads
9	26-2March	Community ecology: concept, characteristics , methods of analysis and Ecological Succession
10	4-9March	Ecosystem : structure and functions ( food chains, food web, trophic levels, energy flow and ecological pyramids
12	18-23March	Ecology :definations, scope and importance, Levels of organization, Climatic and Edaphic factors
13	1-6April	Topographic and Biotic factors, Population Ecology: concept, biotic potential, growth curves, ecotypes and ecads
14	8-13April	Phytogeographical regions of India, Vegetation types of India , Environmental pollution: sources types and controls of air and water pollution
15	15-20April	Green houseeffect and green house gases,impacts of global warming and carbon trading
16	22-27April	Biodiversity: types levels, significance, threats and conservation
17	29-04 May	Final Test/ Revision of whole syllabus

**Government PG College, Ambala Cantt**

**Course File (Session 2023-24)**

**Name of Professor: Shilpa**

**Class- B.Sc II/ 4<sup>TH</sup> Semester/Section A**

**Subject code and Name: Plant Embryology**

**Note-** Attempt five questions in all, selecting two questions from each unit. Question No. 1 is compulsory (short answer type). Nine questions are to be set spread over the entire syllabus. All questions carry equal marks.

**UNIT-I**

Flower-a modified shoot; functions of various floral parts.

Microsporangium, its wall and dehiscence mechanism.

Microsporogenesis, pollen grains and its structure (pollen wall).

Pollen-pistil interaction; self incompatibility.

Pollination (types and agencies); pollen germination (microgametogenesis). Male gametophyte.

**UNIT-II**

Structure of Megasporangium (ovule), its curvatures; Megasporogenesis and Megagametogenesis.

Female gametophyte (mono-, bi- and Tetrasporic).

Double fertilization. Endosperm types and its biological importance.

Embryogenesis in Dicot and Monocot; polyembryony.

Structure of Dicot and Monocot seed. Fruit types; dispersal mechanisms in fruits and seeds.

## **Reference Books**

- Bhojwani, S.S. and Bhatnagar, S.P. 2000. The Embryology of Angiosperms. 4th revised and Enlarged Edition. Vikas Publishing House, Delhi.
- Cutter, E.G. 1969. Plant Anatomy Part-I, Cells and Tissues, Edward Arnold, London.
- Cutter, E.G. 1971. Plant Anatomy : Experiment and Interpretation. Part-II Organs, Edward Arnold London.
- John Wiley & Sons, New York. Fageri, K. and Van der Pijl 1979. The Principles of Pollination Ecology. Pergamon Press, Oxford.
- Fahn, A. 1974. Plant Anatomy, 2nd Edition. Pergamon Press, Oxford. Hartmann, H.T. and Kestler, D.E. 1976. Plant Propagation; Principles and Practices. 3rd Edition. Prentice Hall of India Pvt. Ltd. New Delhi.
- King. J. 1997. Reaching for the Sun: How Plants Work. Cambridge University Press, Cambridge, U.K. Mauseth
- J.D. 1988. Plant Anatomy. The Benjamin/Cummings Publishing Company Inc., Menlo Park, California, USA. Proctor, M. and Yeo, P. 1973. The Pollination of Flowers. William Collins Sons, London.

## LESSON PLAN

<b>Week</b>	<b>Scheduled Dates</b>	<b>Topics to be covered</b>
1	1-6January	Introduction to Plant Embryology
2	8-13January	Structure of flower and its various floral parts Flower as modified shoot
3	15-20January	Process of microsporogenesis
4	22-27January	Pollen pistil interaction Self incompatibility ,Pollination and its various types
5	29-3February	Pollen germination or microgametogenesis Male gametophyte
6	5-10February	Structure of megasporangium and various types of ovules
7	12-17February	Double fertilization Endosperm and its importance
8	19-24February	Megasporogenesis and megagametogenesis
9	26-2March	Structure of female gametophyte
10	4-9March	Structure of female gametophyte Embryogenesis in monocots
12	18-23March	Polyembryony
13	1-6April	Double fertilization ,Endosperm and its importance
14	8-13April	Structure of dicot seed , Fruit and its various types
15	15-20April	Dispersal mechanisms in fruits, Dispersal mechanisms in seeds
16	22-27April	Final Test/Revision

