

Government PG College, Ambala Cantt

Course File (Session 2023-24)

Name of Professor: Shilpa Dhiman

Class- B.Sc I/ Ist Semester/Section A

Subject code and Name: B23-BOT-101 /Diversity of Microbes, Algae, Fungi and Archegoniates

Syllabus

Max. marks 70

Time : 3 hours

External: 50

Internal: 20

Note -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

Bacteria: Structure, nutrition, reproduction and economic importance. **Viruses:** General account of Viruse including structure of TMV and Bacteriophages.

Algae: General characters, Introductory classification; economic importance; and life cycle (excluding development) of Nostoc (Cyanophyceae). Volvox, (Chlorophyceae), Vaucheria (Xanthophyceae), Ectocarpus (Phaeophyceae) and Polysiphonia (Rhodophyceae).

Fungi: General characters, Introductory classification; economic importance; and life-history of Phytophthora (Mastigomycotina), Penicillium (Ascomycotina), Puccinia (Basidiomycotina), Colletotrichum (Deuteromycotina)

UNIT –II

General account of Lichens, types, ecological and economic importance.

Bryophyta: Bryophytes: General characteristics, classification upto classes (Smith, 1935), alternation of generations, structure and reproduction (excluding development) of Marchantia (Hepaticopsida), Anthoceros (Anthocerotopsida), Funaria (Bryopsida), ecological and economic importance of bryophytes

UNIT – III

Pteridophyta: General characters, classification upto classes (A. R. Smith, 2006), structure and reproduction (excluding development) of Rhynia (Psilopsida): Structure and reproduction (excluding development) of Selaginella (Lycopsida), Equisetum (Sphenopsida) and Pteris (Pteropsida). heterospory and seed habit, stelar evolution; Ecological and economic importance

UNIT – IV

Gymnosperms: General characteristics, classification up to classes (Smith 1955), morphology, anatomy and reproduction of Cycas, Pinus, Ephedra ; Distribution and economic importance; General account of paleobotany and Geological time scale

TEXT BOOKS:

- Wiley, J.M., Sherwood, L.M. and Woolverton, C.J. (2019) Prescott's Microbiology. 11th Edition.
- McGraw Hill International. Lee, R.E. (2018) Phycology. 5th Edition. Cambridge University Press.
- Aluwalia, A.S. (2020). Phycology: Principles, Processes and Applications. Daya Publishing House, New Delhi. Dube, H.C. (2012).
- An Introduction to Fungi, Vikas Publishing House Pvt. Ltd., Delhi.
- 4th edition. Mehrotra, R.S. and Aggarwal, Ashok (2013) Fundamentals of Plant Pathology, Tata
- McGraw-Hill Publishing company Ltd, New Delhi Pelczar, M.J. (2001) Microbiology, 5th edition, Tata McGraw-Hill Co, New Delhi.
- Sethi, I.K. and Walia, S.K. (2011). Text book of Fungi & Their Allies, MacMillan Publishers Pvt. Ltd., Delhi. Raven, P.H., Johnson, G.B., Losos, J.B., Singer, S.R. (2005). Biology. Tata McGraw Hill,
- Delhi, India. Sharma, O.P. (2017). Text Book of Pteridophyta, McMillan India Ltd.

COURSE OBJECTIVES

The specific course objective are to expose students to the following topics-

- Origin, evolution and diversity of microbial life
- Microbial species and speciation
- Basic concept of microbial diversity of bacteria, virus and microbes.
- Study of systematic position, structure and functions of Algae and fungi.
- Linkage between microbial diversity , function and ecology
- Study of general characters and economic importance of bryophytes.
- Study of Heterospory , apospory and apogamy and economic importance of Pteridophytes
- General characters and economic importance of Gymnosperms

COURSE OUTCOMES:

- Students will be able to understand the general characteristics of bacteria, actinobacteria, viruses and fungi.
- Students will develop a conceptual understanding of Phycology.
- Students will gain knowledge on the concepts of Bryology.
- Basic understanding of the biology of pteridophytes will be developed by the students

Week No	Scheduled Dates	Topics to be covered
1	1-5 August	Bacteria: Structure, nutrition, reproduction and economic importance. Viruses: General account of Viruse including structure of TMV and Bacteriophages
2	7-12 August	Algae: General characters, Introductory classification; economic importance; and life cycle (excluding development) of Nostoc (Cyanophyceae)
3	14-19 August	Volvox, (Chlorophyceae), Vaucheria (Xanthophyceae), Ectocarpus (Phaeophyceae) and Polysiphonia (Rhodophyceae).
4	21-26 August	Fungi: General characters, Introductory classification; economic importance; and life-history of Phytophthora (Mastigomycotina), Penicillium (Ascomycotina)
5	28-02 September	Puccinia (Basidiomycotina), Colletotrichum (Deuteromycotina General account of Lichens, types, ecological and economic importance
6	4-9 September	Anthoceros (Anthocerotopsida), Funaria (Bryopsida), ecological and economic importance of bryophytes
7	11-16 September	Pteridophyta: General characters, classification upto classes structure and reproduction (excluding development) of Rhynia (Psilopsida
8	18-23 September	structure and reproduction (excluding development) of Rhynia (Psilopsida
9	25-30 September	Structure and reproduction (excluding development) of Selaginella (Lycopsida),
10	2-7 October	Equisetum (Sphenopsida) and Pteris (Pteropsida
11	9-14 October	Heterospory and seed habit, stelar evolution; Ecological and economic importance
12	16-21 October	Gymnosperms: General characteristics, classification up to classes (Smith 1955), morphology

13	23-28 October	Anatomy and reproduction of Cycas, Pinus and Ephedra
14	30-04 November	Distribution and economic importance; General account of paleobotany and Geological time scale
15	06-11 November	Final Test / Revision Of whole syllabus
16	20-25 November	Previous papers Discussion / Revision
17	27-02 December	Previous papers Discussion / Revision

Government PG College, Ambala Cantt

Course File (Session 2023-24)

Name of Professor: Shilpa Dhiman

Class- B.Sc II/ 3rd Semester/Section A

Subject code and Name: Plant Anatomy

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

Diversity in plant forms-annuals, biennials and perennials.

Tissues-meristematic and permanent (simple and complex).

The Shoot system-shoot apical meristem and its histological organizations (monocot and dicot stem); Cambium-structure and functions. Secondary growth in dicot stem; characteristics of growth rings; sap wood and heart wood, periderm

Anomalous secondary growth (Dracaena, Boerhaavia and Achyranthes)

UNIT-II

Leaf-Types of leaves (simple and compound); phyllotaxy.

Epidermis-uniseriate and multiseriate, epidermal appendages and their morphological types.

Anatomy of typical Monocot and Dicot leaf and cell inclusions in leaves; leaf abscission.

Stomatal apparatus and their morphological types.

Root system- the root apical meristem; the histological organization (monocot and dicot root).

Secondary growth in dicot root. Structural modifications in roots- storage (Beta), Respiratory (Rhizophora), Epiphytic roots(Vanda)

Text books-

Bhatnagar, S. and Moitra, A. 1996. Gynnosperms. New Age International - Limited, New Delhi.

Davis, P.H. and Heywood, V.H. 1963. Principles of Angiosperm Taxonomy, Oliver and Boyd, London.

Gifford, E.M. and Foster, A.S. 1988. Morphology and Evolution of Vascular Plants, W.H. Freeman & Company, New York.

Heywood, V.H. and Moore, D.M. (Eds.) 1984. Current Concepts in Plant Taxonomy. Academic Press, London.

Jeifrey, C. 1982. An introduction to Plant Taxonomy. Cambridge University Press, Cambridge, London.

Jones, S.B., Jr. Luchsinger, A.E. 1986. Plant Systematics (2nd edition). McGraw Hill Book Co. New York.

Maheshwari, J.K. 1963. Flora of Delhi. CSIR, New Delhi.

Course Objectives-

The specific objectives of this course are -

- To make the students study morphology, structure and development of flowering plants and its practical and experimental aspects.
- To make the students learn about the basic concepts in anatomy and to understand the various components of stem and wood during its secondary growth,
- Evaluate the stages of plant growth and development

Lesson Plan

Week No	Scheduled Dates	Topics to be covered
1	1-5 August	Introduction to Syllabus Diversity in plant forms-annuals, biennials and perennials Tissues-meristematic and permanent
2	7-12 August	Simple and Complex types of Tissue The Shoot system-shoot apical meristem and its histological organizations
3	14-19 August	Monocot and Dicot stem Sap wood and heart wood, Periderm
4	21-26 August	Anomalous secondary growth 1. Dracaena 2. Boerhaavia 3. Achyranthes
5	28-02 September	Cambium-structure and function Class test/ audio video demonstration

6	4-9 September	Secondary growth in dicot stem Characteristics of growth rings
7	11-16 September	Leaf-Types of leaves (simple and compound);
8	18-23 September	Phyllotaxy , Epidermis-uniseriate and multiseriate
9	25-30 September	Anatomy of typical Monocot and Dicot leaf and cell inclusions in leaves
10	2-7 October	Leaf abscission. Stomatal apparatus and their morphological types
11	9-14 October	Root system- the root apical meristem
12	16-21 October	Histological organization (monocot and dicot root
13	23-28 October	Secondary growth in dicot root
14	30-04 November	Structural modifications in roots- storage (Beta), Respiratory (Rhizophora), Epiphytic (Vanda
15	06-11 November	Final Test / Revision Of whole syllabus
16	20-25 November	Previous papers Discussion / Revision
17	27-02 December	Previous papers Discussion / Revision