COURSES OFFERED BY DEPARTMENT OF BOTANY

Category-I

Botany (H) Courses for Undergraduate Programme of study with Botany as a Single Core Discipline

DISCIPLINE SPECIFIC CORE COURSE – 1: Plant Diversity and Evolution

CREDIT DISTRIBUTION, ELIGIBILITY AND PRE-REQUISITES OF THE COURSE

Course title & Code	Credits	Credit distribution of the course			Eligibility criteria	Pre-requisite of the course (if any)
		Lecture	Tutorial	Practical/ Practice		
Plant Diversity and Evolution **BOT-DSC-1**	**4**	**2**	**0**	**2**	10+2 from any recognized Board with Biology/Biotechnology	**Nil**

Learning Objective:

- To make students aware about the diversity of plants and microbes present on the planet and their relationships with each other in light of evolution.

Learning outcomes

By studying this course students will gain basic knowledge on:

- the diversity and general characteristics of plants and microbes.
- various groups of plants and their evolutionary relationships.
- basic principles and concepts of evolution that contribute to plant diversity.

SYLLABUS OF BOT-DSC-1

Unit1: Origin of life **Weeks: 1.5**

Principles and concepts of evolution, Tree of Life, and classification (upto six kingdoms)

Unit2: Bacteria **Week: 01**

General characteristic features, cell structure, asexual reproduction and modes of gene ransfer (conjugation, transformation and transduction), brief introduction to Archaebacteria.

Unit3: Viruses **Week: 01**

General characteristic features, replication, RNA virus (structure of TMV), DNA virus (structure of T-phage), Lytic and Lysogenic life cycle (Lambda phage).

Unit4: Algae **Weeks: 1.5**

General characteristic features, cell structure, range of thallus, methods of reproduction and evolutionary classification (only upto groups). Brief account of *Spirogyra*, *Sargassum*.

Unit5: Fungi **Weeks: 02**

General characteristic features, reproduction and broad classification. Myxomycetes and their similarities with fungi, plants and animals, Brief account of *Rhizopus*, *Agaricus*. Introduction to lichens.

Unit6: Bryophytes **Weeks: 02**

General characteristic features and reproduction, adaptation to land habit, broad classification, evolutionary trends in Bryophytes. Brief account of *Marchantia*, and *Funaria*.

Unit7: Pteridophytes **Weeks: 02**

General characteristic features and reproduction, broad classification, evolutionary trends in Pteridophytes, affinities with Bryophytes. Brief account of *Adiantum*, *Selaginella*.

Unit8: Gymnosperms **Weeks: 02**

General characteristic features and reproduction, broad classification, evolutionary trends in Gymnosperm, affinities with Pteridophytes. Brief account of *Gnetum*, *Ephedra*.

Unit9: Angiosperms **Weeks: 02**

General characteristic features and reproduction, Concept of natural, artificial and phylogenetic system of classification. Affinities with Gymnosperms.

Practical component:

1. To study structure of TMV and Bacteriophage (electron micrographs/models). **(Week: 01)**
2. To study morphology of *Volvox*, *Oedogonium*, *Chara*, *Fucus* and *Polysiphonia* (Temporary preparation/specimens/slides). **(Weeks: 02)**
3. To study *Rhizopus*, *Penicillium*, *Alternaria* (Temporary preparations), symptoms of rust of wheat, white rust of crucifer (specimen). **(Weeks: 02)**
4. To study *Marchantia* (morphology, WM of rhizoids and scales), *Anthoceros* (morphology), *Sphagnum* (morphology, WM of leaf), *Funaria* (morphology WM of rhizoid and leaf). **(Weeks: 02)**
5. To study *Selaginella* (morphology, WM of strobilus and spores), *Equisetum* (morphology, WM of spores), *Pteris* (morphology, tease mount of sporangia and spores). **(Weeks: 02)**
6. To study *Cycas* (morphology, leaf, leaflet anatomy, coralloid root, bulbils, megasporophyll and microsporophyll); *Pinus* (morphology of dwarf shoot, needle anatomy, male and female cones, WM pollen grains). **(Weeks: 02)**
7. To study variation in leaf venations in dicots and monocots (at least two specimens each). **(Weeks: 02)**
8. To study the types of inflorescences in angiosperms (through specimens). **(Week: 01)**
9. To study the types of fruits in angiosperms (through specimens). **(Week: 01)**

Essential/recommended readings:

- Campbell, N.A., Reece,J.B. (2008) Biology, 8th edition, Pearson Benjamin Cummings, San Francisco.
- Evert, R. F., Eichhorn,S.E. (2012).Raven Biology of Plants, 8th edition, New York, NY: W.H.Freeman and Company.
- Bhatnagar, S.P., Moitra, A. (1996).Gymnosperms. New Delhi, Delhi, New Age International (P) Ltd. Publishers.
- Kumar, H.D. (1999). Introductory Phycology, 2nd edition .Delhi, Delhi, Affiliated East-

West. Press Pvt. Ltd.

- Pelczar, M. J. (2001). Microbiology, 5th edition. NewDelhi, Delhi:TataMcGraw-HillCo.
- Puri,P. (1985). Bryophytes. New Delhi, Delhi, Atma Ram and Sons.
- Sethi, I.K. and Walia, S.K. (2018). Textbook of Fungi and Their Allies. (2nd Edition), Medtech Publishers, Delhi.
- Tortora,G.J., Funke, B.R., Case, C.L. (2007). Microbiology. San Francisco, U.S.A, Pearson Benjamin Cummings.
- Vashishta, P.C., Sinha, A.K., Kumar, A. (2010). Pteridophyta. New Delhi, Delhi, S.Chand & Co Ltd.
- Singh, G. (2019) Plant Systematics-An Integrated Approach. 4th edition. CRC Press, Taylor and Francis Group.
- Blackmore, S., Crane, P. (2019) How Plants Work–Form, Diversity, Survival, Princeton University Press; Illustrated edition.
- Ingrouille, M., Eddie, B. (2006) Plants: Evolution and Diversity. Cambridge University Press.

Suggestive readings:

- Parihar, N.S. (1991). An Introduction to Embryophyta. Vol.II. Pteridophytes. Prayagraj: U.P.: Central Book Depot.
- Singh,V., Pandey,P.C., Jain,D.K. (2001).A Text Book of Botany. Meerut, UP: Rastogi and Co.
- Webster, J., Weber, R. (2007). Introduction to Fungi. Cambridge, Cambridge University Press.

Note: Examination scheme and mode shall be as prescribed by the Examination Branch, University of Delhi, from time to time.