



Central University of Himachal Pradesh
(Established under Central Universities Act 2009)
PO BOX: 21, DHARAMSHALA, DISTRICT KANGRA – 176215, HIMACHAL
PRADESH
www.cuhimachal.ac.in

SEMESTER- I

Course Code: BOT 504 A

Credit: 02

Course Name: Biology and diversity of Bryophytes and Pteridophytes

Course Contents:

Unit 1

General characteristics of Bryophytes and their comparison with other cryptogamous plants.

Economic importance of Bryophytes.

Unit 2

A general account of following (with reference to genera mentioned):

Marchantiales: *Marchantia*; Jungermanniales: *Porella*.

Unit 3

A general account of following (with reference to genera mentioned):

Anthocerotales: *Anthoceros*; Funariales: *Funaria*.

Unit 4

General characteristics of Pteridophytes and their comparison with other archegoniates.

Economic importance of Pteridophytes

Unit 5

A general account of following (with reference to genera mentioned):

Psilopsida: *Psilotum*; Sphenopsida: *Equisetum*; Pteropsida: *Adiantum*.

Suggested readings:

Rashid A (1998) An Introduction to Bryophyta (Diversity, Development and Differentiation).
Vikas Publishing House Pvt. Ltd. New Delhi.

Watson EV (2005) The Structure and life of Bryophytes. Hutchinson University Library, London.

Sharma OP (2017) Text book of Pteridophytes. Mc. Millan India Ltd. New Delhi.

Sporne KR (1982) The Morphology of Pteridophytes. Hutchinson University Library, London (Reprinted in 1991 by BI Publishing Pvt. Ltd., Bombay).



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SEMESTER- I

Course Code: BOT 506 A

Credit: 02

Course Name: An Introduction to Gymnosperms

Course Contents:

Unit I

General characteristics and classification of Gymnosperms (Broad outline) and their affinities with pteridophytes and angiosperms.

Vegetative morphology and reproduction of the following:

Class: Cycadopsida; Order: Cycadales; Family: Cycadaceae: ***Cycas***

UNIT II

Vegetative morphology and reproduction of the following (with reference to the genera mentioned):

Class : Coniferopsida ; Family: Pinaceae : ***Pinus***

Unit III

Vegetative morphology and reproduction of following orders and families (with reference to the genera mentioned)

Class :Gnetopsida

a) Order: Ephedrales; Family: Ephedraceae: ***Ephedra***

b) Order: Gnetales; Family: Gnetaceae: ***Gnetum***

UNIT IV

Vegetative morphology and reproduction of following orders and families (with reference to the genera mentioned)

Class: Ginkgopsida

a) Order :Ginkgoales; Family: Ginkgoaceae : ***Ginkgo***

Unit V

Seed development in Gymnosperms

Economic importance of gymnosperms



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SEMESTER- I

Course Code: BOT 503A

Credit: 02

Course Name: Algae

Course Contents:

Unit I

General characteristics of algae, Classification of Algae, Algae in diversified habitats (terrestrial, fresh water, marine), Thallus organization in algae, Cell ultra-structure, pigments, reserved food, flagella, Reproduction (Vegetative, asexual, sexual) and patterns of life cycle.

Unit II

General characteristics of Division Chlorophyta; Distribution, morphology and life history of following genera: *Chlamydomonas*, *Volvox*, *Ulothrix*, *Oedogonium* and *Chara*.

Unit III

General characteristics of Division Xanthophyta, Bacillariophyta and Phaeophyta; Distribution, morphology and life history of following genera: *Vaucheria*, Diatoms, *Ectocarpus* and *Sargassum*.

Unit IV

General characteristics of Division Rhodophyta and Cyanophyta; Distribution, morphology and life history of following genera: *Batrachospermum*, *Polysiphonia*, *Oscillatoria*, *Nostoc* and *Anabaena*.

Unit V

Blue green algae: A potential Biofertilizer for rice, Algae as a source of Biofuel, Economic importance of algae, Phycoremediation.

Suggested Reading:

1. Fritsch, F. E. The structure and reproduction of algae. Vol. I & II, London, Cambridge Univ. Press (1971-72)
2. Kamat, N. D. (1982), Topics in algae, Sai Kirpa Prakashan, Aurangabad.
3. Kumar, H. D. (1988). Introductory Phycology. Affiliated East-West Press limited, New Delhi.
4. Round, F. E (1986). The biology of algae. Cambridge University Press, Cambridge.
5. Kumar, H. D.. (1985). Algal cell Biology. Affiliated East-West Pres Limited, New Delhi.

6. Moris. I. (1967). *An Introduction to the Algae*. Hutchinsen University Library, London.
7. *The Algae World* Editors: DinabandhuSahoo and Joseph Seckbach DOI 10.1007/978-94-017-7321-8 Springer ISBN 978-94-017-7320-1 ISBN 978-94-017-7321-8



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SEMESTER- I

Course Code: BOT-410

Credit: 04

Course Name: Mycology and Plant Pathology

Course Contents:

Course Objectives: The course is designed to gain insights on fungal diseases of plants, biochemical, physiological and molecular aspects of plant-pathogen interactions and disease resistance mechanisms in plants.

Attendance Requirement:

Students are expected to attend all the lectures pertaining to the Course. To appear in the examination, a minimum of 75% attendance is compulsory.

Evaluation Criteria:

1. Mid Term Examination: 25%
2. End Term Examination: 50%
3. Continuous Internal Assessment : 25% (Breakup is following)
 - a. Assignment/Quiz/: 40%
 - b. Presentation/Seminar/: 40%
 - c. Class participation: 20%

Course Contents:

UNIT I

Koch postulates, disease triangle, disease epidemics and epidemiology, resistance vs tolerance. Types of fungal pathogens: biotrophs, necrotrophs, hemibiotrophs and their modes of penetration and colonization of host tissues.

UNIT II

Plant disease caused by fungal pathogens: Blast disease of rice, Late blight of potato, Black stem rust of wheat, Tikka disease of groundnut.

UNIT III:

Study of host-parasite interactions, pathogen-recognition and infection, virulence, host specific toxins, host non-specific toxins, plant cell wall degrading enzymes, Preformed and inducible

plant defenses-oxidative burst, phenolics, phytoalexins, PR proteins, elicitors, defensins, chitinases, growth regulators.

UNIT IV:

Genetic basis of disease resistance and pathogenicity: gene for gene hypothesis (Flor's hypothesis), Plant disease resistance (*R*) genes, Systemic acquired resistance, Induced Systemic resistance, Hypersensitive Reaction (HR).

UNIT V

Molecular approaches to clone disease resistance genes, Transgenic approaches to control fungal disease.

Reference Material:

1. Plant Pathology, T.N. Agrios, Academic Press, 2001
2. Introduction to Plant Pathology, Richard N Strange, 2003, Springer publication
3. Host Pathogen Interactions, Lucas, 2001, Blackwell publication
4. Annual Review of Phytopathology
5. Annual Review of Plant Biology
6. Current Opinion in Plant Biology



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SEMESTER- I

Course Code: BOT-514

Credit: 02

Course Name: Cytogenetics and Molecular Biology

Course Contents:

Unit-I

Chromatin structure: Histones, nucleosome and higher level of organization; Functional states of chromatin; Euchromatin, heterochromatin, Lampbrush chromosome, Polytene chromosome and Alterations in chromatin organization.

Unit-II

Cytogenetic aspects of cell division: Chromosome labeling; cell cycle analysis, Overview of mitosis and meiosis, sister chromatid cohesion remodeling, regulation of exit from metaphase.

Unit-III

Nucleus: structure, nuclear pores, nucleosome organization, nucleolus. DNA structure and replication: structure and forms of DNA; replication in prokaryotes and eukaryotes, damage and repair.

Unit-IV

Transcription: Structure of ribosome, promoters and transcription factors, mRNA transport, rRNA biosynthesis, mechanism of translation, initiation, elongation and termination, structure and role of tRNA.

Unit-V

Recombinant DNA Technology & Gene Manipulation: General concepts, Various vectors, Enzymes, Cloning strategy in E. coli (plasmid, phage, cosmid, phagemid) and Yeast vectors (YAC), Plants (Ti / Ri plasmids of Agrobacterium).

Suggesting readings:

1. Brooker R.J. Genetics. USA: Addison-Wesley, Longman Publisher, 1999. Print.
2. Brown T.A. Genetics: A Molecular Approach. USA: Chapman & Hall, 1999. Print.
3. Brown T.A. Genomes. USA: Wiley & Sons, 2001. Print.
4. Glick B.R., and Pasternak, J.J. Molecular Biotechnology. USA: American Society for Microbiology, 1998. Print.
5. Griffiths A.J.F., Gelbart, W.M., Miller, J.H., and Lewontin. Modern Genetic Analysis. USA: W.H. Freeman & Company, 2002. Print.
6. Karp G. Cell and Molecular Biology. USA: Wiley & Sons, 1999. Print.
7. Lewin B. Genes VII. UK: Oxford University Press, 2000. Print.
8. Lodish H., Berk, A., Zipursky, L., Matsudaira, P., Baltimore, D., and Darnell, J. Molecular Cell Biology. USA: W.H. Freeman & Co., 2005. Print.
9. Malacinski, J., and Friefelder, D. Essentials of Molecular Biology. USA: Jones and Bartlett Publ., 1999. Print.
10. Primrose S.B., Twyman, R.M., and Old, R.W. Principles of Gene Manipulation. UK: Blackwell Publisher, 2001. Print.
11. Russel, P.J. Genetics. California: Addison Wesley Longman, 2006. Print.
12. Snustad, D.P. and Simmons, M.J. Principles of Genetics. USA: Wiley and Sons, 2003. Print.