

JYOTI NIVAS COLLEGE AUTONOMOUS
SYLLABUS FOR 2021-22 Batch Onwards
Programme: B.Sc.
FIRST SEMESTER SYLLABUS
Title: DIVERSITY OF NON- FLOWERING PLANTS

B.SC. BOTANY: SEMESTER –II (NEP – 2020) SYLLABUS
BOTANY PAPER II - SEMESTER -II

PAPER CODE: 21IIBO2

COURSE OBJECTIVES:

1. To define and understand the life of lower plants.
2. To evaluate and understand the importance of systematic study of Non flowering plants.
3. To compare the diversity and affinities among Algae, Bryophytes, Pteridophytes and Gymnosperms.
4. To demonstrate proficiency in the experimental techniques and methods of analysis to understand the life cycle of Non flowering plants.

COURSE OUTCOMES:

1. Demonstrate and understand the diversity and affinities among Algae, Bryophytes, Pteridophytes and Gymnosperms.
2. Evaluate and compare the morphology, anatomy, reproduction and life cycle across Algae, Bryophytes, Pteridophytes and Gymnosperms, and their ecological and evolutionary significance.
3. Analyze and develop the laboratory skills/explore non-flowering plants for their commercial applications.

Number of Theory Credits	Number of lecture hours/semester	Number of practical Credits	Number of practical hours/semester
4	60	2	60
Content of Theory Course 2			60 Hrs
Unit –1			15
<p>Chapter No. 1 Algae –Introduction and historical development in algology. General characteristics and classification of algae, Diversity- habitat, thallus organization, pigments, reserve food, flagella types, life-cycle and alternation of generation in Algae. Distribution of Algae.</p>			5
<p>Chapter No. 2 Morphology and reproduction and life-cycles of Nostoc, <i>Oedogonium</i>, <i>Chara</i>, <i>Sargassum</i> and <i>Polysiphonia</i>, <i>Diatoms</i> and their importance. Blue-green algae- A general account. Algal blooms and toxins.</p>			5
<p>Chapter No. 3 Algal cultivation- Cultivation of microalgae-<i>Spirulina</i> and <i>Dunaliella</i>; Algal products- Food and Nutraceuticals, Feed stocks, food colorants; fertilizers, aquaculture feed; therapeutics and cosmetics; medicines; dietary fibers from algae and uses.</p>			5
Unit – 2			15
<p>Chapter No. 4. Bryophytes – General characteristics and classification of Bryophytes, Diversity-habitat, thallus structure, Gametophytes and sporophytes.</p>			5

Chapter No. 5 Distribution, morphology, anatomy, reproduction and life-cycles of <i>Marchantia</i> , <i>Anthoceros</i> , and <i>Funaria</i> . Ecological and economic importance of Bryophytes.	5
Chapter No. 6. . Pteridophytes- General characteristics and classification; Structure of sporophytes and life-cycles. Distribution, morphology, anatomy, reproduction and life-cycles in <i>Selaginella</i> , <i>Equisetum</i> , <i>Pteris</i> and <i>Marsilea</i> .	5
Unit – 3	15
Chapter No. 7 A brief account of heterospory and seed habit. Stellar evolution in Pteridophytes. Affinities and evolutionary significance of Pteridophytes. Ecological and economic importance.	5
Chapter No. 8. Gymnosperms- General characteristics. Distribution and classification of Gymnosperms. Study of the habitat, distribution, habit, anatomy, reproduction and life-cycles in <i>Pinus</i> and <i>Gnetum</i> .	5
Chapter No. 9. Affinities and evolutionary significance of Gymnosperms. Economic importance of Gymnosperms - food, timber, industrial uses and medicines.	5
Unit – 4	15
Chapter No. 10. Origin and evolution of Plants: Origin and evolution of plants through Geological Time scale.	4
Chapter No. 11. Paleobotany- Palaeobotanical records, plant fossils, Preservation of	6

plant fossils - impressions, compressions, petrification's, moulds and casts, pith casts.
Radiocarbon dating.

5

Chapter No. 12. Fossil taxa- *Rhynia*, *Lepidodendron* *Lyginopteris* and

Cycadeoidea. Exploration of fossil fuels. Birbal Sahni Institute of Paleosciences.

Text Books

- 1) Chopra, G.L. A text book of Algae. Rastogi & Co., Meerut, Co., New Delhi, Depot. Allahabad.
- 2) Johri, Lata and Tyagi, 2012, A Text Book of, Vedam e Books, New Delhi.
- 3) Sharma, O.P. 1990. Text Book of Pteridophyta. McMillan India Ltd. New Delhi.
- 4) Sharma, O.P. 1992. Text Book of Thallophytes. McGraw Hill Publishing Co. New Delhi.
- 5) Sharma, O.P., 2017, Algae Singh-Pande-Jain 2004-05. A Text Book of Botany. Rastogi Publication, Meerut.

References

1. Sambamurty, A.V.S.S.. A Text Book of Algae. I.K. International Private Ltd., New Delhi.
2. Agashe, S.N. 1995. Paleobotany. Plants of the past, their evolution, paleoenvironment and Allied plants. Hutchinson & Co., Ltd., London.
3. Anderson R.A. 2005, Algal cultural Techniques, Elsevier, London.
4. Publication, Application in exploration of fossil fuels. Oxford & IBH., New Delhi.
5. Eams, A.J., (1974) Morphology of vascular plants - Lower groups. Tata Mc Grew-Hill Publishing Co. New Delhi, Freeman & Co., New York.
6. Fritze, R.E. 1977. Structure and reproduction of Algae. Cambridge University Press.
7. Goffinet B and Shaw A.J. 2009, Bryophyte Biology, 2nd ed. Cambridge University

- Press, Cambridge. Gymnosperms.
8. Srivastava, H N, 2003. Algae Pradeep Publication, Jalandhar, India.
 9. Kakkar, R.K. and B.R.Kakkar (1995) The Gymnosperms (Fossils and Living)
Central Publishing House, Allahabad.
 10. Kumar H. D., 1999, Introductory Phycology, Affiliated East-West Press, Delhi.
 11. Lee, R.E., 2008, Phycology, Cambridge University Press, Cambridge. 4th
edition. McGraw Hill Publishing Co., New Delhi.
 12. Parihar, N.S. 1970. An Introduction to Embryophyta. Vol. I. Bryophyta. Central
Book, Allahabad.
 13. Parihar, N.S. (1976) An Introduction to Pteridophytes, Central Book Depot,
Allahabad.
 14. Parihar, N.S. 1977. The Morphology of Pteridophytes. Central Book Depot.,
Allahabad. Press, Cambridge.
 15. Rashid, A. 1998. An Introduction to Pteridophyta. II ed., Vikas Publishing
House, New Delhi.
 16. Smith, G.M. 1971. Cryptogamic Botany. Vol. II. Bryophytes & Pteridophytes.
Tata Tata McGraw Hill Publishing, New Delhi.
 17. Smith, G.M. 1971. Cryptogamic Botny. Vol. I Algae & Fungi. Tata McGraw Hill
Publishing. New Delhi.
 18. Sporne, K.R. 1965. The Morphology of Gymnosperms. Hutchinson & Co., Ltd.,
London.
 19. Stewart, W.M. 1983. Paleobotany and the Evolution of Plants, Cambridge
University Cambridge.
 20. Sundarajan, S. 1997. College Botany Vol. I. S Chand & Co. Ltd., New Delhi.
 21. Vanderpoorten, A. and Goffinet, B. 2009, Introduction to Bryophytes, Cambridge

University Press, Cambridge.

22. Vashista, B.R. 1978. Bryophytes. S Chand & Co. Ltd., New Delhi.

Pedagogy: Lectures, Practicals, Field and laboratory visits, participatory learning, seminars, assignments, MOOCs and specimen preparation and submission.

Formative Assessment	
Assessment Occasion / type	Weightage in Marks
I TEST	10
II TEST	10
ASSIGNMENT	10
Total	30

Content of Practical Course 2: List of Experiments to be conducted

Practical-1: Study of morphology, classification, reproduction and lifecycle of *Nostoc/Oscillatoria*.

Practical-2: Study of morphology, classification, reproduction and life-cycle of *Oedogonium* & *Chara*, *Sargassum*, *Batrachospermum/ Polysiphonia*.

Practical-3: Study of morphology, classification, reproduction and life-cycle of *Marchantia* & *Anthoceros*.

Practical-4: Study of morphology, classification, anatomy, reproduction and life-cycle of *Selaginella* and *Equisetum*.

Practical -5: Study of morphology, classification, anatomy, reproduction and life-cycle of *Azolla*..

Practical -6: Study of morphology, classification & anatomy, reproduction in *Pinus*.

Practical -7: Study of morphology, classification & anatomy, reproduction in *Gnetum*.

Practical -8: Study of important blue green algae causing water blooms in the lakes.

Practical -9: Study of different methods of cultivation of ferns in a nursery.

Practical -10: Preparation of natural media and cultivation of *Azolla* in artificial ponds.

Practical -11: Media preparation and cultivation of *Spirulina*.

Practical -12: Study different algal products and fossils impressions and slides. (

Practical-13: Submission of algal samples (03) / *Azolla* cultivation/Field visit

(Note: Botanical study tour to a floristic rich area for 1-2 days and submission of study report is compulsory)

