S.S.D. Girls' College, Bathinda

Multidisciplinary Course Based On NEP-2020

B.Sc. / B.Sc. (Honours)

Session: 2025-26

SYLLABUS

B.Sc. (Med.) Part-II (SEMESTER-III)

SUBJECT: MAJOR BOTANY – DIVERSITY OF CRYPTOGAMS

Paper Code: BM302

Total Marks: 70
Theory Marks: 50 marks
Internal Assessment: 20 marks
Pass Marks: 35%

Time Allowed: 3 hours
Total Teaching hours: 3 hours/week
Credit: 3

INSTRUCTION FOR THE PAPER SETTER

The question paper will consist of three sections A, B and C. Section A and B will have four questions each from the respective section of syllabus out of which the student will be required to attempt two questions from each section. Each question will carry 8 marks. Section C will be compulsory with 9 short-answer type questions of 02 marks each which will cover the entire syllabus.

INSTRUCTIONS FOR CANDIDATES

Candidates are required to attempt two questions from each section A and B and the entire section C, which is compulsory.

Section-A

1. Basic characteristics of Algae; habitat, algal cell structure, photosynthetic pigments, reserves food material, classification and economic importance of algae.
2. Important features and life history of Chlorophyceae with emphasis on Volvox and Oedogonium.
3. Important features and life history of Xanthophyceae and Phaeophyceae with emphasis on Vaucheria, Ectocarpus and Sargassum.
4. Important features and life history of Rhodophyceae with emphasis on Batrachospermum. Cell structure and reproduction in Diatoms.

Section – B

5. Bryophyta: General characters, classification, amphibians of Plant Kingdom displaying alternation of generations and ecological and economic importance.
6. Structure, reproduction and affinities of *Marchantia* (Hepaticopsida); *Anthoceros* (Anthocerotopsida); *Funaria* (Bryopsida) - developmental stages are excluded. Evolution of sporophytes in Bryophytes.
7. Pteridophyta: General characters, classification and economic importance of Pteridophytes. Evolution of stellar system in Pteridophytes. Important features and life history of Psilopsida (*Rhynia*) - developmental stages are excluded.
8. Important features and life history of Lycopsida (*Selaginella*); Sphenopsida (*Equisetum*) and Pteropsida (*Pteris* and *Marsilea*) – developmental stages are excluded.

Course Outcomes

1. To discuss about importance of morphology, diversity, structure, classification, reproduction, life cycle pattern and economic importance of Algae.
2. To understand the morphological diversity, taxonomic position, occurrence, thallus structure, reproduction and economic importance of Bryophytes and Pteridophytes.
3. Students will learn about the vegetative and reproductive characteristics of the plant genera.

RECOMMENDED READINGS

1. Parihar, N.S. 1996. *Biology and Morphology of Pteridophytes.* Central Book Depot., Allahabad.
2. Rashid, A. 1998. *An Introduction to Bryophyta.* Vikas Pub. House Pvt. Ltd., New Delhi.
3. Rashid, A. 1999. *An Introduction to Pteridophyta.* Vikas Publ. House, Pvt. Ltd., New Delhi.
4. Sharma, O.P. 2001. *Text Book of Pteridophytes.* MacMillan India Ltd.
5. Vasishta, P.C. 1996. *Bryophyta.* S. Chand & Co. Ltd., New Delhi.
6. Vasishta, P.C. 2000. *Pteridophyta.* S. Chand & Co. Ltd., New Delhi.

Multidisciplinary Course Based On NEP-2020
B.Sc. / B.Sc. (Honours)
B.Sc.-II (Med.) Part-II Semester-III Major Botany
2025-26 Syllabus
Practical Paper: Diversity of Cryptogams
Practical Paper Code: BM302P

Total Marks: 30
Practical Marks: 20 marks
Internal Assessment: 10 marks

Time Allowed: 3 hours
Total Teaching hours: 2 hours/week
Credit: 1

SUGGESTED LABORATORY EXCERCISES

Teachers may select plants/material available in their locality/institution.

1. Study of the genera included under algae and indicating their systematic position.
2. Study of morphology, reproductive structures and anatomy of the examples cited in theory under Bryophyta and Pteridophyta indicating their systematic position.

INSTRUCTIONS FOR PAPER SETTER

1. Section cutting and preparation of permanent slide of material pertaining to Algae, Bryophytes and Pteridophytes.
2. Identification, classification and morphological notes on specimens from Algae, Bryophytes and Pteridophytes.
3. Identification of slides/spots.
4. Practical Note Book.
5. Viva-voce.

S.S.D. Girls' College, Bathinda

Multidisciplinary Course Based On NEP-2020

B.Sc. / B.Sc. (Honours)

Session: 2025-26

SYLLABUS

B.Sc. (Med.) Part-II (SEMESTER-IV)

SUBJECT: MAJOR BOTANY – DIVERSITY AND SYSTEMETICS OF SPERMATOPHYTES

Paper Code: BM402

Total Marks: 70
Theory Marks: 50 marks
Internal Assessment: 20 marks
Pass Marks: 35%

Time Allowed: 3 hours
Total Teaching hours: 3 hours/week
Credit: 3

INSTRUCTION FOR THE PAPER SETTER

The question paper will consist of three sections A, B and C. Section A and B will have four questions each from the respective section of syllabus out of which the student will be required to attempt two questions from each section. Each question will carry 8 marks. Section C will be compulsory with 9 short-answer type questions of 02 marks each which will cover the entire syllabus.

INSTRUCTIONS FOR CANDIDATES

Candidates are required to attempt two questions from each section A and B and the entire section C, which is compulsory.

Section-A

1. Gymnosperms: General features and classification; Origin of Gymnosperms; Economic Importance of Indian Gymnosperms.
2. Pro-Gymnosperms and Fossil Gymnosperms: General characters of Pro-Gymnosperms (*Archaeopteris* and *Aneurophyton*) and Fossil gymnosperms (*Penoxylon*, *Cordaites*, *Glossopteris* and *Lyginopteris*).
3. Cycadales and Coniferales: General characters and classification. Morphology, anatomy, reproduction and life cycle of *Cycas* and *Pinus*.
4. Gnetopsida: General characters of *Ephedrales*, *Welwitschiaies* and *Gnetales*; Morphology, anatomy, reproduction and life cycle of *Ephedra* and *Gnetum*.

Section – B

5. Angiosperm Taxonomy: Brief history; Aims, and fundamental components; Salient features of International code of Botanical Nomenclature: Principles, Ranks of taxa, typification, Principle of priority and citation of authors' names. A brief account on various taxonomic tools like herbarium, Botanical gardens, floras and manual.
6. Classification of Angiosperms: Salient features, comparison, merit and demerits of classification proposed by Bentham and Hooker and Engler and Prantl.
7. Diagnostic features, technical description and economic significance as illustrated by

members of following families: Ranunculaceae, Brassicaceae, Malvaceae, Fabaceae, Apiaceae, Cucurbitaceae, Rosaceae

8. Diagnostic features, technical description and economic significance as illustrated by members of following families: Asclepiadaceae, Solanaceae, Lamiaceae, Euphorbiaceae, Asteraceae, Liliaceae, Poaceae

Course Outcomes

1. To impart knowledge to students about the general characters, classification, evolution, and diversity of different gymnosperms.
2. To acquaint students about the origin and evolution of angiosperms, angiosperm taxonomy, diagnostic features, and technical description of angiosperm families.

RECOMMENDED READINGS

1. Bhatnagar, S.P. and Moitra, A. (2000). Gymnosperms. New Age International Limited, New Delhi.
2. Chopra, G.L. (2002). Angiosperms. Systematic and Life Cycle. Pradeep Publications, Jalandhar.
3. Pandey, B.P. (2004). A Text Book of Botany: Angiosperms. S. Chand and Company Ltd., New Delhi.
4. Sharma, O.P. (2002). Gymnosperms. Pragati Prakashan, Meerut.
5. Sharma, O.P. (2005). Plant Taxonomy. Tata McGraw-Hill Publishing Company Limited, New Delhi.

Multidisciplinary Course Based On NEP-2020

B.Sc. / B.Sc. (Honours)

B.Sc.-II (Med.) Part-II Semester-IV Major Botany

2025-26 Syllabus

Practical Paper: Diversity and Systemetics of Spermatophytes

Practical Paper Code: BM402P

Total Marks: 30	Time Allowed: 3 hours
Practical Marks: 20 marks	Total Teaching hours: 2 hours/week
Internal Assessment: 10 marks	Credit: 1

SUGGESTED LABORATORY EXCERCISES

Gymnosperms

Cycas

I. Section cutting and permanent slide preparation of coralloid root (T.S.), rachis (T.S.) and leaflet (V.S.).
II. Study of microsporophyll, pollen grains (W.M.), megasporophyll, ovule and seed.
III. Study through permanent slides – normal root (T.S.) and ovule (L.S.)

Pinus

I. Section cutting and permanent slide preparation of wood (T.S., T.L.S. and R.L.S.) and needle (T.S.).
II. Morphological study of long and dwarf shoot, male and female cones, pollen grains (W.M.) and seeds.
III. Study through permanent slides – root (T.S.), Male cone (L.S.), female cone (L.S.), ovule (L.S.), embryo (W.M.) showing polycotyledonous condition.

Ephedra

I. Section cutting and permanent slide preparation of young and mature stem (T.S.).
II. Maceration of wood to study vessel structure.
III. Structure of male and female cones and pollen grains (W.M.).

Angiosperms

The following genera are recommended for study. This list is only indicative. Teachers may select plants available in their locality.

1. Ranunculaceae: *Ranunculus* / *Delphinium*	8. Rosaceae: *Rosa*
2. Brassicaceae: *Brassica* / *Iberis*	9. Asclepiadaceae: *Calotropis*
3. Malvaceae: *Hibiscus*, *Abutilon*	10. Solanaceae: *Solanum* / *Datura*
4. Rutaceae: *Murraya* / *Citrus*	11. Euphorbiaceae: *Euphorbia* / *Phyllanthus*
5. Fabaceae: Faboideae: *Lathyrus* / *Trigonella;* Caesalpinioideae: *Cassia;* Mimosoideae: *Acacia* / *Albizzia*	12. Asteraceae: *Helianthus*, *Ageratum*, *Sonchus*
6. Apiaceae: *Coriandrum*	13. Lamiaceae: *Ocimum* / *Salvia*
7. Cucurbitaceae: *Cucurbita*	14. Liliaceae: *Asparagus* / *Allium*
	15. Poaceae: *Avena* / *Triticum*

INSTRUCTIONS FOR PAPER SETTER

1. Section cutting and preparation of permanent slide
2. Description of complete flower, along with V.S., floral diagram and referring to the family giving reasons
3. Description of only two floral whorls of a given flower (to be given by the examiner)
4. Field Report
5. Two Morphological notes (Pertaining to Gymnosperms)
6. Identification of two spots and two slides (with atleast two diagnostic features)
7. Practical Note Book.
8. Viva-voce.