

Affiliated by Sant Gadge Baba Amravati University
Amravati.

Department of Botany

Syllabus Prescribed for Three Year U G Programme

BOT(2S) Botany

Total No. of periods 80

Bryophytes, Pteridophytes, Gymnosperms and Morphology of Angiosperms

Marks: 80

Unit I: Bryophytes

1.1 General characteristics, affinities with algae and pteridophytes and Classification of Bryophytes by G.M. Smith

1.2 Morphology, Anatomy and Reproduction of

i) Marchantiales : *Marchantia*

ii) Anthocerotales : *Anthoceros*

iii) Briales : *Funaria*

Ecological and Economical Importance of Bryophytes

Unit II: Pteridophytes

2.1 General characteristics of Pteridophytes

2.2 Types of Stele in Pteridophytes

2.3 Classification of Pteridophytes by G.M. Smith

2.4 Morphology, Anatomy and Reproduction of

i) Sphenopsida : *Equisetum*

ii) Lycopsida : *Selaginella*

iii) Filicopsida : *Marsilea*

Unit III: Gymnosperms and Palaeobotany

3.1 General characteristics and affinities of Gymnosperms with Angiosperm

3.2 Classification of Gymnosperms by D.D. Pant

3.3 Morphology, Anatomy and Reproduction of

i) Coniferopsida : *Pinus*

ii) Gnetopsida : *Gnetum*

3.4 Economic importance of Gymnosperms.

3.5 Process of plant fossilization and types of fossils.

Unit IV: Morphology of Angiosperms

4.1 Life cycle pattern: Annual, Biennial and Perennial

4.2 Angiosperm plant body: Morphology and Modification of Root and Stem

4.3 Leaf : Types, Modifications, Phyllotaxy, Venation and Stipules

4.4 Inflorescence : Racemose, Cymose and Special Types

4.5 Flowers: Structure of Flower- Calyx, Corolla, Androecium, Gynoecium and Placentation

Unit V: Utilization of Plant Wealth

5.1 Fruits: Morphology and Type

5.2 Morphology, variety and economic importance of

5.2.1 Food plant: Cereal- Wheat (*Triticum aestivum*) ;

Pulses- Pigeon pea (*Cajanus cajan*),

5.2.2 Spices : Cardamom (*Ellataria cardamomum*),

5.2.3 Oil yielding plants : Sunflower (*Helianthus annuus*)

5.2.4 Fiber Plants: Cotton (*Gossypium sp.*),

5.2.5 Essential oils- Plant Description and Uses – Rose (*Rosa sp.*) Nilgiri oil (*Eucalyptus sp.*)

Unit VI : Traditional Knowledge of Medicinal Plants

Morphology, Phytochemistry and medicinal uses of

- 6.1. *Aloe vera*
- 6.2. *Adhatoda vasica*
- 6.3. *Asparagus racemosus*
- 6.4. *Azadirachta indica*
- 6.5. *Catharanthus roseus*
- 6.6. *Chlorophytum borivillianum*
- 6.7. *Emblica officinalis*
- 6.8. *Ocimum sanctum*
- 6.9. *Rauwolfia serpentina*
- 6.10. *Vitex negundo*
- 6.11. *Withania somnifera*
- 6.12. *Tinospora cordifolia*

Skill Enhancement Module-

Module Herbal Technology

1. Definition and Scope of Herbal Technology
2. Overview of “Ayush”
3. Cultivation, harvesting, processing and storage of herbal plant parts and product
4. Morphology and Microscopic Examination. And Preliminary Phytochemistry of
 - i) *Catharanthus roseus*
 - ii) *Ocimum sanctum*
 - iii) *Azadirachta indica*
 - iv) *Achyranthes aspera*
 - v) *Aloe vera*

Activities-

1. Photographic collection and preparation of e-herbarium of medicinal plants
 2. Cultivation of herbal medicinal plants in college garden, home kitchen garden.
 3. Preliminary phytochemical analysis of Mentioned medicinal plants
 4. Microscopic preparation of herbal medicinal plants and its microphotography.
- Project on local herbal plants to be submitted at the end of session.
Report submission including photographs and microphotographs of host and pathogen.

Laboratory/Practical/practicum/hands- on/Activity- (No. of Periods/Week) -2

Practical

1. Bryophytes :Study of morphology and anatomy of vegetative and reproductive parts of following genera – Marchantia, Anthoceros, Funaria
- 2 Pteridophyta: Study of morphology and anatomy of vegetative and reproductive parts of following genera – Selaginella, Equisetum, Marsilea
- 3 Gymnosperms: Study of morphology and anatomy of vegetative and reproductive parts of following genera – Pinus, Gnetum
- 4 Study of types of fossils.
- 5 Morphology:- Detail morphological study of following types of plant parts - Root, Stem, Leaves, Stipule, Inflorescence, Flower, Placentation, Fruits
- 6 Utilization of plants: Morphology varieties and economic importance of following plants
 - i) Food plants-Wheat
 - ii) Pulses – Pigeonpea
 - iii) Spices- Cardamom
 - iv) Oil yielding plants- Sunflower
 - v) Fiber yielding- Cotton
 - vi) *Mentha piperata* (only uses)
 - vii) *Eucalyptus* (only uses)
- 7 Medicinal plants-. *Aloe vera*, *Adhatoda vasica*, *Asparagus racemosus*, *Azadirachta indica*, *Catharanthus roseus*, *Chlorophytum borivillianum*, *Emblica officinalis*, *Ocimum sanctum*, *Rauwolfia serpentina*, *Vitex negundo*, *Withania somnifera*, *Tinospora cordifolia*

Additional Activities

1. Botanical Excursion (short/long)
2. Visit to any biodiversity rich area to study the plant diversity in natural habitat.

3. The botanical excursion is compulsory for all students and the report of excursion should be submitted at the time of practical examination.
4. Photographic collection of bryophytic, pteridophytic and gymnospermic plants specimens

Submission

1. Photographic herbarium of Bryophytes, Pteridophytes, Gymnosperms etc.
2. Botanical excursion report .

Course Material/Learning Resources

Textbooks:

- 1) A.C. Dutta : Text Book of Botany.
- 2) Andrews A.N. : Studies in Paleobotany.
- 3) Arnold C.A. : Introduction of Paleobotany.
- 4) Bhatnagar S.P. and Moitra A., 1996 : Gymnosperms, New Age International Limited, New Delhi.
- 5) Bhojwani & Bhatnagar : Embryology of Angiosperms.
- 6) Coulter M.J. & Chamberlain C.J. : Morphology of Gymnosperms.
- 7) Cutter E.G., 1971 : Plant Anatomy Experiment and Interpretation Part-II, Organs, Edward Arnold, London.
- 8) Cutter, E.G. 1969 : Part-I, Cells and tissues, Edward, Arnold, London.
- 9) Davis P.H., and Heywood V.H., 1993 : Principles of Angiosperm Taxonomy: Oliver and Boyd, London.
- 10) Eames E.J. : Morphology of vascular Plants.
- 11) Gangulee & Kar : College Botany Vol.II
- 12) Gangulee Das and Dutta : College Botany, Vol.I
- 13) Gifford E.M. and Foster A.S., 1988 : Morphology and Evolution of Vascular Plants, W.H. Freeman & Company, New York.
- 14) Hartmann H.T. and Kestler D.E., 1976 : Plant Propagation Principles and practices, 3rd edition, Prentice Hall of India Pvt.Ltd. New Delhi.
- 15) Heywood V.H. and Moore D.M. (Eds) 1984 : Current concepts plant Taxonomy. Academic Press, London.
- 16) Jeffrey C., 1982: An introduction to Plant Taxonomy, Cambridge University Press, Cambridge, London.
- 17) Maheshwari P. : Introduction of Embryology of Angiosperms.
- 18) Pande B.P. : A Text Book of Angiosperms.
- 19) Proctor M. and Yeop, 1973 : The Pollination of Flowers, William Collins Sons, London.
- 20) Radford A.E., 1986 : Fundamentals of Plant Systematics, Harper and Row, New York.
- 21) Rendle A.B. : Classification of flowering plants, Vol.I & Vol.II.
- 22) S. Sundar Rajan : College Botany, Vol.II & Vol.III.
- 23) Saxena and Sarabhai : A Text Book of Botany, Vol.II
- 24) Sharma O.P. : Gymnosperms.
- 25) Shukla & Mishra : Paleobotany.
- 26) Singh and Jain: Taxonomy of Angiosperms.
- 27) Singh, 4. 1999, Plant Systematics - Theory and Practices, Oxford and IBH Pvt. Ltd., New Delhi.
- 28) Sporne K.R.: Morphology of Gymnosperms.
- 29) Sporne K.R., 1965: The Morphology of Gymnosperms, Hutchinson & Company, (Publisher) Ltd. London.
- 30) Stace C.A., 1989: Plant Taxonomy and Biosystematics (2nd Edition Edward Arnold, London.
- 31) Stewart W.N., 1983 : Paleobotany and Evolution of Plants, Cambridge University Press, Cambridge.
- 32) Thomas P., 2000: Trees - Their natural history, Cambridge University Press, Cambridge.
- 33) Trivedi B.S. & Sharma B.B. : Introductory Taxonomy.
- 34) Tyagi & Kshetrapal : Taxonomy of Angiosperms.
- 35) Vasistha P.C.: Gymnosperms.
- 36) Vasistha P.C.: Taxonomy of Angiosperms.
- 37) Vyas Purohit Garg : A Text Book of Gymnosperms.
- 38) Walton: An Introduction & Study of fossil.
- 39) Modern Practical Botany, Volume-I, Dr.P.B.Pande, S.Chand Pub., N.W.
- 40) Modern Practical Botany, Volume-II, Dr.P.B.Pande, S.Chand Pub., N.W.
- 41) Modern Practical Botany, Volume-III, Dr.P.B.Pande, S.Chand Pub., N.W. Sahni, K.C. 2000.
- 42) The Book of Indian Trees, 2nd edition. Oxford University Press, Mumbai.
- 43) Schery, R.W. 1972. Plant for Man. 2nd Ed. Englewood Cliffs, New Jersey. Prentice Hall.
- 44) Sharma, O.P. 1996. Hill's Economic Botany (Late Dr.A.F.Hill, adapted by O.P.Sharma) Tata McGraw Hill Co. Ltd., New Delhi.
- 45) Swaminathan, M.S. and Kocchar, S.L. (Eds) 1989. Plants and Society. Macmillan Publication Ltd., London.
- 46) Thakur, R.S., Puri, H.S. and Husain, A. 1989. Major and Aromatic Plants, CSIR, Lucknow.
- 47) Thomas, P. 2000. Trees : Their National History, Cambridge University Press, Cambridge.
- 48) Wagner, H., Hikino, H. and Farnsworth, N. 1989. Economic and Medicinal Plant Research, Vols. 1-3. Academic Press, London.
- 49) Walter, K.S. and Gillett, H.J. 1998. 1997 IUCN Red List of Threatened Plants. IUCN, the

World Conservation Union, IUCN, Gland, Switzerland, and Cambridge, U.K.

- 50) A Text Book of Botany –Paleobotany, Gymnosperms, Morphology and Utilization of Plants (2014), Dr.P.W.Deotare, Dr.M.A.Shahezaad, Dr.Mrs.U.G.Malode, Dr.U.S.Patil, Dr.Mrs.P.S.Kokate, 113 114 Dr.Mrs.S.P.Khodke, Published by NabhPrakashan, Amravati.
- 51) Morphology of Angiosperms and Utilization of Plants, Dr.Shubhangi Ingole, Published by PaygunPublishers, Amravati.

ReferenceBooks:

<https://www.sanfoundry.com/best-reference-books-bryophyta-pteridophyta-gymnosperm-palaeobotany/>

[https://link.springer.com/chapter/10.1007/978-3-662-02604-](https://link.springer.com/chapter/10.1007/978-3-662-02604-5_5)

[5_5https://books.google.com/books/about/An Introduction to Archegoniate Plants.html?id=0Uh1DwAAQBAJ](https://books.google.com/books/about/An+Introduction+to+Archegoniate+Plants.html?id=0Uh1DwAAQBAJ)

WeblinktoEquivalentMOOConSWAYAMifrelevant

: <https://swayam.gov.in/explorer>

WeblinktoEquivalentVirtualLabifrelevant:

Anypertinentmedia(recordedlectures,YouTube,etc.)

if relevant: <https://youtu.be/Ru96iXsWpyg>

<https://youtu.be/IczPZPt281E>

