

Ahmednagar Jilha Maratha Vidya Prasarak Samaj's
New Arts, Commerce and Science College, Ahmednagar
(Autonomous)
(Affiliated to Savitribai Phule Pune University, Pune)



Choice Based Credit System (CBCS)
Bachelor of Science (B. Sc.)

Syllabus of
F. Y. B. Sc. Botany

Implemented from
Academic year 2021 -22

Ahmednagar Jilha Maratha Vidya Prasarak Samaj's
New Arts, Commerce and Science College, Ahmednagar
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Board of studies in Botany

Sr. No.	Name	Designation
1.	Dr. C. S. Arsule	Chairman
2.	Dr. D. D. Ahire	Member
3.	Dr. Y. R. Gahile	Member
4.	Dr. P. P. Sharma	Academic Council Nominee
5.	Dr. M. L. Ahire	Academic Council Nominee
6.	Dr. S. G. Auti	Vice-Chancellor Nominee
7.	Mr. D. K. Jadhav	Alumni
8.	Dr. S. A. Punekar	Industry Expert
9.	Mr. A. S. Wani	Member (co-opt)
10.	Dr. A. A. Kulkarni	Member (co-opt)

I. Prologue /Introduction of the programme:

1. To provide thorough knowledge about various plant groups from primitive to highly evolved.
2. Accurately interpretation of collected information and use taxonomical information to evaluate and formulate a position of plant in taxonomy.
3. Critically evaluation of ideas and arguments by collection relevant information about the plants, so as recognize the position of plant in the broad classification and phylogenetic level.
4. Identify problems and independently propose solutions using creative approaches, acquired through interdisciplinary experiences, and a depth and breadth of knowledge/expertise in the field of Plant Identification.
5. Students will be able to identify the major groups of organisms with an emphasis on plants and be able to classify them within a phylogenetic framework. Students will be able to compare and contrast the characteristics of plants, algae, and fungi that differentiate them from each other and from other forms of life.
6. Students will be able to use the evidence of comparative biology to explain how the theory of evolution offers the only scientific explanation for the unity and diversity of life on earth. They will be able to use specific examples to explicate how descent with modification has shaped plant morphology, physiology, and life history.
7. Students will be able to explain how plants function at the level of the gene, genome, cell, tissue, Flower development. Drawing upon this knowledge, they will be able to give specific examples of the physiological adaptations, development, reproduction and mode of life cycle followed by different forms of plants.
8. Students will be able to demonstrate proficiency in the experimental techniques and methods of analysis appropriate for their area of specialization within botany.
9. To make the students aware of applications of different plants in various industries.
10. To highlight the potential of these studies to become an enterpruner.
11. To equip the students with skills related to laboratory as well as industries based studies
12. To equippe the students with skills related to laboratory as well as field based studies.
13. To make the students aware about conservation and sustainable use of plants.
14. To create foundation for further studies in Botany.
15. To address the socio-economical challenges related to plant sciences.
16. To facilitate students for taking up and shaping a successful career in Botany.

2. Programme Specific Outcomes (PSOs):

Students enrolled in the programme complete a curriculum that exposes and trains in the full range of essential skills and abilities. They will have the opportunity to master the following objectives.

- I. Educate students about plant science.
- II. Inculcate strong fundamentals on modern and classical aspects of Botany.
- III. Create platform for higher studies in Botany.
- IV. Facilitate students to take-up successful career in Botany
- V. Acquire practical skills to gather information, assess, create and execute new ideas to develop entrepreneurial skills.
- VI. Learn to respect and conserve nature and the environment.

3. Programme Structure and Course Titles

Sr. No.	Class	Semester	Course Code	Course Title	Credits
1.	F.Y.B.Sc.	I	BSC-BO 101 T	Plant Life and Utilization I	2
2.	F.Y.B.Sc.	I	BSC-BO 102 T	Plant Morphology and Anatomy	2
3.	F.Y.B.Sc.	I	BSC-BO 103 P	Practicals based on BO 101 and BO 102	1.5
4.	F.Y.B.Sc.	II	BSC-BO201 T	Plant Life and Utilization II	2
5.	F.Y.B.Sc.	II	BSC-BO202 T	Principles of Plant Science	2
6.	F.Y.B.Sc.	II	BSC-BO203 P	Practicals based on BO 201 and BO 202	1.5
7.	S.Y.B.Sc.	III	BSC-BO301 T	Taxonomy of Angiosperms and Plant Ecology	2
8.	S.Y.B.Sc.	III	BSC-BO302 T	Plant Physiology	2
9.	S.Y.B.Sc.	III	BSC-BO303 P	Practicals based on BO 301 and BO 302	2
10.	S.Y.B.Sc.	IV	BSC-BO 401 T	Plant Anatomy and Embryology	2
11.	S.Y.B.Sc.	IV	BSC-BO402 T	Plant Biotechnology	2
12.	S.Y.B.Sc.	IV	BSC-BO403 P	Practicals based on BO 401 and BO 402	2
13.	T.Y.B.Sc.	V	BSC-BO501 T	Algae and Fungi	2
14.	T.Y.B.Sc.	V	BSC-BO502 T	Archegoniate	2
15.	T.Y.B.Sc.	V	BSC-BO503 T	Spermatophyta and Paleobotany	2
16.	T.Y.B.Sc.	V	BSC-BO504 T	Plant Ecology	2
17.	T.Y.B.Sc.	V	BSC-BO505 T	Cell and Molecular Biology	2
18.	T.Y.B.Sc.	V	BSC-BO506T	Genetics	2
19.	T.Y.B.Sc.	V	BSC-BO507P	Botany Practical I Based on BO 501 and BO 502	2
20.	T.Y.B.Sc.	V	BSC-BO508P	Botany Practical II Based on BO 503 and BO 504	2

<i>Continue.....</i>					
Sr. No.	Class	Semester	Course Code	Course Title	Credits
21.	T.Y.B.Sc.	V	BSC-BO509 P	Botany Practical III Based on BO 505 and BO 506	2
22.	T.Y.B.Sc.	V	BSC-BO510 T	Medicinal Botany	2
23.	T.Y.B.Sc.	V	BSC-BO511P	Practicals based on BO 510	2
24.	T.Y.B.Sc.	VI	BSC-BO601 T	Plant Physiology and Metabolism	2
25.	T.Y.B.Sc.	VI	BSC-BO602 T	Biochemistry	2
26.	T.Y.B.Sc.	VI	BSC-BO603 T	Plant Pathology	2
27.	T.Y.B.Sc.	VI	BSC-BO604 T	Evolution and population Genetics	2
28.	T.Y.B.Sc.	VI	BSC-BO605 T	Advanced Plant Biotechnology	2
29.	T.Y.B.Sc.	VI	BSC-BO606T	Plant Breeding and Seed Technology	2
30.	T.Y.B.Sc.	VI	BSC-BO607P	Botany Practical I Based on BO 601 and BO 602	2
31.	T.Y.B.Sc.	VI	BSC-BO608P	Botany Practical II Based on BO 603 and BO 604	2
32.	T.Y.B.Sc.	VI	BSC-BO609 P	Botany Practical III Based on BO 605 and BO 606	2
33.	T.Y.B.Sc.	VI	BSC-BO610 T	Nursery and Gardening Management	2
34.	T.Y.B.Sc.	VI	BSC-BO611P	Project/Practicals based on Advanced Instrumentation in Botany	2

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Semester-I	Paper-I
Course Code : BSC-BO 101	Title of Course : Plant Life And Utilization-I
Credits: 02	Total lecture: 30 Hours

Course outcomes

On completion of the course, students are able to:

1. Understand the characters and classification of Algae, Fungi, Lichen and Bryophytes
2. Know the systematic, morphology and structure, of Algae, Fungi, Lichen and Bryophytes
3. Understand the life cycle pattern of Algae, Fungi, Lichen and Bryophytes
4. Understand the reproduction of Algae, Fungi, Lichen and Bryophytes.
5. Know the Economic Importance and Utilization of Algae, Fungi, Lichen and Bryophytes.

Detailed syllabus**Credit I****(15 Hours)****UNIT I: INTRODUCTION****(3)**

- 1.1 General outline of plant kingdom (Lower Cryptogams: Thallophytes- Algae, Fungi & Lichens;
- 1.2 Higher Cryptogams: Bryophytes and Pteridophytes;
- 1.3 Phanerogams: Gymnosperms and Angiosperms- Dicotyledons and Monocotyledons).
- 1.4 Distinguishing characters of these groups and mention few common examples from each.

UNIT II: ALGAE**(9)**

- 2.1: Introduction
- 2.2: General Characters
- 2.3: Classification (Bold and Wynne 1978) up to classes with reasons

2.4: Life Cycle of *Spirogyra* w.r.t. Habit, Habitat, Structure of thallus, structure of typical cell, Reproduction- Vegetative, Asexual and Sexual, systematic position with reasons

2.5: Utilization of Algae in Biofuel Industry, Agriculture, Pharmaceuticals, Food and Fodder

UNIT III: LICHENS (3)

3.1: Introduction

3.2: General Characters

3.3: Nature of Association, forms- Crustose, Foliose and Fruticose.

3.4: Utilization of lichens.

CREDIT-II (15 Hours)

UNIT I: FUNGI (9)

4.1: Introduction

4.2: General Characters

4.3: Classification (Ainsworth, 1973)

4.4: Life Cycle of Albugo / Cystopus- Habit, Habitat, Symptoms of White Rust Disease and its Occurrence, Structure of the Mycelium, Reproduction in Albugo, Systematic position.

4.5: Utilization of Fungi in Industry, Agriculture, Food and Pharmaceuticals.

UNIT II: BRYOPHYTES (6)

5.1: Introduction

5.2: General Characters

5.3: Classification (G.M. Smith 1955)

5.4: Life Cycle of *Riccia* w.r.t.Habit, habitat, external and internal structure of thallus, Reproduction- vegetative, asexual and sexual- Structure of sex organs, fertilization, structure of mature sporophyte, structure of spore, systematic position with reasons.

5.5: Utilization: Bryophytes as ecological indicators, agriculture, fuel, industry and medicine. (Development of sex organs not expected for all the above mentioned life cycles).

Suggested Readings:

1. Ainsworth, Sussman and Sparrow (1973). The Fungi. Vol. IV-A and IV-B. Academic Press.
2. Bilgrami, K.S. and Saha, L.C. (1992) A Textbook of Algae. CBS Publishers and Distributors, Delhi.
3. Gangulee, Das and Dutta (2002). College Botany. Vol. I, New Central Book Agency (P) Ltd.
4. Dube, H.C. (1990). An Introduction to Fungi. Vikas Publishing House Pvt. Ltd., Delhi.

5. Krishnamurty, V. (2000). *Algae of India and neighboring countries, Chlorophyta*, Oxford and IBH, New Delhi.
 6. Parihar, N.S. (1980). *Bryophyta, An Introduction of Embryophyta. Vol. I. Central Book Distributors, Allahabad.*
 7. Puri, P. (1980). *Bryophyta: Broad prospective. Atma Ram & Sons, Delhi.*
 8. Smith, G.M. (1971). *Cryptogamic Botany. Vol. I: Algae & Fungi. Tata McGraw Hill Publishing Co., New Delhi.*
 9. Smith, G.M. (1971). *Cryptogamic Botany. Vol. II: Bryophytes & Pteridophytes. Tata McGraw Hill Publishing Co., New Delhi.*
 10. Vashista, B.R., Sinha, A.K. and Singh, V.B. (2005). *Botany for degree students- Algae*, S. Chand Publication.
 11. Vashista, B.R., Sinha, A.K. and Singh, V.B. (2005). *Botany for degree students- Fungi*, S. Chand Publication.
 12. Vashista, B.R., Sinha, A.K. and Singh, V.B. (2005). *Botany for degree students- Bryophytes*, S. Chand Publication.
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Semester-I	Paper-II
Course Code : BSC-BO 102	Title of Course : Plant Morphology And Anatomy
Credits: 02	Total lecture: 30 Hours

Course outcomes:

On completion of the course, students will be able to:

1. Understanding of plant morphology terminologies and identifying morphological peculiarities.
2. Recognize members of the major angiosperm families by identifying their diagnostic features
3. The students will gain ability to apply the acquired knowledge and skills in the field of plant morphology and anatomy.
4. Provide lab based training in writing short species description and illustration
5. This course aims to impart an insight into the internal structure of Dicot and monocot plants
6. The students will learn about the basic concepts in Morphology and anatomy.

Detailed syllabus

CREDIT-I **(15 Hours)**

UNIT I . MORPHOLOGY **(1)**

- 1.1: Introduction, definition, descriptive and interpretative morphology.
- 1.2: Importance in identification, nomenclature, classification, phylogeny and Plant breeding.

UNIT II.: MORPHOLOGY OF VEGETATIVE PARTS: ROOT, STEM AND LEAF **(3)**

- 2.1 Introduction
- 2.2 Morphology of Root: Types and Function

2.2 Morphology of Stem: Types and Function

2.3 Morphology of Leaf: Types and Function

UNIT III: MORPHOLOGY OF REPRODUCTIVE PARTS: (3)

3.1 **INFLORESCENCE:** Introduction and definition

3.2 Types:

- a) Racemose -Raceme, Spike, Spadix, Corymb, Umbel, Catkin and Capitulum.
- b) Cymose -Solitary, Monochasial- Helicoid and scorpioid; Dichasial and Polychasial.
- c) Special types -Verticillaster, Cyathium and Hypanthodium.

3.3 Significance

UNIT IV: FLOWER (5)

4.1 Introduction and definition

4.2 Parts of a typical flower: Bract, Pedicel, Thalamus- forms, Perianth- Calyx and Corolla, Androecium and Gynoecium.

4.3 Symmetry: Actinomorphic and zygomorphic, Sexuality- Unisexual and bisexual, Insertion of floral whorls on thalamus- Hypogyny, Epigyny and perigyny, Merous condition-Trimerous, tetramerous and pentamerous.

4.4 Floral whorls:

- a) **Calyx:** Nature- Polysepalous, Gamosepalous; Aestivation- types, Modifications of Calyx- Pappus, Petaloid and Spurred.
- b) **Corolla:** Forms of Corolla-
 - i) Polypetalous- Cruciform and Papilionaceous.
 - ii) Gamopetalous- Infundibuliform, Bilabiate, Tubular and Campanulate.
 - iii) Aestivation- types and significance.
- c) **Perianth:** Nature- Polytepalous, Gamotepalous.
- d) **Androecium:** Structure of typical stamen, Variations- cohesion and adhesion.
- e) **Gynoecium:** Structure of typical carpel, number, position, cohesion and adhesion; placentation- types and significance.

UNIT V: FRUITS (3)

5.3.1 Introduction and definition

5.3.2 Types of fruits:

- a) **Simple:** Indehiscent - Achene, Cypsela, Nut and Caryopsis.
Dehiscent - Legume, Follicle and Capsule,
- b) **Fleshy:** Drupe, Berry, Hesperidium and Pepo.
- c) **Aggregate:** Etaerio of Berries and Etaerio of Follicles.
- d) **Multiple fruits:** Syconus and Sorosis.

CREDIT- II (15 Hours)

UNIT I: ANATOMY (2)

3.1 Introduction and definition

3.2 Importance in Taxonomy, Physiology, Ecological interpretations, Pharmacognosy and Wood identification.

UNIT II: TYPES OF TISSUES (8)

Outline with brief description, simple and complex tissues.

4.1: **Meristmatic tissues:** Meristem, characters and types based on origin, position and plane of division, functions.

4.2: **Permanent tissues:** Simple tissues- parenchyma, collenchymas, chlorenchyma and sclerenchyma.

4.3: **Complex/Vascular tissues:** Components of xylem and phloem, types of vascular bundles and functions.

4.4: **Epidermal tissues:** Epidermis, structure of typical stomata, trichomes, motor cells; functions.

UNIT III: INTERNAL ORGANIZATION OF PRIMARY PLANT BODY (5)

5.1: Internal structure of dicotyledon and monocotyledon root.

5.2: Internal structure of dicotyledon and monocotyledon stem.

5.3: Internal structure of dicotyledon and monocotyledon leaf.

Suggested Readings:

1. Chandurkar, P.J. (1989). Plant Anatomy. Oxford and IBH Publishing Co. Pvt. Ltd., New Delhi.
2. Dutta, A.C. (2003). Botany for Degree students. Oxford University Press, New Delhi.
3. Eames, J. and Mc. Daniels (1994). An Introduction to Plant Anatomy. Tata McGraw Hill Publishing Comp., New Delhi.
4. Esau, K. (1993). Plant Anatomy. Wiley Eastern Ltd. New Delhi.
5. Esau, K. (2006). Anatomy of seed plants. John Wiley and Sons, New York.
6. Fahn, A. (1974). Plant Anatomy. Pergamum Press Oxford.
7. Gangulee, Das and Dutta (2002). College Botany. Vol. I. New Central Book Agency, Kolkata.
8. Lawrence, G.H.M. (2012). Taxonomy of vascular Plants. Scientific Publishers (India) Jodhpur.
9. Naik, V.N. (1994). Taxonomy of Angiosperms. Tata McGraw Hill Publishing Comp., New Delhi.
10. Pandey, B.P. (2007). Plant Anatomy. S. Chand and Co. Ltd. New Delhi.
11. Pandey, B.P. (2009). A Text Book of Botany- Angiosperms. S. Chand and Co. Ltd. New Delhi.

12. Radford, Albert E. (1986). *Fundamentals of Plant Systematics*. Publ. Harper and Row, New York.
 13. Saxena, A.K. and Sarabhai, R.P. (1968). *A Text Book of Botany*. Vol. III. Ratan Prakashanmandir, Agra.
 14. Sharma, O.P. (1993). *Plant Taxonomy*. 2nd Edition, McGraw Hill Education, New Delhi.
 15. Singh, Gurucharan (2005). *Systematics- Theory and Practice*. Oxford IBH.
 16. Sutaria, R.N.A. *Text Book of Systematic Botany*.
 17. Tayal, M.S. (2012). *Plant Anatomy*. Rastogi Publications.
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Semester-I	Paper-III
Course Code : BSC-BO 103 P	Title of Course : Practicals Based on BO 101 & BO 102
Credits: 1.5	Total lecture: 45 hours

Practicals:

1. Study of Life Cycle of *Spirogyra*. (1P)
2. Study of Life Cycle of *Albugo/Cystopus* (1P)
3. Study of Life Cycle of *Riccia* (1P)
4. Study of forms of Lichens- Crustose, Foliose and fruticose. (1P)
5. Study of Morphology of Root, Stem and Leaf (1P)
6. Study of Inflorescence. (2P)
 - a. Racemose: Raceme, Spike, Spadix, Catkin, Corymb, Umbel and Capitulum
 - b. Cymose: Solitary cyme, Uniparous cyme: helicoid and scorpiod, Biparous cyme and Multiparous cyme.
 - c. Special type: Verticillaster, Hypanthodium and Cyathium.
7. Study of flower with respect to Calyx, Corolla and Perianth, Androecium and Gynoecium (1P)
8. Study of fruits with suitable examples. (1P)
 - a) Simple fruit: Dry: Achene, Cypsella and Legume; Fleshy: Berry and Drupe.
 - b) Aggregate fruit: Etaerio of follicles and Etaerio of Berries.
 - c) Multiple fruit: Syconus and Sorosis.
9. Study of internal primary structure of dicotyledonous root and stem e.g. Sunflower. (1P)
10. Study of internal primary structure of monocotyledonous root and stem e.g. Maize. (1P)
11. Study of internal primary structure of dicotyledonous and monocotyledonous leaf e.g. Sunflower and Maize. (1P)

Note: One day excursion tour to study Algae, Fungi, Bryophytes and Lichens.

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Semester- II	Paper- I
Course Code : BSC-BO 201	Title of Course : Plant Life And Utilization-II
Credits: 02	Total lecture: 30 Hours

Course outcomes:

On completion of the course, students are able to:

1. Understand the general characters of pteridophytes, gymnosperms and angiosperms.
2. Know the systematic, morphology and structure of pteridophytes, gymnosperms and angiosperms
3. Understand the life cycle pattern of pteridophytes and gymnosperms
4. Understand the reproduction of pteridophytes and gymnosperms
5. Know the utilization and economic importance
6. Know the utilization and economic importance of pteridophytes, gymnosperms and angiosperms.

Detailed syllabus**CREDIT-I****(15 Hours)****UNIT I: INTRODUCTION****(3)**

Introduction to plant diversity- Pteridophytes, Gymnosperms and Angiosperms with reference to vascular plants.

UNIT II: PTERIDOPHYTES**(12)**

General characters, Outline classification according to Sporne (1976) up to classes with reasons. Life cycle of *Nephrolepis* w.r.t. Habit, habitat, distribution, morphology, anatomy of stem and leaf, Reproduction – vegetative and sexual. Utilization and economic importance of Pteridophytes.

CREDIT-II**(15 Hours)****UNIT I: GYMNOSPERMS:****(8)**

General characters, Outline classification according to Sporne (1977) up to classes with reasons. Life cycle of *Cycas* w.r.t. Habit, Habitat, Distribution, Morphology and Anatomy of Stem, leaf and reproductive organs- Male cone, Microsporophyll, microspores and megasporophyll, megaspore; structure of seed; Utilization and economic importance of gymnosperms.

UNIT I: ANGIOSPERMS**(7)**

General characters, Systems of classification, Outline of classification of Bentham and Hooker's system up to series, comparative account of monocotyledons and dicotyledons.

Utilization and economic importance of Angiosperms: In food, fodder, fibers, horticulture and medicines.

Suggested Readings:

1. Bendre, Ashok and Kumar, Ashok (1993). A Text Book of Practical Botany, Rastogy Publications, Meerut.
2. Chamberlain, C.J. (1934). Gymnosperms- Structure and Evolution. Chicago.
3. Coulter, J.M. and Chamberlain, C.J. (1917). Morphology of Gymnosperms. Chicago.
4. Davis, P.H. and Heywood, V.H. (1963). Principles of Angiosperms taxonomy. Oliver and Boyd Publ. London.
5. Dutta, S.C. (1988). Systematic Botany. Wiley Eastern Ltd., New Delhi.
6. Eames, E.J. (1983). Morphology of Vascular Plants. Standard University Press.
7. Gangulee and Kar (2006). College Botany. New Central Book Agency (P.) Ltd. Kolkata.
8. Naik, V.N. (1994). Taxonomy of Angiosperms. Tata McGraw Hill Publishing Comp., New Delhi.
9. Parihar, N.S. (1976). Biology and Morphology of Pteridophytes. Central Book Depot.
10. Rashid, A. (1999). An Introduction to Pteridophyta. Vikas Publishing House Pvt. Ltd. New Delhi.
11. Sharma, O.P. (1990). Text Book of Pteridophyta. McMillan India Ltd. Delhi.
12. Singh, V. and Jain, D.K. (2010). Taxonomy of Angiosperms. Rastogy Publications, Meerut.
13. Singh, V., Pande, P.C., and Jain, D.K. (2011). A Text Book of Botany: Angiosperms. Rastogy Publications, Meerut.
14. Smith, G.M. (1955). Cryptogamic Botany Vol. II. McGraw Hill.
15. Sporne, K.R. (1986). The Morphology of Pteridophytes. Hutchinson University Library, London.
16. SundarRajan, S. (1999). Introduction to Pteridophyta. New Age International Publishers, New Delhi.

17. Vashishta, P.C., Sinha, A.R. and Kumar, Anil (2006). *Gymnosperms*. S. Chand and Comp. Ltd. New Delhi.
 18. Vashista, B.R., Sinha A.K. and Kumar, A. (2008). *Botany for degree students-Pteridophyta*, S. Chand and Comp. Ltd. New Delhi.
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Semester-II	Paper-II
Course Code : BSC-BO 202	Title of Course : Principles of Plant Science
Credits: 02	Total lecture: 30 Hours

Course outcomes:

1. The Students will learn about basic processes and functions at physiological, cellular and molecular level.
2. By the end of this course students will be able to understand the structure of cells in relation to the functional aspects.
3. to understand the difference between prokaryotic and eukaryotic cells
4. to study the details of the plant cell wall, cytosol and cytoplasmic organelles.
5. to understand the properties of nucleic acids (DNA &RNA)

Detailed syllabus:

CREDIT-1: PLANT PHYSIOLOGY AND CELL BIOLOGY (15 Hours)

- Unit I.** Introduction, definition and scope of plant physiology. (1)
- Unit II.** Diffusion – definition, importance of diffusion in plants, imbibition as a special type of diffusion.
Osmosis – definition, types of solutions (hypotonic, isotonic, hypertonic), endosmosis, exo-osmosis, osmotic pressure, turgor pressure, wall pressure, importance of osmosis in plants.
Plasmolysis – definition, mechanism and significance.
Plant growth - introduction, phases of growth, factors affecting growth, (6)
- Unit III** Cell: Differences between prokaryotic and eukaryotic cell, Structure of plant cell, Cell organelles and their functions. Plant cell wall – components of cell wall, structure and functions. Plasma membrane – structure and function. (5)

Unit IV Chromosomes and its types. Cell cycle in plants- importance of cell cycle in plants, divisional stages of mitosis and meiosis. (3)

CREDIT-II: MOLECULAR BIOLOGY (15 Hours)

Unit I Introduction and scope of molecular biology, Contribution of Watson Crick, Rosalind Franklin, Morris Willkins and Chargoff in the discovery of DNA Structure. Central dogma of molecular biology (4)

Unit II Structure of DNA, nucleoside and nucleotide, Properties of double helical structure of DNA and its characteristic features, types of DNA (A, B and Z DNA). (4)

Unit III DNA replication- Definition, Types (conservative, semi-conservative and dispersive), enzymes involved, Importance of DNA replication. (4)

Unit IV Structure and types of RNA. (3)

Suggested Readings:

1. Buchanan, B.B, Gruissem, W. and Jones, R.L (2000). Biochemistry and Molecular Biology of Plants. American Society of Plant Physiologists Maryland, USA.
2. Cooper, G.M. and Hausman, R.E. (2007). The Cell: Molecular Approach 4th Edition, Sinauer Associates, USA.
3. David, Nelson and Cox, Michael (2007). Lehninger Principles of Biochemistry. W.H. Freeman and Company. New York.
4. Devlin, R.M. (1983). Fundamentals of Plant Physiology. Mc. Millan, New York.
5. Dutta, A.C. (2000). A Class Book of Botany. Oxford University Press, UK.
6. Hopkins, William G. (1995). Introduction to Plant Physiology. Publ. John Wiley and Sons, Inc.
7. Lewin, Benjamin (2011). Genes. X Jones and Bartlett.
8. Lincoln, Taiz and Eduardo, Zeiger (2010). Plant Physiology. 5th Edition. Sinauer Associates, Inc. Publishers. Sunderland, USA.
9. Opik, Helgi, Rolfe, Stephen A. and Willis, Arthur J. (2005). The Physiology of Flowering Plants. Cambridge University Press, UK.
10. Pal, J.K. and Ghaskadbi, Saroj (2009). Fundamentals of Molecular Biology. Oxford University Press. India.
11. Pandey, S.N. and Sinha, B.K. (2014). Plant Physiology. Vikas Publishing House Pvt. Ltd., India.
12. Salisbury, F.B. and Ross, C.B. (2005). Plant Physiology. 5th Edition. Wadsworth Publishing Co. Belmont California, USA.
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**Ahmednagar Jilha Maratha Vidya Prasarak Samaj's
New Arts, Commerce and Science College, Ahmednagar
(Autonomous)**

**Syllabus of F. Y. B. Sc. Botany
under
Faculty of Science**

Semester-II	Paper-III
Course Code : BSC-BO 203 P	Title of Course : Practicals Based On BO 121 & BO 122
Credits: 1.5	Total lecture: 45 hours

Practicals:

1. Study of life cycle of *Nephrolepis*. (1P)
2. Study of life cycle of *Cycas*. (1P)
3. Study of Bentham and Hooker's system of classification outline up to series with example (1P)
4. Study of comparative account of Dicotyledonous and Monocotyledonous plants w.r.t to external morphological characters. (1P)
5. Study of utilization and economic importance of Angiosperms- food, fodder, fibers, horticulture and medicines. (1P)
6. To observe characteristic features of prokaryotic and eukaryotic plant cell. (1P)
7. Study of mitosis preparation of slides using onion root tips to observe divisional stages(1P)
8. Study of meiosis- preparation of slides using *any suitable material* to observe divisional stages. (1P)
9. Estimation of chlorophyll-a and chlorophyll-b by using suitable plant material. (1P)
10. Plasmolysis- endosmosis, exosmosis, incipient plasmolysis using *Rhoeo* leaf peeling and Demonstration of Osmosis- curling experiment. (1P)
11. Study of DPD by using suitable plant sample (1P)
12. Demonstration: DNA and RNA model (1P)

Note: Compulsory one-day excursion tour to study diversity of vegetation.

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