



Savitribai Phule Pune University

(Formerly University of Pune)

Three Year B.Sc. Degree Program in Botany

(Faculty of Science & Technology)

F.Y.B.Sc. Botany

Choice Based Credit System Syllabus

To be implemented from Academic Year 2019-2020

Title of the Course: B. Sc Botany

1. Structure of Course:

Structure B.Sc. Botany syllabus					
Year	Semester	Course Type	Course code	Course Name	Credits
1	1	Compulsory Course	BO 111	Plant life and utilization I	2
			BO 112	Plant morphology and Anatomy	2
			BO 113	Practical based on BO 111 & BO 112	1.5
	2	Compulsory Course	BO 121	Plant life and utilization II	2
			BO 122	Principles of plant science	2
			BO 123	Practical based on BO 121 & BO 122	1.5
2	3	Compulsory Course	BO 231	Botany Theory Paper 1	2
			BO 232	Botany Theory Paper 2	2
			BO 233	Botany Practical Paper	2
	4	Compulsory Course	BO 241	Botany Theory Paper 1	2
			BO 242	Botany Theory Paper 2	2
			BO 243	Botany Practical Paper	2
3	5	Discipline Specific Elective Course	BO 351	Botany Theory Paper 1	2
			BO 352	Botany Theory Paper 2	2
			BO 353	Botany Theory Paper 3	2
			BO 354	Botany Theory Paper 4	2
			BO 355	Botany Theory Paper 5	2
			BO 356	Botany Theory Paper 6	2
			BO 357	Botany Practical Paper 1	2
			BO 358	Botany Practical Paper 2	2
			BO 359	Botany Practical Paper 3	2
	Skill Enhancement course	BO 3510	Botany Theory Paper 7	2	
		BO 3511	Botany Theory Paper 8	2	
3	6	Discipline Specific Elective Course	BO 361	Botany Theory Paper 1	2
			BO 361	Botany Theory Paper 2	2
			BO 362	Botany Theory Paper 3	2
			BO 363	Botany Theory Paper 4	2
			BO 364	Botany Theory Paper 5	2
			BO 365	Botany Theory Paper 6	2
			BO 366	Botany Practical Paper 1	2
			BO 367	Botany Practical Paper 2	2
	BO 368	Botany Practical Paper 3	2		
	Skill Enhancement course	BO 3610	Botany Theory Paper 7	2	
BO 3611		Botany Theory Paper 8	2		

2. Equivalence of Previous Syllabus:

Old Course (2013 Pattern)	New Course (2019 CBCS Pattern)
Fundamentals of Botany: PAPER – I Term- I: Plant Diversity	BO 111 Plant life and utilization I
Botany Theory Paper II Term I – Industrial Botany	BO 112 Plant morphology and Anatomy
Fundamentals of Botany: PAPER - I Term- II: Morphology and Anatomy	BO 121 Plant life and utilization II
Botany Theory Paper II Term- II – Industrial Botany	BO 122 Principles of plant science
F. Y. B. Sc. Botany Practical Paper - III based on Theory Paper I and Paper II	BO 113 Practical based on BO 111 & BO 112 and BO 123 Practical based on BO 121 & BO 122

SEMESTER-I: PAPER-I**BO-111: PLANT LIFE AND UTILIZATION I (30 Lectures)****CREDIT-I****15 Lectures (15 Hours)****1. INTRODUCTION****3 L**

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

2. ALGAE**9 L**

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

3. LICHENS**3 L**

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 Lectures (15 Hours)****4. FUNGI****9 L**

4.1: Introduction

4.2: General Characters

4.3: Classification (Ainsworth, 1973)

4.4: Life Cycle of Mushroom- *Agaricus bisporus* w.r.t. Habit, Habitat, Structure of thallus, Structure of Sporocarp, Structure of Gill, Reproduction- Asexual and sexual, Systematic position.

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

5. BRYOPHYTES**6 L**

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).

CREDIT- II**15 Lectures (15 Hours)****3. ANATOMY:****2 L**

3.1 Introduction and definition

3.2 **Importance in Taxonomy, Physiology, Ecological interpretations,** Pharmacongnoisy and Wood identification.**4. TYPES OF TISSUES:****8 L**

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.**5. INTERNAL ORGANIZATION OF PRIMARY PLANT BODY:****5 L**

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.

REFERENCES:

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.
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13. Saxena, A.K. and Sarabhai, R.P. (1968). A Text Book of Botany. Vol. III. Ratan Prakashan mandir, 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.
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SEMESTER-II: PAPER-I**BO-121: PLANT LIFE AND UTILIZATION-II (30 Lectures)****CREDIT-I****15 Lectures (15 hours)**

- 1. INTRODUCTION:** Introduction to plant diversity- Pteridophytes, Gymnosperms and Angiosperms with reference to vascular plants. 3 L
- 2. PTERIDOPHYTES:** 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. 10 L
- 3. Utilization and economic importance of Pteridophytes.** 2 L

CREDIT-II**15 Lectures (15 hours)**

- 1. GYMNOSPERMS:** 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. 8 L
- 2. ANGIOSPERMS:** General characters, Outline of classification of Bentham and Hooker's system up to series, comparative account of monocotyledons and dicotyledons. 4L
- 3. Utilization and economic importance of Angiosperms:** In food, fodder, fibers, horticulture and medicines. 3L

REFERENCES:

- Bendre, Ashok and Kumar, Ashok (1993). A Text Book of Practical Botany, Rastogy Publications, Meerut.
- Chamberlain, C.J. (1934). Gymnosperms- Structure and Evolution. Chicago.
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- Davis, P.H. and Heywood, V.H. (1963). Principles of Angiosperms taxonomy. Oliver and Boyd Publ. London.
- Dutta, S.C. (1988). Systematic Botany. Wiley Eastern Ltd., New Delhi.
- Eames, E.J. (1983). Morphology of Vascular Plants. Standard University Press.
- Gangulee and Kar (2006). College Botany. New Central Book Agency (P.) Ltd. Kolkata.
- Naik, V.N. (1994). Taxonomy of Angiosperms. Tata McGraw Hill Publishing Comp., New Delhi.
- Parihar, N.S. (1976). Biology and Morphology of Pteridophytes. Central Book Depot.
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- Sharma, O.P. (1990). Text Book of Pteridophyta. McMillan India Ltd. Delhi.
- Singh, V. and Jain, D.K. (2010). Taxonomy of Angiosperms. Rastogy Publications, Meerut.

SEMESTER-II: PAPER-II**BO-122: PRINCIPLES OF PLANT SCIENCE (30 Lectures)****CREDIT-1: PLANT PHYSIOLOGY AND CELL BIOLOGY****15 Lectures (15 Hours)**

1. Introduction, definition and scope of plant physiology. 1 L
2. Diffusion – definition, importance of diffusion in plants, imbibition as a special type of diffusion. 1 L
3. Osmosis – definition, types of solutions (hypotonic, isotonic, hypertonic), endosmosis, exo-osmosis, osmotic pressure, turgor pressure, wall pressure, importance of osmosis in plants. 2 L
4. Plasmolysis – definition, mechanism and significance. 1 L
5. Plant growth - introduction, phases of growth, factors affecting growth, 2 L
6. Structure of plant cell, differences between prokaryotic and eukaryotic cell. 2 L
7. Plant cell wall – components of primary cell wall, structure and functions. 1 L
8. Ultrastructure and functions of chloroplast 2 L
9. Cell cycle in plants- importance of cell cycle in plants, divisional stages of mitosis and meiosis. 3 L

CREDIT-II: MOLECULAR BIOLOGY**(15 Lectures) 15 Hours**

1. Introduction and scope of molecular biology, central dogma of molecular biology. 2 L
2. Structure of DNA, nucleoside and nucleotide 2 L
3. Watson Crick model of DNA and its characteristic features, types of DNA (A, B and Z DNA). 3 L
4. Types of chromosomes. 2 L
5. Structure and types of RNA. 3 L
6. DNA replication- Types of replication (conservative, semi-conservative and dispersive), enzymes involved, leading and lagging strands, Okazaki fragments. 3 L

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