Teaching Plan
F.Y.B.Sc. Botany CBCS Pattern
(Semester II, Paper I) 2021-2022
BO-121: PLANT LIFE AND UTILIZATION II - 2 Credits (30 Lectures)

Sr. No.	Month	Topic
1 2	April	**Credit-I** 1.INTRODUCTION: Introduction to plant diversity- Pteridophytes, Gymnosperms and Angiosperms with reference to vascular plants. 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. 3.Utilization and economic importance of Pteridophytes..
3	May	**Credit-II** 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.
4	June	2. ANGIOSPERMS: General characters, Outline of classification of Bentham and Hooker's system up to series, comparative account of monocotyledons and dicotyledons. 3. Utilization and economic importance of Angiosperms: In food, fodder, fibers, horticulture and medicines. **Revision and MCQ discussion**

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Teaching Plan
F.Y.B.Sc. Botany CBCS Pattern
(Semester II, Paper II) 2021-2022
BO-122: PRINCIPLES OF PLANT SCIENCE - 2 Credits (30 Lectures)

Sr. No.	Month	Topic
1 2	April	**CREDIT-1: PLANT PHYSIOLOGY AND CELL BIOLOGY** 1. Introduction, definition and scope of plant physiology. 2. Diffusion – definition, importance of diffusion in plants, imbibition as a special type of diffusion. 3. Osmosis – definition, types of solutions (hypotonic, isotonic, hypertonic), endosmosis, exo-osmosis, osmotic pressure, turgor pressure, wall pressure, importance of osmosis in plants. 4. Plasmolysis – definition, mechanism and significance. 5. Plant growth - introduction, phases of growth, factors affecting growth 6. Structure of plant cell, differences between prokaryotic and eukaryotic cell.
3	May	7. Plant cell wall – components of primary cell wall, structure and functions. 8. Ultrastructure and functions of chloroplast 9. Cell cycle in plants- importance of cell cycle in plants, divisional stages of mitosis and meiosis **CREDIT-II: MOLECULAR BIOLOGY** 1. Introduction and scope of molecular biology, central dogma of molecular biology. 2. Structure of DNA, nucleoside and nucleotide 3. Watson Crick model of DNA and its characteristic features, types of DNA (A, B and Z DNA).
4	June	4. Types of chromosomes. 5. Structure and types of RNA. 6. DNA replication- Types of replication (conservative, semi-conservative and dispersive), enzymes involved, leading and lagging strands, Okazaki fragments. **Revision and MCQ discussion**

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Teaching Plan
S.Y.B.Sc. Botany CBCS Pattern
(Semester IV, Paper I) 2021-2022
BO 241: Plant Anatomy and Embryology- 2 Credits (30 Lectures)

Sr. No.	Month	Topic
1	April	Credit-I Plant anatomy: (15 Lectures) 1. Introduction 1.1 Definition 1.2 Scope of plant anatomy 2. Epidermal tissue system 2.1 Structure, types and functions of epidermis 2.2 Structure, types and functions of Stomata 2.3 Epidermal outgrowths- non-glandular and glandular 2.4 Motor cells
2	April and May	3. Mechanical tissue system 3.1 Principles involved in distribution of mechanical tissues with one example each a) Inflexibility, b) Incompressibility, c) Inextensibility and d) Shearing stress 3.2 Vascular tissue system: Structure and function of xylem, phloem and cambium 4. Normal secondary growth 4.1 Introduction 4.2 Normal secondary growth in dicotyledonous stem 4.3 Development of annual rings, periderm, bark, tyloses and lenticel 5. Anomalous secondary growth 5.1 Introduction 5.2 Causes of anomalous secondary growth 5.3 Anomalous secondary growth in: a) Dicotyledonous stem (Bignonia), b) Dicotyledonous root (Raphanus), c) Monocotyledonous stem (Dracaena) **Credit-II Plant Embryology (15 Lectures)** 7. Introduction 7.1 Definition and scope of plant embryology 8. Microsporangium and male gametophyte
4	May and June	8.1 Structure of tetrasporangiate anther 8.2 Types of tapetum 8.3 Sporogenous tissue 8.4 Microsporogenesis: process and its types 8.5 Types of microspore tetrad 8.6 Male gametophyte: structure and development of male gametophyte 9 Megasporangium and female gametophyte 9.1 Structure 9.2 Types of ovules 9.3 Types of megaspore tetrads 9.4 Female gametophyte: structure of typical embryo sac 9.5 Types of embryo sacs – monosporic, bisporic and tetrasporic 10. Pollination and Fertilization: 10.1 Introduction and definition 10.2 Types of pollination 10.3 Germination of pollen grain 10.4 Entry of pollen tube- ance. 10.5 Double fertilization and its signific. 11. Endosperm and embryo 11.1 Endosperm: Types – nuclear, helobial and cellular. 11.2 Structure of Dicotyledonous and Monocotyledonous embryoporogamy, mesogamy and chalazogamy **Revision and MCQ discussion**

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Teaching Plan
S.Y.B.Sc. Botany CBCS Pattern
(Semester IV, Paper II) 2021-2022
BO 242: Plant Biotechnology (2 Cr- 30 Lectures)

Sr. No.	Month	Topic
1	April	Chapter 1 Introduction to Plant Biotechnology 1.1 History and definition 1.2 Scope and importance of plant biotechnology 1.3 Current status of biotechnology in India. Chapter 2 Plant Tissue Culture 2.1 Concept of plant tissue culture and cellular totipotency 2.2 Basic techniques: Types of culture, Media preparation, sterilization, inoculation, incubation, hardening
2	April and May	2.3Applications with reference to: Micropropagation, Somaclonal variation, Haploid production, Protoplast fusion &Somatic hybrids, Embryo rescue, Production of secondary metabolites. 2.4 Commercial Plant Tissue culture laboratories in Maharashtra and India. Chapter 3 Single Cell Protein (SCP) 3.1 Concept and definition 3.2 Importance of proteins in diet 3.3 Production of SCP from Spirulina and Yeast 3.4 Importance &acceptability of SCP **Credit II: Chapter 4 Plant Genetic Engineering** 4.1 Introduction, concept 4.2 Tools of genetic engineering (restriction enzymes, ligases, plasmid vectors) 4.3 Gene cloning Technique
4	May and June	4.4 Applications of plant genetic engineering: insect pest resistance, abiotic stress tolerance, herbicide resistance Chapter 5 Genomics, Proteomics and Bioinformatics 5.1 Genomics-concept, types, methods used for whole genome sequencing 5.2 Proteomics-concept, types, methods used in proteome analysis 5.3 Bioinformatics-concept, database and its classification, data retrieval tools. Chapter 6 Bioremediation 2L 6.1 Introduction and concept 6.2 Microbial remediation 6.3 Phytoremediation
		Chapter 7 Biofuel technology 7.1 Definition, Concept and types of Renewable and nonrenewable energy sources 7.2 Definition and concept of Biogas, Bioethanol, Biobutanol, Biodiesel &Biohydrogen **Revision and MCQ discussion**

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