# Teaching Plan

**T. Y. B. Sc. - Botany: 2022 - 23**

**BO: 351 Cryptogamic Botany**

**(Semester– V; Paper – I)**

| Sr. No | Month | Topics |
|---|---|---|
| 1 | August | **Introduction**: Cryptogams- meaning. Types- Lower Cryptogams, brief Review with examples<br>**Algae**: General characters, distribution, Thallus organization, habit and Habitat reproduction and Classification (G.M.Smith 1955) up to classes. |
| 2 | September | **Study of life cycle** of algae with reference to taxonomic position, Occurrence, Thallus structure, and reproduction of *Nostoc*, *Oedogonium Chara*, *Sargassum* and *Batrachospermum*.<br>Economic importance of algae- Role in industry, agriculture, fodder and medicine. |
| 3 | October | **Fungi:** General characters, Habit and habitats, thallus organization, cell wall composition, nutrition and Classification. (Alexopoulos and Mims 1979) up to classes.<br>Study of life cycle of fungi with reference to taxonomic position, thallus structure, and reproduction of Mucor (Zygomycotina),<br>*Saccharomyces* (Ascomycotina), *Puccinia* (Basidiomycotina), *Penecillium* and *Cercospora* (Deuteromycotina) [Two members of Deutero.]<br>Symbiotic Associations - Lichens, *Mycorrhiza* and their significance<br>**Theory Internal Exam** |
| 4 | November | **Revision and Assignment**<br>**Practical Internal Exam** |

**Prof. S.S.Katkar**

# Teaching Plan

**T. Y. B. Sc. - Botany: 2022 -23**

**BO.352: Archegoniate**

**(Semester– V; Paper – II)**

| Sr. No | Month | Topics |
|---|---|---|
| 1 | August | **Introduction to Archegoniate:**<br>**Introduction**, general characters, distribution of Bryophytes to land habit, classification of **Bryophytes** according to G.M. Smith (1955) up to classes with reasons.<br>**Range of thallus organisation**, origin of Bryophytes - Pteridophytes and Algal hypothesis, evolution of sporophyte. |
| 2 | September | Study of Life Cycle of Bryophytes with respect to Taxonomic position, Morphology, Anatomy, Reproduction, Gametophytes and sporophytes of ***Marchantia***, ***Anthoceros*** and ***Funaria.***<br>Ecological and economic importance of **Bryophyte.** |
| 3 | October | **Introduction**- Vascular Cryptogams, General characteristics, Classification according to K.R. Sporne (1975) up to classes with reasons, Diversity and Distribution of **Pteridophytes**.<br>Resemblances of Pteridophytes with Bryophytes, Differences between Pteridophytes and Bryophytes, Origin of Pteridophytes -Algal and Bryophytes, Evolution of **Pteridophytes**- Telome Theory and Enation Theory. |
| 4 | November | Study of Life Cycle of **Pteridophytes** with respect to Taxonomic position, Morphology, Anatomy, Reproduction, Sporophytes and Gametophytes of ***Psilotum***, ***Selaginella*** and ***Equisetum.***<br>Ecological and Economical Importance of Pteridophytes.<br>**Theory Internal Exam Practical Internal Exam**<br>**Revision, Assignment and Question paper discussion.** |

**Prof. R.V. Mechkar.**

# Teaching Plan

**T. Y. B. Sc. - Botany: 2022- 23**

**BO.353: Spermatophyta and Palaeobotany**
**(Semester– V; Paper – III)**

| Sr. No | Month | Topics |
|---|---|---|
| 1 | August | **Introduction to Gymnosperms**<br>General characters, economic importance and classification according to Chamberlain (1934). |
| 2 | September | **Study of life cycle of *Pinus*** with reference to distribution,morphology, anatomy, reproduction, gametophyte, sporophyte, seed structure and alternation of generations.<br>**Revision and Assignment** |
| 3 | October | **Study of life cycle of *Gnetum*** with reference to distribution, morphology, anatomy, reproduction, gametophyte, sporophyte, seed Structure and alternation of enerations.<br>**Fossil-**<br>Definition, process of fossil formation, types of fossils.-Impression, Compression, Petrifaction, Pith cast and Coal ball.<br>**Origin of angiosperms:**with reference to time, place and ancestry-<br>1) Pseudanthial theory 2) Transitional-Combinational Theory<br>**Classification:** Outline, Merit and Demerits of Cronquist's System and APG IV system of classification. Study of following families with reference to systematic position (As per Bentham & Hooker), Diagnostic characters,floral formula, floral diagram and any five examples with their economic importance – Nymphaeaceae, Oleaceae, Amaranthaceae, Cannaceae<br>**Revision and Assignment** |
| 4 | November | **Herbaria and Botanical Gardens**<br>Functions of Herbarium, Important herbaria (World: Kew herbarium; India: Central National Herbarium, Kolkata). Botanic gardens of the world (Royal Botanic Garden, Kew) and India<br>**Revision and Assignment**<br>**Speciation & Endemism**<br>Species concept (Biological, Taxonomic & Phylogenetic Species Concept), Speciation (Allopatric, Sympatric &Parapatric), Endemism and its types (Palaeoendemism, Holoendemism and Neoendemism)<br>**Theory Internal Exam**<br>**Practical Internal Exam**<br>**Question paper discussion** |

**Dr. Sangeetha J. S.**

# Teaching Plan

## T. Y. B. Sc. - Botany: 2022-23

## BO.354: Plant Ecology

## (Semester– V; Paper – IV)

| Sr. No | Month | Topics |
|---|---|---|
| 1 | August | **Introduction**, interrelationship between the living world and the environment, levels of organization, components and dynamism of ecosystem, homeostasis, niche concept, concept of limiting factors<br>**Biogeography**: Floristic realms, speciation and its types, biogeographic regions of India,Plant indicators<br>Population ecology:Definition, characteristics, population growth form, r and k selection |
| 2 | September | **Community ecology**: Introduction and Definition, community structure, physiognomy, Raunkiaer's life form classification, keystone species, edge and ecotone<br>Biogeochemical cycles: The carbon cycle, Nitrogen cycle, Phosphorus cycle, and Hydrologic cycle<br>Ecological Impact Assessment (**EIA**) Introduction, Historical Review of EIA, Objectives of EIA, Stages of EIA process: Screening; Scoping; Baseline study; Impact prediction and assessment; Mitigation; Producing Environmental Impact Statement (EIS); EIS review; Decision making; Monitoring, Compliance and Enforcement; Benefits of EIA. |
| 3 | October and November | Environmental Audit Meaning and concept, need, objectives, benefits, types, audit protocol, process, certification, personnel environmental audit<br>Remote Sensing Definition, basic principles, process of ecological data acquisition and interpretation, global positioning system,application of remote sensing in ecology.<br>Ecological management: Concepts, sustainable development, sustainability indicators<br>**Revision, Seminars and Question paper discussion**<br>**Theory Internal Exam**<br>**Practical Internal Exam** |

**Prof. P. D. Kad.**

# Teaching Plan

### T. Y. B. Sc. - Botany: 2022-23

## BO.355: Cell and Molecular Biology

### (Semester– V; Paper – V)

| Sr. No | Month | Topics |
|---|---|---|
| 1 | August | **Introduction to Cell Biology** : Definition, Brief history of Cell Biology, Units of measurement for cell, Interdisciplinary nature of Cell Biology<br>**Cell organelles**: Ultrastructure, components and functions of Cell wall and cell membranes, mitochondria and Chloroplast, endoplasmic Reticulum, Golgi apparatus, Lysosomes, Vacuoles |
| 2 | September | **Nucleus**: Morphology and ultrastructure of nucleus, nucleolus and nucleolar organizer Nuclear envelope – structure of nuclear pore complex, transport of molecules across nuclear envelope.<br>**Chromosomes**: Euchromatin and heterochromatin Histones, Packing of DNA into chromosomes in eukaryotes, Karyotype and ideogram, Polytene chromosomes and lampbrush chromosomes. |
| 3 | October and November | **Genetic material DNA**: historical perspective from 1953 to 2020, Griffith's and Avery's transformation experiments, Hershey-Chase bacteriophage experiment.<br>DNA replication (Prokaryotes and Eukaryotes): Molecular mechanism of DNA replication. Enzymes involved in both prokaryotic and eukaryotic DNA replication and their inhibitors (antibiotics).<br>**Gene expression**:Transcription (Prokaryotes in details and passing remarks on Eukaryotes) Types of RNA: mRNA, tRNA, rRNA;<br>**Theory Internal Exam**<br>Types of promoters; types of RNA polymerase enzymes in eukaryotes; molecular mechanism of transcription.<br>**Translation** (Prokaryotes and Eukaryotes): Definition, concept and properties of genetic code; molecular mechanism of translation.<br>**Regulation of gene expression**: Concept of operon, *lac* operon and *trp* operon, positive and negative control, one gene one enzyme hypothesis.<br>**Cell signaling:** Introduction and definition, Signaling molecules and receptors, Calcium signaling pathway in plants<br>**Practical Internal Exam**<br>**Revision, Question paper discussion** |

**Dr. S.M.Jagtap**

**Teaching Plan**

**T. Y. B. Sc. - Botany: 2022-23**

**BO: 333: Genetics and Evolution**

**(Semester– III; Paper – III)**

| Sr. No | Month | Topics |
|---|---|---|
| 1 | August | **Genetics**- Introduction Definition, Concept of heredity and variations, Branches and Applications of Genetics<br>**Mendelism** - Genetical terminology, Selection of experimental material , Monohybrid cross, Law of dominance, Incomplete dominance, Law of segregation/law of purity of gametes, Dihybrid cross, Law of independent assortment, Back cross and Test cross<br>**Interactions of genes** - Non-epistatic genetic interactions- complementary genes (9:7), Duplicate Genes (15:1), Epistatic genetic interactions- Masking genes (12:3:1), Supplementary genes (Recessive epistasis) (9:3:4), Inhibitory genes(13:3), Lethal genes (2:1)-Concept, Inheritance of coat colour in mice, Inheritance of sickle cell anemia<br>**Multiple alleles** -Definition, Concept, Characters of multiple alleles, Examples of multiple alleles – inheritance of blood group in human, self-incompatibility in Nicotiana and eye colour in Drosophila<br>**Linkage and Crossing over** Linkage- Definition and Types, Crossing over: Definition and Types, Construction of a linkage map by two point test cross and three point test cross |
| 2 | September | **Quantitative and Cytoplasmic Inheritance** -Concept of quantitative inheritance, Difference between qualitative and quantitative traits, Inheritance of quantitative trait in Maize (Cob length), Cytoplasmic inheritance – Definition and concept, Chloroplast- Varigation in Four O'clock plants, Mitochondria- Petite mutants in yeast<br>**Sex linked inheritance** -Concept of Sex chromosomes and autosomes, Inheritance of X- linked genes - eye colour in Drosophila, Inheritance of colour blindness in humans, Inheritance of Y linked genes - Holandric genes in humans, Sex influenced genes – baldness in humans Sex-limited genes - feathering in domestic fowl<br>**Euploidy and Aneuploidy** - Numerical changes in chromosomes- Euploidy and Aneuploidy, EuploidyMonoploidy, Origin and production, morphology and uses. Polyploidy -Concept and Characteristics of polyploids, Autopolyploidy- Origin and production, effects of autopolyploidy, uses. Allopolyploidy- Concept, synthesized allopolyploidy (wheat and cotton) Evolutionary significance of polyploidy –Aneuploidy, Monosomy and nullisomy- origin and cytology, Trisomy in Datura and humans<br>**Chromosomal Abberations** -Types of structural changes in chromosomes, Deletion: types, cytology and genetic effects, Duplication: types and cytology, |
| 3 | October | **Chromosomal Abberations** -position effect and bar eye phenotype in Drosophila, Inversion: types and their cytology, Translocation: types, |

| | | |
|---|---|---|
| | | translocation complexes, Variation in chromosome morphology: Isochromosomes, ring chromosomes and Robertsonian translocation<br>**Evolution – Introduction and Theories of Evolution** - The concept of organic evolution, Theories of Evolution, Pre-Darwinian periodTheory of Inheritance of acquired characters (Lamark's), Darwinism- Theory of Natural Selection, Post-Darwinian period- Modern synthetic theory<br>**Evidences of Evolution** - Direct evidences and conclusions from fossil records, Indirect evidences, Evidences from Genetics, Evidences from bio-geographical relations<br>**Population Genetics and Evolution** Concept of Mendelian population, Gene pool and its models, Hardy-Weinberg law of gene frequencies, Factors affecting allelic frequency, Genetic polymorphism |
| 4 | November | **Revision, Assignment, Previous Question paper discussion**<br>**Theory Internal and External Exam** |

**Prof. P.D.Kad**

# Teaching Plan

**T. Y. B. Sc. - Botany: 2022-23**

**Skill Enhancement course**

**BO.3510: Medicinal Botany**

**(Semester– V; Paper – X)**

| Sr. No | Month | Topics |
|---|---|---|
| 1 | August | **Medicinal Plants**: History, Scope and Importance 01 2 Indigenous Medicinal Sciences; Definition and Scope<br>**Ayurveda**: History, origin, panchamahabhutas, saptadhatu and tridosha concepts, Rasayana, plants used in ayurvedic treatments. |
| 2 | September | **Siddha**: Origin of Siddha medicinal systems, Basis of Siddha system, plants used in Siddha medicine.<br>**Unani**: History, concept: Umoor-e- tabiya, tumors treatments/ therapy, polyherbal formulations.<br>**Conservation** of endangered and endemic medicinal plants: Definition: endemic and endangered medicinal plants, Red list criteria; *In situ* conservation: Biosphere reserves, sacred groves, National Parks; *Ex situ* conservation: Botanic Gardens, Ethnomedicinal plant Gardens. |
| 3 | October | **Propagation of Medicinal Plants**: Objectives of the nursery, its classification, important components of a nursery, sowing, pricking, use of green house for nursery production, propagation through cuttings, layering, grafting and budding. |
| 4 | November | **Theory Internal Exam**<br>**Assignment**<br>**Ethnobotany** and Folk medicines: Definition; Ethnobotany in India: Methods to study ethnobotany; Applications of Ethnobotany: National interacts, Palaeo-ethnobotany.<br>**Folk medicines** of ethnobotany, ethnomedicine, ethnoecology, ethnic communities of India. Application of natural products to certain diseases. Jaundice, cardiac, infertility, diabetics, Blood pressure and skin diseases.<br>**Theory Internal Exam**<br>**Revision, Question paper discussion& Seminars** |

**Prof. R.V. Mechkar.**

# Teaching Plan

**T. Y. B. Sc. - Botany: 2022-23**

**Skill Enhancement course**

**BO.3511: Plant Diversity and Human Health**

**(Semester– V; Paper – XI)**

| Sr. No | Month | Topics |
|---|---|---|
| **1.** | **August** | **Plant diversity and its scope-** Genetic diversity, Species diversity, Plant diversity at the ecosystem level.<br>**Agrobiodiversity** and cultivated plant taxa, wild taxa. Values and uses of Biodiversity: Ethical and aesthetic values, Precautionary principle, Methodologies for valuation, Uses of plants, Uses of microbes.<br>**Loss of Biodiversity**: Loss of genetic diversity, Loss of species diversity, Loss of ecosystem diversity, Loss of agrobiodiversity, Projected scenario for biodiversity loss.<br>**Revision** |
| 2. | September | **Conservation of Biodiversity**: Conservation of genetic diversity, species diversity and ecosystem diversity, In situ and ex situ conservation, Social approaches to conservation, Biodiversity awareness programmes, Sustainable development. |
| 3. | October and November | **Management of Plant Biodiversity:** Organizations associated with biodiversity management-Methodology for execution-IUCN, UNEP, UNESCO, WWF, NBPGR; Biodiversity legislation and conservations.<br>**Revision, Seminars**<br>**Role of plants in relation to Human Welfare**<br>a) Importance of forestry their utilization and commercial aspects<br>b) Avenue trees<br>c) Ornamental plants of India.<br>d) Alcoholic beverages through ages.<br>Fruits and nuts: Important fruit crops their commercial importance.<br>Wood and its uses.<br>**Theory Internal Exam**<br>**Practical Internal Exam**<br>**Revision, Question paper discussion** |

**Prof. S.S.Katkar**

# Teaching Plan

**S.Y.B.Sc. Botany (CBCS): 2022 - 23**
**BO-231. Taxonomy of Angiosperms and Plant Ecology**
**(Semester III, Paper I)**

| Sl. No | Month | Topic |
|---|---|---|
| 1 | August | **1. Introduction to Angiosperm Taxonomy**<br>Definition, Scope, objectives and importance of taxonomy, Exploration, Description, Identification, Nomenclature and Classification Concept of Systematics with brief historical background.<br>2. **System of classification: Comparative account of various system of classification, Artificial system-Carl Linnaeus** |
| 2 | September | 2. **System of classification**– Natural System- Bentham and Hooker, Phylogenetic system -Engler and Prantl, APG system -A brief review<br>**3. Study of plant families**<br>Study of following families with reference to systematic position (As per Betham and Hooker's System of classification), Salient features, floral formula, floral diagram and any five examples with their economic importance- Annonaceae , Myrtaceae, Rubiaceae |
| 3 | October | **Study of Plant Families**<br>Solanaceae, Apocynaceae,Nyctaginaceae and Amaryllidaceae<br>**Introduction to Ecology:** Definition, concept, scope and interdisciplinary approach, autecology and synecology<br>**Species diversity:** definition, concept, scope and types: Alpha, Beta, and Gamma diversity.<br>**Methods of vegetation sampling:** quadrate method, transect method, plot less method<br>Ecological grouping of plants with reference to their significance of adaptive external and internal features: a)Hydrophytes, b) Mesophytes c) Xerophytes d) Halophytes with examples. |
| 4 | November | **Botanical Nomenclature**<br>Concept of nomenclature, brief history, Binomial nomenclature, International code of nomenclature of Algae, Fungi and Plants (ICN),Principles,<br>Rules and Recommendation, Type specimen and its types (Holotype, Paratype, Isotype, Lectotype, Neotype ). Concept of Typification, Ranks and endings of taxa names,. Coining of Genus names and species names Single,double and multipleauthority citation.<br>**Revision and Assignment**<br>**Theory Internal and External Exam** |

**Dr. Sangeetha J.S.**

# Teaching Plan

**S. Y. B. Sc. Botany; CBCS 2022 -23**

**BO: 232; Plant Physiology**

**(Semester III, Paper II)**

| Sr. No. | Month | Topic |
|---|---|---|
| 1 | August | **Introduction to Plant Physiology**<br>Brief history, Scope and applications of plant physiology<br>**Absorption of water**<br>Role of water in plants<br>Mechanisms of water absorption with respect to crop plants<br>Factors affecting rate of water absorption |
| 2 | September | **Revision, Assignment**<br>**Ascent of sap**<br>Introduction and definition.<br>Transpiration pull or cohesion-tension theory; evidences and objections<br>Factors affecting ascent of sap<br>**Transpiration**<br>Definition<br>Types of transpiration – cuticular, lenticular and stomatal<br>Structure of stomata<br>Mechanism of opening and closing of stomata –Steward's hypothesis, Active K+ transport mechanism<br>Factors affecting the rate of transpiration |
| 3 | October and November | **Theory Internal Examination**<br>**Transpiration (cont.)**<br>Significance of transpiration<br>Antitranspirants<br>Guttation<br>Exudation<br>**Revision, Assignment**<br>**Question paper discussion**<br>**Practical Internal Examination** |

**Dr. K.M.Nitnaware**

# Teaching Plan

**F. Y. B. Sc. - Botany: 202-23**
**Plant life and utilization I (BO 111)**
**(Semester – I; Paper – I)**

| Sr. No. | Month | Topics |
|---|---|---|
| 1 | August | **INTRODUCTION -** 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.<br>**Revision and Assignment** |
| 2 | September | **ALGAE –** Introduction, General Characters, Classification (Bold and Wynne 1978) up to classes with reasons.<br>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.Utilization of Algae in Biofuel Industry, Agriculture, Pharmaceuticals, Food and Fodder<br>**Revision and Assignment** |
| 3 | October | **LICHENS** – Introduction, General Characters, Nature of Association, forms- Crustose, Foliose and Fruticose. Utilization of lichens.<br>**FUNGI –** Introduction, General Characters, Classification (Ainsworth, 1973).<br>Life Cycle of Mushroom- ***Agaricusbisporus***w.r.t. Habit, Habitat, Structure of thallus, Structure of SporocarpStructure of Gill, Reproduction- Asexual and sexual, Systematic position. Utilization of Fungi in Industry, Agriculture, Food and Pharmaceuticals.<br>**Revision and Assignment** |
| 4 | November | **BRYOPHYTES –** Introduction, General Characters, Classification (G.M. Smith 1955)<br>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,<br>**Revision and Assignment**<br>**Theory Internal Exam**<br>**BRYOPHYTES** Structure of mature sporophyte, structure of spore, systematic position with reasons. Utilization:. Bryophytes as ecological indicators, agriculture, fuel, industry and medicine<br>**Practical Internal Exam** |

**Dr. K. M. Nitnaware**

# Teaching Plan

**F. Y. B. Sc. - Botany: 2022 -23**

**Plant Morphology and Anatomy(BO 112)**

**(Semester – I; Paper – II)**

| Sr. No | Month | Topics |
|---|---|---|
| 1. | August | **Anatomy**<br>Introduction and definition<br>Importance in Taxonomy, Physiology, Ecological interpretations, Pharmacongnosy and Wood identification. Importance in Pharmacongnosy and Wood identification. |
| 2. | September | **Types of Tissues**<br>Outline with brief description, simple and complex tissues<br>Meristmatic tissues: Meristem, characters and types based on origin, position and plane of division, functions.<br>Permanent tissues:Simple tissues - parenchyma, collenchymas, chlorenchyma and sclerenchyma. |
| 3. | October | Complex/Vascular tissues:Components of xylem and phloem, types of vascular bundles and functions.<br>Epidermal tissues:Epidermis, structure of typical stomata, trichomes, motor cells; functions.<br>**Internal Organization of Primary Plant body**<br>Internal structure of dicotyledon and monocotyledon root.<br>Seminar and revision<br>**Theory Internal Examination** |
| 4. | November | **Internal Organization of Primary Plant body (cont.)**<br>Internal structure of dicotyledon and monocotyledon stem.<br>Internal structure of dicotyledon and monocotyledon leaf.<br>**Revision and Assignment**<br>**Question paper discussion**<br>**Practical Internal Exam** |

**Dr. Sangeetha J.S.**