

B.Sc. Semester Programme (3 year - 6 Semester)

Botany

Proposed Outline of Papers for all Semesters and Syllabus for Semesters 1 and 2. (To be implemented from Session starting July 2018)

		Max Marks
Year I: Semester I		
Paper I	Diversity of Plant Viruses, Bacteria, & Fungi	100
Paper II	Diversity of Algae, Lichens, and Bryophytes	100
Total		200
Year I: Semester II		
Paper III	Diversity of Pteridophytes, Gymnosperms & Elementary Palaeobotany	100
Practical	Based on Papers I, II and III	100
Total		200
Year II: Semester III		
Paper IV	Angiosperms: Taxonomy, Morphology, and Embryology	100
Practical	Based on Papers IV, V and VI	100
Total		200
Year II: Semester IV		
Paper V	Cytology, Genetics	100
Paper VI	Plant Physiology	100
Total		200
Year III: Semester V		
Paper VII	Plant Biochemistry	100
Paper VIII	Plant Resource Utilization, Palynology and Biostatistics	100
Practical	Based on Papers VII, VIII, IX, X and XI	100
Total		300
Year III: Semester VI		
Paper IX	Ecology, Soil Science and Evolution	100
Paper X	Environmental Botany, Plant Pathology	100
Paper XI	Plant Molecular Biology, Biotechnology	100
Total		300
Grand Total		1400

Detailed Syllabus, B.Sc., Semesters I and II

Semester I

Paper I: Diversity of Plant Viruses, Bacteria, & Fungi (04 Credits, 40 Lectures)

Unit I

Overview of cell structure and function in the prokaryotes (Bacteria) and eukaryotes (Yeast); Classification of prokaryotes based on cell structure (Archaea, Gram positive and Gram negative bacteria, Mollicutes); Nature, classification and structure (helical and icosahedral symmetry) of plant viruses; Classification, thallus organisation and reproduction in fungi; Economic importance of fungi.

Unit II

Symptoms (external & internal) of virus infected plants; Transmission of plant viruses; Genome organisation and replication of tobacco mosaic virus; Techniques in plant virology - purification, serology and electron microscopy; Structure and replication of bacteriophage; Structure and replication of viroids.

Unit III

Metabolic diversity of bacteria (phototrophy, chemolithotrophy, autotrophy, heterotrophy, nitrogen fixation, fermentation); Bacterial cell division and microbial growth; Bacterial genome and plasmids; Variability in bacteria: Mutation and genetic recombination; Microbial growth control; Bacterial culture and staining; Economic importance of bacteria.

Unit IV

The characteristics and life cycles of the following fungi: Oomycota - *Albugo*, *Pythium*; Zygomycota - *Rhizopus*; Chytridiomycota - *Synchytrium*; Ascomycota - *Saccharomyces*, *Aspergillus*, *Ascobolus*; Basidiomycota - *Ustilago*, *Puccinia*, *Agaricus*; Deuteromycota - *Fusarium*.

Semester I

Paper II - Diversity of Algae, Lichens, and Bryophytes (04 Credits, 40 Lectures)

Unit I

General features, range of thallus organization, classification; ultrastructure of eukaryotic algal cell and cyanobacterial cell; economic importance of algae.

Lichens: classification, thallus organization, reproduction, physiology and role in environmental pollution.

Unit II

Characters and life cycle of: Cyanophyta - *Microcystis*, *Oscillatoria*; Chlorophyta - *Volvox*, *Hydrodictyon*, *Oedogonium*, *Coleochaete*, *Chara*; Bacillariophyta - *Navicula*; Xanthophyta - *Vaucheria*; Phaeophyta - *Ectocarpus*; Rhodophyta – *Polysiphonia*.

Unit III

General characters, classification, reproduction and affinities of Bryophytes; Gametophytic and sporophytic organization of Bryophyta - *Pogonatum*; Anthocerotophyta – *Anthoceros*.

Unit - IV

General characters of Marchantiophyta; Gametophytic and sporophytic organization of *Riccia*, *Marchantia*, *Frullania*.

Semester II

Paper III – Diversity of Pteridophytes, Gymnosperms, and Elementary Palaeobotany (04 Credits, 40 Lectures)

Unit I

General characters, affinities, classification, and stelar system in Pteridophytes; Heterospory and seed habit; Morphology, anatomy, development, vegetative and reproductive parts in Psilopsida – *Rhynia*; Lycopsida - *Lycopodium*, *Selaginella*.

Unit II

Morphology, anatomy, development, vegetative and reproductive parts in Sphenopsida - *Equisetum*; Filicopsida - *Adiantum*, *Nephrolepis*, *Marsilea*.

Unit III

General characters, affinities, classification, and economic importance of Gymnosperms; Morphology, anatomy, development, vegetative and reproductive parts in Cycadales - *Cycas*

Unit –IV

Morphology, anatomy, development, vegetative and reproductive parts in Coniferales - *Pinus*; Ephedrales - *Ephedra*.

Elementary Palaeobotany: General account, types of fossils, methods of fossilization and geological time scale.

Semester II Practical

Paper I

Plant viruses: Morphological forms of plant viruses; external symptoms of virus infected plants; viral inclusions.

Bacteria: Morphological forms of bacteria; Gram positive and Gram negative bacteria; bacterial colony characters; root nodule.

Fungi: Study of the vegetative and reproductive structures in *Albugo*, *Pythium*, *Rhizopus*, *Synchytrium*, *Saccharomyces*, *Aspergillus*, *Ascobolus*, *Ustilago*, *Puccinia*, *Agaricus*, *Fusarium*.

Paper II

Algae: Study of the vegetative and reproductive structures in *Microcystis*, *Oscillatoria*, *Volvox*, *Hydrodictyon*, *Oedogonium*, *Choleochaete*, *Chara*, *Navicula*, *Vaucheria*, *Ectocarpus*, *Polysiphonia*.

Lichens: Study of the thallus, and reproductive structures in crustose, foliose and fruticose lichens.

Bryophytes: Study of the vegetative and reproductive structures in *Pogonatum*, *Anthoceros*, *Riccia*, *Marchantia*, *Frullania*.

Paper III

Pteridophytes: Study of the vegetative and reproductive structures of *Lycopodium*, *Selaginella*, *Equisetum*, *Adiantum*, *Nephrolepis*, *Marsilea*.

Gymnosperms: Study of the vegetative and reproductive structures in *Cycas*, *Pinus*, *Ephedra*.

Elementary palaeobotany: Study of different types of fossil forms (specimens/slides)