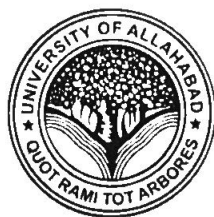


SYLLABUS  
**BACHELOR OF SCIENCE**  
(BOTANY)



Session: 2020-21

DEPARTMENT OF BOTANY  
University of Allahabad

## B.Sc. I Year

### PAPER I: FUNGI, LICHENS, BACTERIA AND VIRUSES

#### Unit I: Fungi

- A general introduction to fungi including structure, reproduction, importance and classification.
- The life history of following genera:  
Lower fungi: *Albugo, Phytophthora, Mucor*  
Higher Fungi: Ascomycetes: *Sphaerotheca, Peziza*  
Basidiomycetes: *Ustilago, Puccinia, Agaricus*  
Fungi imperfectii: *Cercospora*

#### Unit II: Lichens, Bacteria and Plant Viruses

- Lichens: Occurrence, general structure and reproduction with special reference to *Parmelia*.
- Economic importance of Lichens in general
- Bacteria: Reproduction and economic importance
- Viruses: Structure, transmission, multiplication

### PAPER II: ALGAE AND BRYOPHYTA

#### Unit I: Algae

- A general introduction to algae, including their vegetative, structure, reproduction, ecology and economic importance
- A broad classification of algae
- A study of reproduction and life cycle of the following genera:  
Cyanophyceae: *Oscillatoria, Nostoc*  
Chlorophyceae: *Volvox, Oedogonium*  
Xanthophyceae: *Vaucheria*  
Pheophyceae: *Ectocarpus, Fucus, Sargassum* (for practical only)  
Rhodophyceae: *Batrachospermum, Polysiphonia*

#### Unit II: Bryophyta

- A general introduction of bryophytes.
- The life histories of following genera:  
Hepaticopsida: *Marchantia, Porella*  
Anthocerotopsida: *Anthoceros*  
Bryopsida: *Sphagnum*

### PAPER III: PTERIDOPHYTA AND GYMNOSPERMOPHYTA

#### Unit I: Pteridophyta

- A general account of the pteridophytes with special reference to life histories of the following genera:  
Psilophyta: *Rhynia*  
Lycophyta: *Selaginella*  
Arthrophyta: *Equisetum*  
Filicophyta: *Marsilea*

#### Unit II: Gymnospermophyta

- Classification and general account of the gymnosperms with special reference to the life histories of the following genera:  
Cycadales: *Cycas*  
Coniferales: *Pinus*

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## STRUCTURE OF EXAMINATION (B.Sc. I Year)

### Theory examination:

Paper I: Fungi, Lichens, Bacteria and Viruses	: 34 Marks
Paper II: Algae and Bryophyta	: 33 Marks
Paper III: Pteridophyta and Gymnospermophyta	: 33 Marks

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**Total** : **100 Marks**

### Practical examination:

- The practical examination will be based on the course work prescribed for Paper I, II and III. Preparation and study of suitable glycerin mounts and section of plant materials of cryptogams and gymnosperms will be made to test their knowledge of these groups.
- The dissection of plants and parts of plants prescribed, the preparation, staining, mounting and study of given plants (permanent preparations are not required).
- A practical study of plants prescribed in the syllabus. Notebooks containing a complete record of laboratory work must be produced at the practical examination. Marks will be allotted as follows:

Practical Examination	: 36 Marks
One test during the year	: 05 Marks
Viva-Voice	: 04 Marks
Class record	: 05 Marks

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**Total** : **50 Marks**

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## B.Sc. II Year

### PAPER I: TAXONOMY, MORPHOLOGY, ANATOMY AND LIFE HISTORY OF ANGIOSPERMS

#### Unit I: Taxonomy

History of plant taxonomy with special reference to India; brief account of Bentham & Hooker; Englar & Prantl system of classification; detailed account of the following families: Poaceae (Graminae); Liliaceae, Orchidaceae; Musaceae; Ranunculaceae; Capparidaceae; Papaveraceae; Caryophyllaceae; Rosaceae; Apiaceae (Umbelliferae); Amaranthaceae; Casuarinaceae; Euphorbiaceae; Apocynaceae; Cucurbitaceae; Acanthaceae; Solanaceae; Convolvulaceae; Lamiaceae (Labiatae); Rubiaceae.

#### Unit II: Morphology and Anatomy

Broad outlines of morphology and anatomy of vegetative and reproductive organs of angiosperms; Tissue and Tissue system; Morphology and anatomy of root and stem; An account of normal primary structure and secondary growth in herbaceous and woody plants; Primary Anomaly, Anomalous secondary growth as exemplified by stems of *Boerhaavia*, *Pyrostegia* (*Bignonia*), and *Dracaena*; Anatomy of leaf; Leaf abscission, General morphology of flower and floral parts.

#### Unit III: Life History of Angiosperms

A brief account of anther, ovule, male gametophyte, *Polygonum* type embryo sac; Fertilization; Development of embryo as exemplified by *Capcella bursapostoris* and *Sagitaria* types; Apomixis and Polyembryony

### PAPER II: PLANT PHYSIOLOGY AND ECOLOGY

#### Unit I: Plant Physiology

Cell constituents and their micro-chemical reactions; Physiology of cell; Absorption of materials in general; ascent of sap; Transpiration; Assimilation of Nitrogen; Translocation of plant food materials; Fermentation; Plant-water relations (water absorption, transpiration & translocation, salt uptake and translocation); Growth hormones; Dormancy; Vernalization and Photoperiodism; Phytochrome system; Enzymes: classification and mechanism of action; Respiration & Photorespiration; Photosynthesis; Lipid metabolism.

#### Unit II: Ecology

Ecological factors: Climatic, Edaphic, Phytogeographic and Biotic factors; Plant succession; Plant communities: Hydrophytes, Mesophytes, Xerophytes, Mangroves, Epiphytes and Parasites; Food chains; Ecosystem; Pollution

### PAPER III: CYTOLOGY, GENETICS, MOLECULAR BIOLOGY AND EVOLUTION

#### Unit I: Cytology and Genetics

Chromosomes; Cell divisions; Mendelian genetics; Linkage and crossing over; Gene concept; Determination of sex in plants; Mutation (chromosomal and genic), Chromosomal aberration and Polyploidy

#### Unit II: Molecular Biology

Structure of DNA, RNA and proteins; Genetic code: An elementary knowledge protein synthesis mechanism

#### Unit III: Evolution

Origin of life and organic evolution: Evidences, mechanism and theories

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## STRUCTURE OF EXAMINATION (B.Sc. II Year)

### Theory examination:

Paper I: Taxonomy, Morphology, Anatomy and Life History of Angiosperms	: 34 Marks
Paper II: Plant Physiology and Ecology	: 33 Marks
Paper III: Cytology, Genetics, Molecular Biology and Evolution	: 33 Marks

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**Total** : **100 Marks**

### Practical examination:

The practical examination will be based on the course work prescribed for Paper I, II and III.

Marks will be allotted as follows:

Practical Examination	: 35 Marks
One test during the year	: 05 Marks
Viva-Voice	: 05 Marks
Class record	: 05 Marks

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**Total** : **50 Marks**

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## B.Sc. III Year

### PAPER I: BIOTECHNOLOGY AND PLANT PATHOLOGY

#### **Unit I: Biotechnology, Applied Microbiology and Genetic Engineering**

Microbiology and Applied Microbiology: Definition and Scope; An elementary knowledge of soil, water, sewage, milk, food, air and industrial microbiology; Importance and application of Bacillus, Streptococcus, Lactobacillus, Leuconostoc, Clostridium; Symbiotic and non-symbiotic nitrogen fixing bacteria and Blue-green algae, Mycorrhiza

Genetic Engineering: Concept and scope, Gene-transplants, Role of enzymes, Restriction endonucleases and Plasmids in transferring genes, Applications of genetic engineering

#### **Unit II: Plant Pathology**

Disease and disease inciting organisms, symptoms of plant diseases; Dissemination of pathogens; Forecasting of plant diseases; Host-parasite interaction; Principles of defense mechanism and control

### PAPER II: ECONOMIC BOTANY; APPLIED PLANT ANATOMY & PLANT BREEDING; MARINE BIOLOGY & LIMNOLOGY

#### **Unit I: Economic Botany**

Uses of plants and plant products belonging to Angiosperm with special reference to the following:

**Food plant:** Cereals (wheat, rice and maize), Legumes (Pigeon pea, Groundnut, Gram) Sugarcane and fruits

**Food Adjuncts:** Beverages (Tea and Coffee), Spices, (Piper nigrum, Capsicum, Curcuma, Zinziber, Crocus sativus, Coriandrum sativum, Syzygium aromaticum)

**Masticatories and Fumicatories:** (Piper-betel, Areca catechu, Acacia catechu, Nicotiana tobaccum and products thereof)

**Drug:** yielding plants, drugs, narcotics, (Cinchona, Aconitum, Atropa, Artemisia, Rauwolfia, Cannabis sativa, Papaver somniferum)

**Timber:** Teak, Sal, Shisham

**Fiber:** Cotton, Jute and Coir

**Edible oils:** Arachis, Coconut, Brassica, Ricinus

**Rubber:** Haevea and Ficus

**Gums:** Acacia, Sterculia

**Weeds and weed control:** An introduction and definition of weeds, methods of weed control

#### **Unit II: Applied Plant Anatomy and Plant Breeding**

Applied Plant Anatomy: Economic aspects of applied plant anatomy; Applications of anatomy in horticulture and food adulteration; Medicinal plants; wood present-day, in Archaeology, forensic application.

Plant Breeding: Method of breeding of self-pollinated crop, cross pollinated crops and asexually propagated crops; Techniques of plant breeding- emasculation, pollination, etc.

#### **Unit III: Marine Biology and Limnology**

An elementary knowledge of marine biology and limnology, a general study of morphological and reproductive features of macrophytes growing in fresh water and sea water with special reference to their adaptations, periphyton, factors influencing growth of fresh water and marine flora.

### PAPER III: PALAEOBOTANY AND PALYNOLOGY; PLANT DIVERSIFICATION; MORPHOGENESIS AND TISSUE CULTURE

#### **Unit I: Palaeobotany and Palynology**

An elementary knowledge of Palaeobotany, Process of fossilization, types of fossils, methods of study; form genera of fossil plants; Palynology: An introductory knowledge to Palynology.

#### **Unit II: Plant Diversification**

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Evolutionary trends, origin and evolution of different plant groups

**Unit III: Morphogenesis and Tissue Culture**

Phenomenon of morphogenesis; an elementary knowledge of polarity, symmetry, cellular and tissue differentiation, protoplast fusion; Methodology and application of tissue culture

**STRUCTURE OF EXAMINATION (B.Sc. III Year)**

**Theory examination:**

Paper I: Biotechnology and Plant Pathology : 50 Marks  
Paper II: Economic Botany; Applied Plant Anatomy & Plant Breeding; Marine Biology & Limnology : 50 Marks  
Paper III: Palaeobotany and Palynology; Plant Diversification; Morphogenesis and Tissue Culture : 50 Marks

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**Total** : **150 Marks**

**Practical examination:**

The practical examination will be based on the course work prescribed for Paper I, II and III. Marks will be allotted as follows:

Practical Examination : 60 Marks  
One test during the year : 05 Marks  
Viva-Voice : 05 Marks  
Class record : 05 Marks

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**Total** : **75 Marks**

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