

New Curriculum According To U.G.C.

(with minor revision and rearranged paper sequence)

M.Sc. Examination

BOTANY

Annual System

An Out-Line

First Year :

- Course - I (Paper-I) - Biology & diversity of low plants (cryptogams) - I (Algae & Bryophyta Morphogenesis).
- Course - II (Paper-II) - Biology & diversity of lower plants-II (Fungi/ Bacteria/Virus/lichens/Microbiolty).
- Course-III (Paper-III) - Biology & diversity of vascular plants (Pteridophyta/Gymnosperm/Palabotany)
- Course-IV (Paper-IV) - Plant Physiology and Biochemistry.
- Course-V (Paper-V) - Plant Ecology and Soil Science & Phytogeography.

Second Year :

- Course-I (Paper-I) - Microtechnique, Biotechnology & Genetic Engineering.
- Course-II (Paper-II) - Diversity and taxonomy of seed plants- Angiosperms (Toxonomy, Anatomy, Emlerijology.)
- Course-III (Paper-III) - Cell Biology/Genetics/Plant Breeding/ Statistics.
- Course-IV (Paper-IV) - Plant Resource utilization & Conservation and Applied Botany.
- Course-V (Paper-V) - Elective-Specialization paper
- (Anyone Optional)
- i) Advanced Plant Physiology.
 - ii) Molecular Plant Pathology or Palaeo botany.
 - iii) Environment and Plant Response or
 - iv) Crop Genetics and Plant Breeding.

Details of New Curriculum according to UGC, revised in Present set up.

Note :

1. Total Curriculum divided in five courses/or five papers in first and second year each, in U.G.C. model. Present set up of university curriculum already has included five papers each year according to U.G.C. recommendation.
2. Only minor alterations have been made particularly in sequence of paper in M.Sc. (Previous) and M.Sc. (Final) in the U.G.C. model to accommodate content of courses in present setup of syllabus.
3. Some recommended practical exercises on few courses are new in U.G.C. model and our universities/Colleges have not specific facilities for it. Only such exercises are not included in present setup, otherwise most of recommendations adapted as such.

Paper - I : Biology & Diversity of Lower Plants :

Cryptogams (Algae & Bryophyta)

M.M. 100

Section - A : Algae :

1. Algae in diversified habitat.
2. Systematic study of thallus organization, structure, reproduction, pigmentation, criteria for classification of algae (pigments, reserve food, flagella) and classification.
3. Salient features of Protochlorophyta, chlorophyta, charophyta, xanthophyta, Bassillariophyta, Phaeophyta, Rhodophyta.
4. Phylogeny and inter-relationship of principal group based on the following.
 - i) *Chlorophyta* : Volvocales (*Pandorina*, *Eudorina*, *Volvox*), Chlorococcales (*Chlorococcus*, *Hydrodictyon*), Ulotricales (*Ulothrix*, *Microspora*, *Ulva*), Cladophorales (*Pithophora*), Chaetophorales (*Chaetophora*, *Fritschella*, *Draparnaldia*, *Draparnaldiopsis*, *Coleochaete*), Oedogoniales (*Oedogonium*) Conjugales (*Spirogyra*) Scleronales (*Voluceria*, *Acetabularia*), Charales (*Chara*).
 - ii) *Xanthophyta* : A general account.
 - iii) *Bassillariophyta* : A general account.
 - iv) *Phaeophyta* : Ectocarpales (*Ectocarpus*); Lamnariales

(*Laminaria*); Dictyotales (*Dictyota*, *Padina*); Fucales (*Fucus* and *Sargassum*).

v) *Cyanophyta* : Ultrastructure, salient features of *Gleocapsa*, *Microcystis*, *Anabena*, *gleotrichia*, *Nostoc*, *Rivularia*, *Scytonema*.

5. Economic Importance of Algae.

Section - B : Bryophyta :

1. Morphology, structure, reproduction, life history, distribution phylogeny of bryophytes based on following :-

A) Hepaticopsida :

- (i) Sphaerocarpaceae (*Sphaerocarpus*, *Geothallus*)
- (ii) Marchantiales (*Riccia*, *Cyathodium*, *Plagiochasma*, *Lunularia*, *Astellia*, *Marchantia*);
- (iii) Monocleales (*Monoclea*)
- (iv) Jungermanniales (*Pellia*, *Porella*, *Fossombronia*)
- (v) Calobriales (*Calobryum*);
- (vi) Takakiales (*Takakia*).

B) *Anthocerotopsida* : *Anthocerotales* (*Anthoceros*, *Notohylus*)

C) *Bryopsida* : Sphagnales (*Sphagnum*), Andreales (*Andreaea*) Bryales (*Furnaria*, *Pogonatum*), Bauxboumiales (*Bouxbomia*)

Section - C : Morphogenesis

(A general Introduction to Morphogenesis)

1. Meristem (Apical meristem of root, stem and leaf.)
2. Polarity (As expressed in external structure, its manifestation and developmental pattern.)
3. Symmetry (Radial, bilateral, dorsiventral, development of symmetry and form.)

Practical : Practical related to this paper will be based on plant types prescribed in each section (i.e. algae and bryophyta).

Paper - II : Biology and Diversity of Lower Plants - II

(*Fungi*, *Bacteria*, *Virus*, *Lichens*, *Microbiology*)

M.M. 100

Section - A : Fungi :

1. General characteristics, nutrition (saprophytic, symbiotic,

biotrophic) Reproduction in Fungi.

2. Heterothalium, Heterokryosis, Parasexuality, Physiological specialization.
3. Systematic study of structure and reproduction, life cycle, phylogeny and affinities of main groups of fungi with special reference to following :-
 - i) *Myxomycetes* : (Trichiales, Stemonitales, Physarales).
 - ii) *Plasmodiophoromycetes* : (Plasmodiophacrales).
 - iii) *Oomycetes* : Saprologniales (*Saprolognia*, *Achyra Peronosporales* (*Pythium*, *Phytophthora*, *Albugo*, *Peronospora*).
 - iv) *Chitridiomycetes* : Chitridiales, Blastocladiiales, Monoblepharidales.
 - v) *Zygomycetes* : Mucorales (*Pilobolus*), Entomophthorales.
 - vi) *Ascomycetes* : Protomycetales, (*Protomyces*), Endomycetales (*Sachromyces*), Taphrinales (*Taphrina*), Urotiales (*Aspergillus*, *Penicillium*), Erysiphales (*Erysiphae Phyllactenia*, *Phyllachora*, *Chaetomium*), Sphaeriales. (*Xylaria*), *Clavicepitales*, *Laboulbenales*, *Pleoporales* *Pezizales* (*Peziza*, *Morchalla*).
 - vii) *Basidiomycetes* : Tramitiales, Ustiligenales (*Ustilago*, *Urocystis*) Uredinales (*Puccinia*, *Melampsora* *Uromyces*, *Revenelia*).
 - viii) *Deuteromycetes* : Sphaeropsidales, Melanconiales (*Collatotricum*), Moniliales (*Helminthosporium*, *Alternaria*, *Cercospora*, *Fusarium*).
4. Record trends of classification of fungi.

Section - B : Bacteria, Virus, Lichens :

1. **Bacteria** : A general account of structure, nutrition, cytology, classification and economic importance and reproduction in bacteria.
2. **Viruses** : Characteristics and ultrastructure, Isolation and purification of viruses, transmission, and multiplication.
3. **Phytoplasma** : General characteristics and role in causing plant diseases.
4. **Lichens** : A general account with particular reference to mode of life, structure, reproduction, classification and economic

importance.

Section - C : Microbiology :

1. Archaeobacteria (Archaea) and Eubacteria.
2. Cyanobacteria - salient features, biological importance.

Practical Exercise :

1. Practical related to this paper will be based on plant types of each section.
2. Symptomatology of important fungal, bacterial and viral diseases of plants.
3. Identification of fungal cultures of possible/available fungal types.
4. Gram staining of bacteria.
5. Study of foliose and other types of lichen thallus.

Paper - III : Biology and Diversity of Vascular Plants (Pteridophyta, Gymnosperm, Palaeobotany)

M.M. 100

Section - A : Pteridophyta :

1. Morphology, anatomy and reproduction, phylogenetic relationships with emphasis on detailed study of following :
 - i) *Psilopsida* : (Psilophylales, Psilotales)
 - ii) *Lycoposida* : (Lycopodiales, Sellagenales, Lepidodendrales, Isoetales, Pleurotales).
 - iii) *Sphnopsida* : (Equicetales, Hyniales, Sphenophyllales, and Calamitales)
 - iv) *Pteropsida* : (A general account)
 - v) *Filicinae* : A general account
 - vi) *Eusporangiate Ferns* : (Ophioglossales, Marattiatales)
 - vii) *Leptosporangiate ferns* : Filicales.
2. General Account of fossil Pteridophyta
3. Evolution of Stele in pteridophytes.
4. Heterospory and origin of seed habit.
5. Economic importance of Pteridophytes.

Section - B : Gymnosperm and Palaeobotany

1. Classification, distribution, morphology, Life history of gymnosperm.

