BOTANY M.S.c SYLLABUS

SEMESTER SYSTEM

Semester-One

Paper		Name of Paper	Max Marks
Paper-I	:	Algae and Bryophytes	50
Paper-II	:	Fungi and plant viruses	50
Paper-III	:	Pteridophytes, Gymnosperms and Palacobotany	50
Paper-IV	:	Microbiology	50
Practicals	:	Based on the above theory papers.	100

The students will be required to choose any one of the following papers.

a) Plant Pathology
b) Advance Plant Physiology
c) Forest Ecology
d) Advance Plant Taxonomy
e) Advanced Molecular Genetics
f) Environmental Management and Technology

Practical : Their shall be two practical examinations:

Practical-1 : Based on Ist IInd and IIIrd (General) papers having 75 maximum marks.

Practical-2 : Based on IVth Elective paper having 25 maximum marks.

BOTANY M.Sc. SYLLABUS

FIRST SEMESTER

SEMESTER-I

Paper-I: ALGAE AND BRYOPHYTES

A. ALGAE:

1. Criteria for algal classification, comparative survey of important systems of classification of algae up to the rank of class.
2. A study of division Cyanophyta, Chlorophyta, Xanthophyta, Phaeophyta and Rhodophyta with reference to the following.
   a. General features.
   b. Range of structure and organization of thallus.
   c. Reproductive diversity and life cycle patterns.
   d. Classification up to the level of order.
3. General characteristic of the divisions Prochlorophyta, Charophyta, Euglenophyta, Pyrrophyta, Bacillariophyta and Cryptophyta.
4. Evolutionary tendencies in algae; parallelism in evolution.
5. Distribution of Algae in soil, freshwater and marine environments.
6. Economic Importance of Algae.

Practical:

1. Study of important genera from the above groups.
2. Local collection of different algae forms and their study.

B. BRYOPHYTES:

1. Criteria and recent trends in the classification of Bryophytes.
2. Origin and evolution of bryophytes.
3. Diversity in Bryophytes: Habit and Habitat; Developmental morphology and organization of gametophyte and sporophyte bodies.
4. A comparative study of morphology, anatomy, life history, classification and phylogeny of the following groups (with special reference to Indian forms.): Takakiales, Calobryales, Monocleales, Sphaerocarpales, Marchantiales, Jungermanniales, Anthocerotales, Sphagnales, Andreaeales and Bryales.
5. Fossil history of Bryophytes.
6. Ecological significance and economic importance of Bryophytes.

Practical:

Study and identification of the following genera with suitable preparations:

Riccia, Targionia, Cyathodium, Plagiochasma, Dumartiera, Asterella (Fimbriaria), Conocephalum, Lunularia, Marchantia, Riccardia (Anura), Pellia, Porella, Anthoceros, Notothylas, Spahagnum, Pogonatum and Funaria.

SEMESTER-I

Paper- II: FUNGI AND PLANT VIRUS

A: FUNGI

1. The status of fungi. Principles of important systems of classification up to the rank of classes.
2. A study of the classes Myxomycetes, Plasmodiophoromycetes, Chytridiomycetes, Oomycetes, Zygomycetes, Ascomycetes, Basidiomycetes and Deuteromycetes with reference to:-
   a. Classification upto the rank of orders.
   b. Range of structure and organization of vegetative and reproductive bodies.
   c. Ultra structure.
   d. Method of reproduction.
   e. Variation in life-cycle.
   f. Economic importance.
3. Nutritional and physical requirement for growth and reproduction.
4. Heterokaryosis, Parasexuality, Heterothallism, Hormonal control of sexual reproduction.

5. **Fungal associations:**
   i. Lichens: general account of lichens with special reference to:-
      a) Habitat, Structure and organization of lichens.
      b) Method of reproduction.
      c) Physiological relationship of mycobiont and phycobiont.
      d) Economic importance of lichens.
   ii. Mycorrhizae:
      a) Types of mycorrhizae.

B: PLANT VIRUS

1. Brief history of plant virus and their origin.
2. Nomenclature and classification of plant virus and their strains.
3. Variation in morphology and ultra structure of plant viruses.

4. Mode of infection and replication of plant viruses.
5. Translocation of viruses in the hort.
6. Basic control measures and production of virus-free plants.
7. Modern concept of organic viruses, viroids virusoides, satellite viruses and Prions

Practical :

1. Collection of virus diseased plant samples and their study.
2. Study of particle morphology of different plant virus (by photograph only)

SEMESTER-I

Paper- III: PTERIDOPHYTES, GYMNOSPERMS AND PALEOBOTANY

A: PTERIDOPHYTES

1. Classification and origin of Pteridophytes.
2. The vegetative sporophyte; Microphyll and megaphylls; Stelar theory; Telome theory.
3. The fertile sporophyte: sporangia: position, ontogeny types, structure.
4. Heterospory: Occurrence, causes and significance.
5. The gametophytes: Germination of fern spore, Development of fern prothallus.
6. Comparative study of Psilopsida, Lycopsida, Sphenopsida and Pteropsida.

Practicals: Monographic study of the sporophyte body of the following:

Osmunda, *Ophioglossum*, *Lygodium*, *Gleichenia*, *Cyathea*, *Pteris*, *Dryopteris*, *Adiantum* and *Polypodium.*

B: GYMNOSPERMS

1. Classification of gymnosperms upto the rank of orders.

2. A general account of the following groups with special reference to the genera indicated in brackets.

Pteridospermales (*Calymmatotheca*, *Hoeninghausi*), Glosopteridales, Caytoniales (*Caytonia*), Cycadales, Bennettitales(*Williamsonia* sp.), Pentoxylales, Corditales (*Cordaites* sp.), Ginkgoales (*Ginkgo biloba*) Coniferales (general anatomy, cone organization, life history and distribution), Ephedrales (*Ephedra* sp.) Gnetales (*Gnetum* sp.) and Welwitschiales (*Welwitschia* sp.)

C: PALEOBOTANY

1. Principles of Paleobotany and geological time scale.
2. Process of fossilization and types of fossils.
3. Methods of study of fossils and carbon dating technique.

Practical: A comparative study of vegetative and reproductive parts of the representatives from the above groups.

SEMESTER-I

Paper- IV: MICROBIOLOGY

1. Details study of bacteria with reference to their ultra structure, reproduction and classification (Ref. Bergy's manual of systematic bacteriology).
2. Soil Microbiology- Decomposition of organic matter and geo bicycles of elements; Bio-fertilizers.
3. Basic concepts of food microbiology.
4. Water microbiology, potable water and sewage disposal.
5. Industrial base of microbes, production of ethanol, antibiotics, etc.
6. Basic principles of immunology, vaccines and immunoglobulins.