# ALIGARH MUSLIM UNIVERSITY, ALIGARH

## FACULTY OF LIFE SCIENCE

## SYLLABUS FOR

# M.SC. BOTANY

**The living world; biological classification; plant kingdom**: Characteristics and classification of viroids, viruses, bacteria and fungi, host-virus interaction, Reproduction in fungi and bacteria.

**Nematodes**: Elementary idea of nematodes; General life cycle of plant parasitic nematodes and diseases caused by them namely ear cockle of wheat; root knot of vegetables and slow decline of citrus.

**Plant Diseases**: General account of plant diseases and their causal organisms viz. Tobacco mosaic virus, Citrus canker, Little leaf of brinjal, White rust of crucifers, Stem gall of coriander, late blight of potato, Powdery mildew of cucurbits, Stem rust of wheat and Red rot of sugarcane.

**Algae**: Characteristics and classification; structure and reproduction of Nostoc*, Chlamydomonas, Volvox, Vaucheria, Chara, Batrachospermum, Ectocarpus;* economic importance.

**Bryophytes**: Characteristics and classification; structure and reproduction of *Riccia, Marchantia, Anthoceros, Funaria,* economic importance.

**Pteriodophytes**: Characteristics and classification, structure and reproduction of *Psilotum, Lycopodium, Selaginella, Equisetum*. Telome theory, evolution, heterospory and seed habit.

**Gymnosperms**: Characteristics and classification, structure and reproduction of *Cycas, Pinus* and *Ephedra*.

**Angiosperms**: Bentham and Hooker's system of classification: Diagnostic features of Ranunculaceae, Papaveraceae, Caryophyllaceae, Rutaceae, Cucurbitaceae, Apiaceae, Rubiaceae, Apocynaceae, Solanaceae, Acanthaceae, Lamiaceae, Euphorbiaceae, Arecaceae, Poaceae.

**Anatomy**: Anatomy of root,stem and leaf of dicots and monocots. Secondary growth.

**Cell**: Prokaryotic and eukaryotic cells, structure and functions, cell cycle and cell division (amitotic, mitotic and meiotic cell division).

**Physiology**: Plant water relations; mineral nutrition; photosynthesis; Glycolysis, TCA, translocation of food material; respiration; nitrogen and nucleic acid metabolism; growth and development, general aspects of phytohormones

**Reproduction**: Asexual reproduction; structure and function of flower, microsporogenesis, megasporogenesis, fertilization, development of embryo, endosperm, and seed; apomixis.

**Genetics and Plant Breeding**: Mendel's principles of inheritance, gene interactions, quantitative genetics, cytoplasmic inheritance. Composition and roles of different forms of nucleic acids; DNA replication, transcription, translation, techniques of hybridization and emasculation, suction method of emasculation, hot water emasculation, bagging, tagging, pollination. Physical and chemical mutagens, gamma garden, polyploidy.

**Ecology**: Organisms and environment, population, biotic community and succession; ecosystem- structure and function; natural resources and biodiversity and their conservation.

**Anomalous Plant Anatomy**- Scattered vascular bundles in dicots (*Podophyllum*), vascular bundles in a ring in monocots (*Triticum*), Separate xylem and phloem bundles, Dorsiventral, unifacial and isobilateral leaves. Kranz anatomy.

**Methods of Environmental Analysis**: Cell fractionation (Homogenization and centrifugation). Analysis of water: Colour, odour, turbidity, dissolved oxygen.

**Experiments in Cytology and Genetics**: Flower bud fixation; preparation of slides. Test cross methods-monohybrid cross, dihybrid cross.

**Introduction to Environment**: Environmental issues (species invasion, biodiversity, urbanization), control of environmental degradation (Phytoremediation, hot spot concept). Air, water, soil, noise and radioactive pollutions.

**Tissue Culture and Plant Biotechnology**: Cellular totipotency, callus and cell suspension culture, anther and pollen culture, micropropagation; organogenesis, application in crop improvement, synthetic seeds and their applications; somatic hybridization; somaclonal variation; cryopreservation. Genetic transformation and transgenic plants. Application of plant biotechnology. Murashige and skoog medium (1962).Whites medium (1963), preparation of stock solution, sterilization methods, types of culture (Leaf, shoot, nodal segment, callus, cell suspension cultures).