

M.Sc. Botany

(Semester-IV)

Option I

It consist of Core Elective papers

MBOTEC-I: Cytogenetics and Crop improvement (5 Credits)

MBOTEC-2: Practical based on MBOTEC-I (5 Credits)

MBOTEC-I: Applied Microbiology and Plant Pathology (5 Credits)

MBOTEC-2: Practical based on MBOTEC-I (5 Credits)

Or any other Elective Core papers decided by BOCS and duly approved by competent bodies of the University.

Option II

MBOTEC-I: Any theory paper of Core Elective

MBOTEC-2: Project dissertation and Viva-voce

Option III

MBOTEC-I and MBOTEC-2: Combined together and act as Project dissertation and Viva-voce carrying 200 marks (10 Credits).

M.Sc. Botany

(Semester-IV)

MBOTBC-I: Cytogenetics and Crop improvement (5 Credits)

Time: 3hrs

Marks: 70

The question paper will consist of 7 questions divided into 3 sections.

Section A: Question No.1 will be compulsory comprising ten objective types questions (two from each Unit) each carrying two marks (10x2:20 marks).

Section B: Question No. 2 will also be compulsory and comprise five short answer types questions (one from each Unit) and students will have to attempt only four questions (4 x 5:20marks).

Section C: Five long answer types questions are to be set (one from each Unit) of which any three questions are to be answered (3 x 10:30 marks).

Unit I

Haploidy- Origin, production, cytological behaviour and genetic uses. Aneuploidy and polyploidy- Origin, classification, production, cytological behaviour and genetic uses; Role of polyploidy in evolution and speciation; Evolution of karyotypes. Chromosome banding pattern: Techniques, functional differentiation of chromosome segments, their chemical nature, significance and effect

Unit II

Mutations: Spontaneous and induced; physical and chemical mutagens- classification, mode of action; molecular basis of gene mutations; site directed mutagenesis; role of mutations in crop improvement Cytoplasmic inheritance and maternal effect

Transposons: Structure and types of transposons (Prokaryotic and Eukaryotic); Mechanism of transposition (replicative and non-replicative); Retroposons ; Application of transposon

Unit- III

Role Cytogenetics in crop improvement. Epigenetics: Introduction; histone code; base modification; paramutations in maize; Epigenetics and Lamarckism; Epigenome and epigenomics.

Unit IV

Role Cytogenetics in crop improvement. Genetic basis of evolution and speciation Incompatibility Centres of origin of cultivated crops

Unit V

A Brief account of classical methods of plant breeding. Modern techniques of plant breeding: Hybrids vs cybrids, protoplast fusion and somatic hybridization (parasexual hybridization techniques) and a brief idea of Terminator gene technology. Heterosis and heterosis breeding. Breeding for disease and drought resistance

MBOTEC-2: Practical based on MBOTEC-I (Cytogenetics and Crop improvement) (5 Credits)

M.Sc. Botany

(Semester-IV)

MBOTEC-I: Applied Microbiology and plant pathology (5 credits)

Time: 3hrs

Marks: 70

The question paper will consist of 7 questions divided into 3 sections.

Section A: Question No.1 will be compulsory comprising ten objective types questions (two from each Unit) each carrying two marks (10x2:20 marks).

Section B: Question No. 2 will also be compulsory and comprise five short answer types questions (one from each Unit) and students will have to attempt only four questions (4 x 5:20marks).

Section C: Five long answer types questions are to be set (one from each Unit) of which any three questions are to be answered (3 x 10:30 marks).

Unit I

Fermentation technology: Scope and prospects. Microbial Metabolites: Primary and secondary metabolites; Production of organic acids (citric acid), amino acid (Glutamic acid) and Vitamin (Vitamin B12). Production of antibiotics (Streptomycin). Enzymes production and their commercial applications: Amylases, proteases Renin

Unit II

Biochemical activity of microorganisms in milk. Fermented dairy products: yogurt and cheeses
Microorganisms as food; Single cell proteins (SCP), Edible mushroom (Button and Oyster),
Fermented beverages: Production of wine and beer

Unit III

Treatment of solid wastes: Composting & Land filling. Wastewater treatment methods: Oxidation pond, Trickling filter, Activated sludge methods; Anaerobic treatment of wastewater. Waste water treatments by plants. Bioremediation and biogas production

Unit IV

History, classification and importance of plant pathology Chemical and biological management of plant disease control. Integrated pest management (IPM). Biopesticides: Bacterial, viral and fungal biopesticides and their applications

Unit V

Selected plant diseases with special reference to symptoms, etiology and disease management
Cereals: blast of rice, Karnal bunt of wheat. Fruits & Vegetables: Downy mildew of cucurbits, Bacterial spots of tomato, downy mildew of grapes. Pulses: Wilt of arhar, powdery mildew of pea
Oil seeds: Rust of linseed. Fibre crop: Wilt of cotton. Spices & condiments: Stem galls of coriander, leaf spot of turmeric and leaf curl of chilli. Sugarcane: Whip smut of sugarcane, grassy shoot disease of sugarcane, Tea, Coffee & Tobacco: Blister blight of tea, leaf rust of coffee & leaf blight of tobacco

**MBOTEC-2: Practical based on MBOTEC-I (Applied Microbiology and Plant pathology)
(5 Credits)**