**BOTANY DEPARTMENT**

**KURUKSHETRA UNIVERSITY KURUKSHETRA**

**Scheme of examination for M.Phil-Botany Programme w.e.f. session 2018-19 under CBS**

 **Name Credit Hrs Marks Internal Assessment Total**

**Paper- I** **Bot-501** 4 3 80 20 =100

(**Recent Advance in Plant Sciences**)

**Paper - II** **Bot- 502** 4 3 80 20 =100

(**Research Techniques)**

**Paper - III** **Seminar -503** 2 2 50 -- =50

**Paper – IV** **Review - 504** 2 2 50 -- =50

**writing**

 **Dissertation** Grades : A, B, C, D

**Course Work for M.Phil. Programme**

**Botany Department, Kurukshetra University, Kurukshetra**

Paper- I **Recent Advance in Plant Sciences**

Bot-501

 Max. Marks: 80(Theory), Internal Assesment-20

 Duration : 3 hours Credit-4

Note: 1. Ten questions will be set from the entire syllabus and two from each unit.

2. The candidates are required to attempt five questions in all, selecting one from each unit. All questions carry equal marks.

Unit I

**Mycology and Plant Pathology**

1. Morphology and classification of fungi, bacteria and viruses.

2. Fungal Ecology, Fungal Biotechnology.

3. Fungi as symbionts of photobiont, plants and insects.

4. Chemical control, fungicides, systemic fungicides and soil fumigants.

5. Biological control.

6. Botanicals in disease control and mycoherbicidal strategies for biocontgrol.

7. Disease inciting microorganisms and symptoms of plant diseases.

Unit II

**Seed Germination and Dormancy**

1. Physiology and biochemistry of seed germination and CAM Plants.

2. Environmental and hormonal control of seed dormancy.

**Photosynthesis**

1. The path of carbon in photosynthesis, C3 and C4.

2. Structure and functions of Rubisco.

**Phytohormones**

Recent Advances in the mechanisms of action of gibberellin, abscisic acid and ethylene.

 **Senescence**

Leaf senescence: Physiological and biochemical changes: and regulation of senescence.

Unit III

 **Ecology and Resource Conservation**

 1. Productivity: Patterns and process.

 2. Biodiversity: Patterns, processes, conservation of biodiversity.

 **Ecological restoration**

1. Basic concepts, process and strategies ecological restoration, restoration of aquatic ecosystem-river corridors, wetlands and lakes. Rehabilitation of salt affected soils. Bioremediation and phytoremediation.

2. Principles and approaches of Forest Management. Global changes and sustainability.

Unit IV

**Algal Biotechnology**

1. Algal fertilizers.

2. Algal immobilization: methods and applications, single cell proteins.

3. Cyanobacteria and N2-fixation.

**Plant Cell and Tissue Culture**

1. Introduction, concept of cellular differentiation, totipotency.

2. Organogenesis and embryogenesis, techniques and utility.

3. Somatic hybridization: Protoplast fusion, hybrid selection and regeneration.

4. Applications of plant tissue culture: Clonal propagation, artificial seeds, production of secondary metabolites, cryopreservation.

Unit V

**Eukaryotic Genome**

1. Chromosomes and their chemical organization: split genes, repeated DNA, different types and multigene families.

2. Regulation of gene expression in eukaryote a different levels: Transcriptional, post-transcriptional, translational and post-translational.

3. **Transgenic Plants**

Transgenics for improvement of nutritional quality, fruit ripening, resistance against insects, fungi, bacteria and viruses, molecular farming and vaccines.

**Course Work for M.Phil. Programme**

**Botany Department, Kurukshetra University, Kurukshetra**

Paper-II- Bot-502

**Research Techniques**

 Max. Marks: 80(Theory), Internal Assesment-20

 Duration : 3 hours, **Credit-4**

Note: 1. Ten questions will be set from the entire syllabus and two from each unit.

2. The candidates are required to attempt five questions in all selecting one from each unit. All questions carry equal marks.

Unit – I

**Techniques of isolation and raising pure cultures of microorganisms**

 1. Isolation of microorganisms from soil by the serial agar plating method.

 2. Isolation of Fungi by Warcup and wakesman methof.

 3. Isolatin o VAM fungi, inoculums production and mass culturing of

 4. Microorganisms

5. Preparation of basic solid media, selective media etc., sub culturing techniques, Streak Plate, Pour Plate, Spread Plate methods.

6. Demonstration of Koch’s postulates for fungal pathogens.

7. Isolation of plant pathogens.

Unit- II

 **Methods of extraction of Plant Metabolites**

 1. Chlorophyll and carotenoids.

 2. Amino acids and organic acids

 3. Starch and sugars

4. Tracer Techniques and Autoradiography, Methods of estimation of total proteins Spectrophotometry

5. Principles, applications: UV, Visible spectrophotometry and Atomic Absorption Spectrophotometry.

Unit – III

**General Techniques of Plant Tissue Culture**

 1. Medium preparation and types of media

 2. Sterilization techniques for medium, glassware and explants

 3. Inoculation techniques

 4. Techniques for isolation and culture of protoplasts.

**General Botanical Micro techniques**

 1. Fixation, types of Fixatives

 2. Sectioning, types of microtomes

 3. Biological stains, staining techniques

**Microscopy**

Principles, types of microscopy (Phase-Contrast, Fluorescence, TEM and SEM).

Unit – IV

**Electrophoresis :** Types (Paper, TLC, GLC and HPLC) & their applications

**Principle and types** : Partition, adsorption, affinity, ion exchange, Gas chromatography, gel filtration, HPLC.

Unit – V

**Ecology and Environmental Analysis**

1. Methods of vegetation analysis, Plants function traits (PFTs), estimating plant biomass, and productivity.

2. Methods of analysis of carbon sequestration, nitrogen mineralization and immobilization

3. Application for data analysis & practical, use of basic computer software: M.S.Office, SPSS