

## **31. SYLLABUS FOR COMPETITIVE EXAMINATION FOR THE POST OF TEACHING ASSOCIATE IN PLANT PATHOLOGY**

### **Unit-1: Fundamentals of Plant Pathology –**

History of Plant Pathology, importance of plant diseases, factors affecting plant diseases, classification of plant diseases, causes of plant diseases, general characters of fungi, bacteria, fastidious vesicular bacteria, phytoplasmas, Spiro plasmas, viruses, viroids, algae, protozoa, rickettsia, phanerogamic parasites and nematodes. Disease triangle and tetrahedron, pathogenesis, symptoms & signs of plant diseases.

### **Unit-2: Diseases of Field and Horticultural Crops and their Management–**

Symptoms, etiology, disease cycle and management of major diseases of rice, maize, bajra, groundnut, soyabean, pigeonpea, finger millet, green gram, castor, wheat, gram, mustard, sugarcane, sunflower, cucurbits, onion, garlic, chillies, turmeric, coriander, cabbage, cauliflower, brinjal, tomato, okra, beans, ginger, aonla, ber, guava, banana, papaya, pomegranate, marigold, rose, tea and coffee. Types of phanerogamic parasites, Important plant diseases caused by stem and root parasites of phanerogams, Environmental factors and nutritional deficiency, primary and secondary air pollutants, methods of management.

### **Unit-3: Mycology–**

Introduction, terminology and history of mycology, general characters of fungi, types of fungal thalli, reproduction in fungi (Sexual and asexual), classification of fungi, comparative morphology and characters of different groups of fungi upto generic level, lichens and its importance.

### **Unit-4: Plant Bacteriology–**

Introduction, terminology and history of plant bacteriology, cell structure of bacterial cell, chemical composition of prokaryotes viz: MLOs/phytoplasmas, spiropasmas and other fastidious prokaryotes. Importance of phytopathogenic bacteria, classification and nomenclature of phytopathogenic prokaryotes, important plant diseases caused by bacteria and MLOs, reproduction of bacteria, general biology of bacteriophage, L-form bacteria, plasmids and Bdellovibrio.

### **Unit-5: Plant Virology–**

History of plant viruses, composition and structure of viruses, symptomatology of important plant viral diseases, chemical and physical properties of viruses, virus-vector relationship, classification, replication and movement of viruses. Isolation and purification of viruses, mycoviruses, arbo- and baculoviruses, satellite viruses, viroids and prions.

### **Unit-6: Laboratory and Analytical Techniques–**

Preparation and sterilization of media, methods of isolation, methods of purification and preservation in pure culture, methods of inoculation, molecular detection of pathogens in seeds and other planting material. ELISA, ISEM and PCR. Laboratory equipments and their uses: Autoclave, Hot air oven, Laminar air flow, spectrophotometer, electrophoresis, light and electron microscopy.

### **Unit-7: Principles of Plant Pathology –**

Plant disease complex, Survival and dispersal of plant pathogens, Role of environment and host nutrition on disease development, Host-parasite interaction, Infection process, Disease development: role of enzymes, toxins, growth regulators, Defense mechanisms. Effect of plant pathogens on host metabolism, Genetics of resistance, 'R' genes, Variation and variability of plant pathogens.

### **Unit-8: Principles of Integrated Disease Management (IDM)–**

Introduction, history, importance, concepts and principles of Integrated Disease Management (IDM). Methods of control: host plant resistance, cultural, mechanical, physical, legislative, biological and chemical control methods, constraints and strategies of IDM implementation.

### **Unit-9: Epidemiology and Forecasting of Plant Diseases–**

Basic concepts of plant disease epidemiology, factors affecting epidemic development (influence of pathogen, host and environment on disease development), crop loss assessment, disease forecasting, Epidemic analysis and prediction models, Survey and surveillance (including through remote sensing), disease severity and disease intensity.

### **Unit-10: Physiological and Molecular Plant Pathology–**

Molecular mechanisms of pathogenesis, mechanism of resistance, PR proteins, Phytoalexins, Antiviral proteins, SAR, HR and active oxygen radicals, Tissue culture, Elementary genetic engineering, Management of pathogens through satellite, Antisense-RNA. Ribozymes, coat protein, hypovirulence cross protection/useful genes and promoter technology, Biosafety and bioethics.

### **Unit-11: Post-Harvest Plant Pathology –**

Concept of post-harvest diseases, principles of plant disease management as preharvest and post-harvest, Types of post-harvest diseases, Factors governing postharvest diseases, Role of bio-control agents and chemicals in controlling post –harvest diseases, Role of different storage structures, control of aflatoxigenic and mycotoxigenic fungi.

### **Unit-12: Mushroom Production Technology–**

History and importance of mushroom, Edible and poisonous mushroom, cultivation technology of Pleurotus, Agaricus and Volvariella species, Maintenance of pure culture of mushroom fungi. Equipment's required for establishment of Mushroom unit, Nutritive value and uses of mushroom, economic aspects of mushroom cultivation and diseases of cultivable mushroom.