VBS Purvanchal University Jaunpur

Syllabus

Distribution of paper for M.Sc.(Ag.) Plant Pathology

M.Sc. (Ag.) -I Year Plant Pathology			
	Theory/Practical	Paper	Max. Marks
1	Paper I	Mycology	100
2	Paper-II	Microbiology	100
3	Paper-III	Statistics	50
4	Practical Paper	Based on I & II	100

M.Sc.(Ag.)-II Year Plant Pathology			
	Theory/Practical	Paper Name	Max. Marks
1	Paper I	Plant Disease & Their control	100
2	Paper-II	Principles of Plant Pathology.	100
3	Practical	Based on Paper Ist & IInd	100
4	Paper III	Method of Plant Disease Control	100
	or Thesis	Research Work	
5	Practical	Based on Paper III	50
	Viva-Voce	Based on Thesis (Research Work)	

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Syllabus

M. Sc. (Ag.) First Year

Plant Pathology

(Mycology)

Paper-I

M.M.:100

Theory

History of Mycology, Taxonomy, and Nomanclature of fungi, origin and Phyilogeny of fungi, Economic Importance of fungi.

General structure of a fungal thallus, its growth, reproduction and dissemination.

General introduction of the fungal, classification and broad out line of the major division, Sub-division, classes, order and families of the fungi.

A Critical account of different groups of fungi of Myxomycomycota, Mastigomycotina, Zygomycotina, Ascomycotina, Basidiomycotina and Deuteromycotina with special emphasis on taxonomy, life history, phylogeny, interrelationship and distribution:-

Myxomycota:-	*Stemonitis, Physarum & Plasmodiophora*.
Mastigomycotina:-	*Synchytrium, Olpidium, Physoderma, Allomycoes, Aphanomyces, Saprolegnia, Achlya, Pythium, Phytophthora, Albugo, Peronospora, Sclerospora & Bremia.*
Zygomycotina:-	*Mucor, Rhizopus, Pilobolus, choanephora & Entomphthora*.
Ascomycotina	*Saccharomyces, Gymnoascus, Taphrina, Erysiphe, Sphaerotheca, Phyilactinia, Uncinula,Leptosphaeria.Neurospora,Cochliobolus Podospheaera, Pyrenophora, Venturia, Pleospora, Chaetomium, Ceratocystis, Glomerella, Xylaria, Phllochora, Nectria, Claviceps, Peziza, Sclerotinia, Mycosphaerella & Physalospora.*
Basidiomycotina:-	*Exobasidium, Agaricus, Pleurotus, Polyporus, Boletus, Coprinus, Armilaria, Ustilago, Sphacelotheca, Tolyposporium, Urocystis, Tellitia, Neovossia, Entyloma, Puccinia, Uromyces, Hemilia, Phragmidium, Melampsora & Gymoosporangium*.
Deutaromycotina:-	*Phyllosticta, Phoma, Macrophoma, Ascochyta, Diplodia, Dariuca, Phomopsis,Septoria,Pestalotia, Verticillium, Colleetotrichum ,Cephalosporium, Gloeosporium, Pyricularia, Fusarium, Helminthosporium, Alternaria, Cercospora, Botrytis, Asperaillus. Penicillium, Sclerotium & Rhizoctonia.*

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(Microbiology)

Paper-II

M.M.:100

Theory

Bacteria:- Historical development leading to the concept of bacteria as a plant pathogen. Broad out line of morphology, growth, reproduction, Nomenclature and classification of plant pathogenic bacteria. Mode of infection, Transmission and survival of plant pathogenic bacteria. Effect of environmental factors on bacterial plant pathogens.

Bacteriophages, their structure, Properties, multiplication and role in Agriculture.

Bacteria in relation to Agriculture, Nitrogen fixation, Nitrogen cycle and biological aspects of Nitrogen fixation.

Elementary knowledge of Mycoplasma, its nature, structure, multiplication and classification.

Virus:- History and economic importance of plant Viruses, nature and properties, classification and nomenclature of plant viruses. Structure of typical plant virus as determined by electron microscopy and X-rys diffraction. Transmission of plant viruses with special reference to insect vectors. Biochemistry of plant virus infection. Immunity and serological reactions, variation, mutation and origin of viruses and virus strains.

Nematode:_ History of nematology, morphology, taxonomy and economic importance of plant parasitic nematodes.

Biology, population studies and Host-parasite relationship of different plant parasitic nematodes.

Life cycle of root knot nematode and cyst nematodes.

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(Statistics)

Paper-III

M.M.:50

Theory

Summarization of Data. Frequency distribution and graphical representation of date. Calculation of mean, mode & median and standard deviation. Standard error. Statistical significance. Practical applications of simple tests of significance viz. I and F test Principal use of X^2 (Chi square) test. Product moment, Correlation and its test of significance.

Principles of design of experiment. Paired comparisons. Planning and analysis of completely randomized block. Latin square and Split-plot designs. Missing plot technique in randomized block and Latin square designs, single plot missing, Factorial experiments (without confounding) confounding den 2^3 designs. Progeny row over trails, University trails, Simple rotational experiments.

Statistics of area and yield of crops. Agency for collection in Utter Pradesh. Methods of collection and compilation of primary data. Crop estimation and forecasting in U.P. Normal Yield and condition factor, improvement of statistics or area and yield random sample surveys. Crop cutting experiments.

Statistics of live-stock and fisheries. Census of Live stock and agriculture in general. Sources of official statistics.

Linear regression, Analysis of co-variance. Elementary ideas of probability.

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M.Sc.(Ag.) Plant Pathology Ist Year

Practical

M.M.:100

Practical:- Paper I & II

The Practical work will be base on and co-ordinated with the theoretical courses.

Microscopy, Calibration and measurement of spores. Camera Lucida drawing. Cleaning of glassware's, preparation of reagent and stains.

Preparation of mounting fluids and stains for temporary and permanent mounts. Collection, preservation and maintenance of plant pathogens. Microtome and Microtomy techniques.

Sterilization methods, Preparation of culture media, determination of pH, inoculation, isolation of aquatic fungi, isolation of fungi from infected tissues and soil, purification of fungal cultures, morphological feature of different groups of fungi based on theory course.

Staining techniques and preparation of permanent slides of hand sections demonstrating the host-parasite relationship of the important fungi.

Collection, identification, spawn preparation on different bases and mushrooms cultivation under laboratory conditions.

Microscopic examination of different shape of bacteria, isolation of bacteria on artificial culture media, and staining techniques, single, gram's spore, Capsule and negative staining of bacteria and their examination.

Students should be familiar with viruses inoculation techniques, identification and comment upon virus affected plants.

Familiarity with techniques for recovery of plant parasite nematodes from soil and infected plant tissues.

Preparation of herbarium and Museum specimen, field trips, class records and permanent slides.

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M. Sc.(Ag.) Final Year

Plant Pathology

Paper-I: Plant diseases and their control

M.M.:100

Theory :- Plant diseases, their causes, classification and factors responsible for the incidence of plant diseases. General symptoms of plant disease caused by fungi, bacteria, virus and nematodes.
Study of the following plant diseases with reference to symptoms, Most-parasite relationship etiology, perpetuation and control measures:-

Wheat :- Downy mildew, Powdery mildew, Rusts, Loose and flag Smut, Karnal bunt, Hill bunt, Alternaria leaf blight, Tundu or Ear-rot, Ear cookle of wheat.

Barley :- Helminthosporium stripe, Loose and Covered smut, Molya, Barley Yellow Dwarf.

Oats :- :Loose and covered smut.

Rice :- Blast disease, Brown spot, Bunt, Leaf smut, false smut, Bacterial blight, Bacterial streak, Tungro, White tip, Ufra or stem nematode, Root nematode and Khaira disease.

Maize :- Downy mildew, Brown spot, Brown stripe, Heads smut, Ear Rots, Bacterial stalk rot, Bacterial leaf stripe, Mosaic.

Jowar :- Downy mildew, Rust, Smuts, Helminthosporim leaf blight, Cercospora leaf spot, Anthracnose, Striga.

Bajra :- Green Ear Disease, Eargot, Rust, Smut, Brown leaf spot, Leaf Blast.

Pea :- Downy mildew, Powdery mildew, Rust, Wilt, Bacterial blight, Mosaic.

Arhar :- Phytophthora Blight, Wilt, Cercospora leaf Spot, Bacterial leaf spot, Canker, Yellow mosaic, Sterility mosaic.

Bean :- Anthracnose and Rust.

Gram :- Rust, Sclerotinia blight, wilt complex, Root knot, Aschochyta blight.

Soyabean :- Rust, Anthracnose, Cercospora leaf spot, charcoal rot, Bacterial blight, Fire blight, yellow mosaic, Root knot.

Urd & Mung:- Powdery mildew, Cercospora leaf spot, Charcol rot, Protomycopsis leaf spot, Leaf crinkle, Mosaic.

Lathyrus :- Downy mildew, Powdery mildew, Rust, Wilt.

Lentil :- Downy mildew, Powdery mildew, Dry rood rot, Sclerotinia blight, Rust, Wilt.

Sugarcane:- Red rot, smut, wilt & stalk rot, red striga, Ratoon Stunting, Grassy shoot, mosaic, Rood knot ,Striga.

Cotton :- Wilt, Root rot, Anthracnose, Black arm, Root knot.

Coriander :- Stem gall.

Tabacco :- Damping -off, Downy mildew, Powdery mildew, Angular leaf spot, Mosaic, Leaf curl, Orobanche.

Coffee :- Rust.

Tea :- Bliaster blight, Red rust.

Brasaica & Allied plant :- Club root, White rust, Downy mildew, Alternaria leaf spot, Black rot, Mosaic, Cuscuta.

Seasamum :- Leaf Spot, Wilt, Anthroacnose, Bacterial leaf spot, Leaf curl, Phyllody.

Linseed :- Powdery mildew, Rust, Leaf spot, Wilt.
Ground nut:- Tikka disease, Rust, Root rot, wilt, Mosaic, Rosetta.
Castor :- Rust, Leaf spot, Blight.
Coconut :- Bud rot, Stem Bleeding,
Turmeric :- Leaf Botch, Leaf spot, root rot, wilt.
Colocasia :- Phytophtora blight.
Ginger :- Rhizome rot.
Potato :- Blight, Wart, Scab, Early blight, Soft rot, Brown rot, Rhizoctonia stem canker, Leaf roll, Mosaic, Phyllody, Witches broom, Golden nematode, Root knot, orobanche.
Sweet Potato:- White rust, Cercospora leaf spot, Alternaria leaf spot, Sclerotium tuber rot, Rhizoctonia rot Charcol rot, Black rot.
Radish & Shaljam:- White rust, Aternaria leaf spot, Mosaic, orobanche.
Chukander :- Corcospora leaf spot, Alernaria leaf spot, Sclerotium root rot, Rhizoctonia rot, Yellows, Root knot.
Carrot :- Cercospera leaf blight, Alternaria blight, Bacterial blight, Soft rot, Mosaic.
Tomato :- Damping off, Wilt, Canker, Mosaic, Leaf Curl, Root knot, orobanche.
Brinjal :- Leaf spot, Phomopsis blight, Sclerotinia blight, Bacterial wilt, Root knot, Little leaf, Mosaic.
Chilli :- Anthracnose, Bacterial spot, Mosaic, Leaf curl.
Cabbage & Cauliflower:- Club root, Downy mildew, Blck leg, Alternaria leaf spot, Black rot, Soft rot.
Bhindi :- Cercospora leaf spot, Yellow vein mosaic, Root knot.
Cucurbits :- Damping off, Downy mildew, Powdery mildew, Fruit rot, Wilt, Backerial leaf spot, Bacteral soft rot, Root knot, Mocaic.
Onion & Garlic :- Downy mildew, Smut, Blast, Neck rot, Purple blotch, Soft rot, Nematode rot, Black mould.
Mango :- Powdery mildew, Anthracnose, Bacterial Leaf spot. Malformation, Black tip, Loranthus.
Citrus :- Decline disease, Greening, Canker, Gumosis, Scab, root rots, Cuscuta.
Guava :- Wilt, Stem, Canker.
Papaya :- Root rot, Bacterial leaf spot, Mosaic, Leaf curl.
Graps :- Downy mildew, Powdery mildew, Anthracnose.
Apple :- Powdery mildew, Canker, Fire blight.
Peach :- Leaf curl, Powdery mildew.
Banana :- Panama Disease, Bacterial wilt, Bunchy top, Anthracnose, Black tip, Leaf spot.

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Paper-II: Principles of Plant Pathology

M.M.:100

Theory :-

History of plant pathology. Mutual relationship between the organisms. Scope and importance of Plant Pathology in Agriculture.

Relation of environment of plant disease production, liberation and dissemination of inoculums, predisposition, Epidemiology and conditions necessary for its establishment, Forecasting of plant diseases, losses caused by plant diseases, appraisal of losses.

Pathogens, their classification and survival, phenomenon of plant infection and its effect on host physiology. Bio-chemical approach of host pathogen interactions in plant disease.

Role of enzyme, Toxins and auxins in pathogenesis, defence mechanisms in plants, Resistance and susceptibility in plant pathogens, Physiologic specialization in parasitic fungi.

Elementary knowledge of Rhizospere and Phyliosphere.

General principles of plant disease management.

Practical Bases on Paper Ist & IInd

M.M.:100

The practical work will be based on and co-ordinates with the theoretical course.

Microscopy, Calibration and measuremet of spores. Camera lucida drawing. Microtome and microtomy procedures.

Various methods of preservation of plant pathogen. Preparation of diseased material for microscopic Examinations, preparation of permanent slide of hand sections demonstration .

Sterilization methods, preparation of culture media, determination of Ph, isolation of pathogen from infected tissues, purification of fungal cultures, inoculation techniques for pathogenecity test, Koch's postulates, isolation of soil rhizoaphere and phyllosphere, micro organisms.

Laboratory evaluation of fungicides by different techniques; indigenous fungicidal preparations, use and maintenance of application equipments.

Preparation of herbariums and museum specimen, field trips class records and permanent slides.

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Paper-III: Methods of plant disease control

M.M.:100

Theory :-

Scope and importance plant protection in Agriculture pathogenesis and parasitism, Biochemical Mechanicsm of Pathogenesis.

General principles of plant disease Control:-

Prophylaxis:- Quarantine and prohibitions, General ideas of quarantine regulations inforce in India and in U.P. Set-up of plant protection organization at state and national level.

Eradication:- Crop rotation, Field sanitation, eliminations of alternate and colletral host.

Protection :- (a) Environmental manipulation.
(b) Chemical land marks during a century progress in the use of chemicals to control plant diseases.

History, Study of different types of fungicides related chemicals, their chemistry, mode of action, environmental interactions, compatibility and utilization, formulation and chemotherapy.

Characterstics of an ideal fungicides, methods of fungicidal application; use of foliage post harvest fungicides, seed and soil treatments.

Systemic fungicides, Antibiotics, mode of their action, movement, distribution and residual effect.

Fungicidal toxicity test, techniques for boi-assay of fungicides, doses response; L.D Value.

Familiarity with important auxiliary spray materials and their functions.

Immunization:- Plant disease resistance, Factors responsible for resistance and bread down of resistance, Principles and methods of breeding for disease resistance. Important crop Varieties known to be resistant to disease.

Concept of integrated plant disease management.

Practical Bases on Paper IIIrd

M.M.:50

Preparation and use of different fungicides, laboratory evaluation of fungisides by different techniques, Familiarity with parts and working of spraying and dusting machines and application of fungicides to seeds, Plants and soil.

Preparation of culture media, isolation and purification of pathogen inoculation techniques for pathogenecity test. Preparation and preservation of museum specimen, field trips and class records.