

Proforma

***Name of the Faculty : Dr. Surjeet Singh and Dr. Rakesh Punia**

Discipline : Plant Pathology

Semester : 2nd Semester (2017-18)

Subject : Plant Bacteriology (Pl. Path. 503) Cr. hrs: 2+1

Lesson Plan Duration : 15 weeks

**** Work Load (Lecture/Practical) per week (in hours): Lectures-02, Practicals-02**

Week	Theory		Practical	
	Lecture Day	Topic	Practical Day	Topic
1 st	1 st	History of plant bacteriology- Early history	1 st	Collection and identification of phytopathogenic bacteria
	2 nd	History of plant bacteriology- Spontaneous generation vs. germ theory		
2 nd	3 rd	History of plant bacteriology- Modern bacteriology	2 nd	Different isolation methods for phytopathogenic bacteria
	4 th	Introduction to phytopathogenic prokaryotes		
3 rd	5 th	Terminology related to phytopathogenic prokaryotes	3 rd	Purification of phytopathogenic bacteria
	6 th	Importance of bacteria- In agriculture		
4 th	7 th	Importance of bacteria-In industry	4 th	Principles of Koch Postulates
	8 th	Classification and nomenclature of phytopathogenic bacteria		
5 th	9 th	Classification and nomenclature of phytopathogenic bacteria	5 th	Principles of Koch Postulates
	10 th	Classification and nomenclature of phytopathogenic bacteria		
6 th	11 th	Important diseases caused by phytopathogenic bacteria, their description and control measures	6 th	Different staining methods
	12 th	Important diseases caused by phytopathogenic bacteria, their description and control measures		
7 th	13 th	Important diseases caused by phytopathogenic bacteria, their description and control measures	7 th	Biochemical characterization of bacteria
	14 th	Important diseases caused by phytopathogenic bacteria, their description and control measures		
8 th	15 th	Important diseases caused by phytopathogenic bacteria, their description and control measures	8 th	Biochemical characterization of bacteria
	16 th	Important diseases caused by phytopathogenic bacteria, their description and control measures		
9 th	17 th	Growth of phytopathogenic bacteria	9 th	Serological characterization of bacteria
	18 th	Nutrients requirement of phytopathogenic bacteria		
10 th	19 th	Reproduction of phytopathogenic bacteria	10 th	Serological characterization of bacteria
	20 th	Preservations of cultures of phytopathogenic bacteria		
11 th	21 st	Preservations of cultures of phytopathogenic bacteria	11 th	Isolation of

	22 nd	Variability among phytopathogenic bacteria		plasmid
12 th	23 th	Variability among phytopathogenic bacteria	12 th	Isolation of plasmid
	24 th	Biology of bacteriophages and L form bacteria		
13 th	25 th	Biology of plasmids	13 th	Isolation of plasmid
	26 th	Biology of bdellovibrios		
14 th	27 th	Prokaryotic inhibitors and their mode of action	14 th	Use of antibiotics
	28 th	Prokaryotic inhibitors and their mode of action		
15 th	29 th	Survival and dissemination of phytopathogenic bacteria	15 th	Use of antibiotics
	30 th	Survival and dissemination of phytopathogenic bacteria		

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***Name of the Faculty** : Dr. Anil Kumar and Dr. Rakesh Punia/ Teacher from Entomology
Discipline : Plant Pathology
Semester : 2nd Semester (2017-18)

Subject : Plant Quarantine (Pl. Path. 520/Ento.520/Nema. 514) Cr. hrs: 2+0

Lesson Plan Duration : 15 weeks

**** Work Load (Lecture/Practical) per week (in hours):** Lectures Theory-02, Practicals-0

Week	Theory		Practical	
	Lecture Day	Topic	Practical Day	Topic
1 st	1 st	Definitions of pest, pesticides and transgenics as per government notification	--	--
	2 nd	Other terminology used in plant quarantine		
2 nd	3 rd	Different abbreviations used in plant quarantine	--	--
	4 th	Importance of plant quarantine- In Agriculture		
3 rd	5 th	Role of domestic quarantine	--	--
	6 th	Role of international quarantine		
4 th	7 th	Quarantine restrictions in the moment of agricultural produce seed and planting material	--	--
	8 th	Quarantine restrictions in the moment of agricultural produce seed and planting material		
5 th	9 th	Case histories of exotic diseases and pests	--	--
	10 th	Case histories of exotic diseases and pests		
6 th	11 th	Present status of exotic diseases and pests	--	--
	12 th	Plant protection organization in India		
7 th	13 th	Plant Quarantine order-2003	--	--
	14 th	Plant Quarantine order-2003		
8 th	15 th	Detection of pathogens and pests during import	--	--
	16 th	VHT techniques for salvaging of infected planting material during interception		
9 th	17 th	Other techniques used for salvaging of infected planting material during interception	--	--
	18 th	Acts related to registration of insecticides transgenics		
10 th	19 th	Insecticide Act 1968	--	--
	20 th	Insecticide Act 1968		
11 th	21 st	Environmental Acts	--	--
	22 nd	Industrial Safety Acts		
12 th	23 th	APEDA	--	--
	24 th	WTO regulations		
13 th	25 th	Non tariff barriers	--	--
	26 th	Pest risk analysis		
14 th	27 th	Sanitary and Phytosanitary measures	--	--
	28 th	Sanitary and Phytosanitary measures		
15 th	29 th	Pesticide industry in India	--	--
	30 th	Good laboratory practices for pesticide labs.		

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***Name of the Faculty : Dr. Anil Kumar and Dr. A.S. Rathi**

Discipline : Plant Pathology

Semester : 2nd Semester (2017-18)

Subject : Disease Resistance in Plants (Pl. Path. 513) Cr. hrs: 2+0

Lesson Plan Duration : 15 weeks

**** Work Load (Lecture/Practical) per week (in hours): Lectures Theory-02, Practicals-0**

Week	Theory		Practical	
	Lecture Day	Topic	Practical Day	Topic
1 st	1 st	Introduction and Historical development of disease resistance	--	--
	2 nd	Pathogenicity and process of infection		
2 nd	3 rd	Disease resistance terminology	--	--
	4 th	Gene centers as sources of resistance		
3 rd	5 th	Disease escapes	--	--
	6 th	Disease tolerance		
4 th	7 th	Host defense systems	--	--
	8 th	Morphological and anatomical resistance		
5 th	9 th	Morphological and anatomical resistance	--	--
	10 th	Preformed chemicals in host defence		
6 th	11 th	Post-infectious chemicals in host defence	--	--
	12 th	Post-infectious chemicals in host defence		
7 th	13 th	Role of Phytoalexins in plant resistance	--	--
	14 th	Hypersensitivity and its mechanisms		
8 th	15 th	Hypersensitivity and its mechanisms	--	--
	16 th	Variability in fungi		
9 th	17 th	Variability in bacteria	--	--
	18 th	Variability in virus		
10 th	19 th	Disease resistance	--	--
	20 th	Different types of resistance		
11 th	21 st	Identification of physiological races of pathogen	--	--
	22 nd	Identification of physiological races of pathogen		
12 th	23 th	Disease progression in relation to resistance	--	--
	24 th	Stabilizing selection in plant pathogens		
13 th	25 th	Stabilizing selection in plant pathogens	--	--
	26 th	Gene for gene concept		
14 th	27 th	Protein for protein and immunization basis	--	--
	28 th	Molecular basis of disease resistance		
15 th	29 th	Management of resistance genes	--	--
	30 th	Different strategies for gene deployment		

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***Name of the Faculty : Dr. Kushal Raj and Dr. Promil Kapoor**

Discipline : Plant Pathology

Semester : 2nd Semester (2017-18)

Subject : Plant Virology (Pl. Path. 502) Cr. hrs: 2+1

Lesson Plan Duration : 15 weeks

**** Work Load (Lecture/Practical) per week (in hours): Lectures Theory-02, Practicals-02**

Week	Theory		Practical	
	Lecture Day	Topic	Practical Day	Topic
1 st	1 st	History of plant virology	1 st	Study of symptoms caused by viruses
	2 nd	History of plant virology		
2 nd	3 rd	Composition and structure of plant viruses	2 nd	Study of symptoms caused by viruses
	4 th	Symptomatology of important plant viral diseases		
3 rd	5 th	Symptomatology of important plant viral diseases	3 rd	Study of symptoms caused by viruses
	6 th	Symptomatology of important plant viral diseases		
4 th	7 th	Transmission of plant virus	4 th	Methods of transmission of virus
	8 th	Transmission of plant virus		
5 th	9 th	Chemical properties of plant viruses	5 th	Assay of viruses
	10 th	Physical properties of plant viruses		
6 th	11 th	Host virus interaction	6 th	Assay of viruses
	12 th	Virus vector relationship		
7 th	13 th	Virus nomenclature and classification	7 th	Physical properties of plant viruses
	14 th	Virus nomenclature and classification		
8 th	15 th	Virus nomenclature and classification	8 th	Purification methods of plant viruses
	16 th	Genome organization of viruses		
9 th	17 th	Replication of viruses	9 th	Method of raising antisera
	18 th	Movement of viruses		
10 th	19 th	Isolation and purification of virus	10 th	Study of serological tests
	20 th	Isolation and purification of virus		
11 th	21 st	Lecture of genera introduction of electron microscopy	11 th	Study of serological tests
	22 nd	Principles of the working of electron-microscope and ultra microtome		
12 th	23 th	Protein and nucleic acid based diagnostics	12 th	Study of serological tests
	24 th	Protein and nucleic acid based diagnostics		
13 th	25 th	Protein and nucleic acid based diagnostics	13 th	Handling of electron
	26 th	Protein and nucleic acid based diagnostics		

				microscopy
14th	27th	Mycoviruses, phytoplasma arbo and baculoviruses	14th	Study of ultratomy
	28th	Satellite viruses, satellite RNAs, phages, viroids and prions		
15th	29th	Origin and evolution, genetic engineering, ecology	15th	Handling of PCR
	30th	Mechanism of resistance, and management of plant viruses		

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***Name of the Faculty : Dr. Anil Kumar and Dr. Hawa Singh**

Discipline : Plant Pathology

Semester : 2nd Semester (2017-18)

Subject : Epidemiology and Forecasting of plant diseases (Pl. Path. 518) Cr. hrs: 2+1

Lesson Plan Duration : 15 weeks

**** Work Load (Lecture/Practical) per week (in hours): Lectures Theory-02, Practicals-02**

Week	Theory		Practical	
	Lecture Day	Topic	Practical Day	Topic
1 st	1 st	Epidemic concept	1 st	To study the Measuring of diseases
	2 nd	Terminology related to epidemiology		
2 nd	3 rd	Historical development of epidemiology	2 nd	Spore dispersal and trapping
	4 th	Pathometry and crop growth stages		
3 rd	5 th	Epidemic growth and analysis	3 rd	Spore dispersal and trapping
	6 th	Epidemic growth and analysis		
4 th	7 th	Common and natural logarithms	4 th	To study the methods of weather recording
	8 th	Function fitting area under disease progress curve and correction factors		
5 th	9 th	Function fitting area under disease progress curve and correction factors	5 th	Different methods of survey
	10 th	Inoculum dynamics of the pathogens		
6 th	11 th	Population biology of the pathogens	6 th	Different methods of measurement of diseases
	12 th	Population biology of the pathogens		
7 th	13 th	Temporal spatial variability in plant pathogens	7 th	Different methods of measurement of diseases
	14 th	Temporal spatial variability in plant pathogens		
8 th	15 th	Survey, surveillance and vigilance	8 th	Methods of multiplication of inoculum
	16 th	Differences between survey, surveillance and vigilance		
9 th	17 th	Crop loss assessment	9 th	Methods of multiplication of inoculum
	18 th	Different types of models used in crop loss assessment		
10 th	19 th	Principles and prerequisites of forecasting	10 th	Computerized data analysis
	20 th	Principles and prerequisites of forecasting		
11 th	21 st	Principles and prerequisites of forecasting	11 th	Computerized data analysis
	22 nd	Systems and factors affecting various components of forecastings		
12 th	23 th	Systems and factors affecting various components of forecastings	12 th	Function fitting
	24 th	Systems and factors affecting various components of forecastings		
13 th	25 th	Some early forecasting procedures based on weather	13 th	Function fitting

		and inoculum potential		
	26th	Some early forecasting procedures based on weather and inoculum potential		
14th	27th	Some early forecasting procedures based on weather and inoculum potential	14th	Model preparation and validation
	28th	Modeling disease growth and disease prediction		
15th	29th	Modeling disease growth and disease prediction	15th	Model preparation and validation
	30th	Modeling disease growth and disease prediction		

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***Name of the Faculty : Dr. Naresh Mehta**

Discipline : Plant Pathology

Semester : 2nd Semester (2017-18)

Subject : Advanced Bacteriology (Pl. Path. 603) Cr. hrs: 2+1

Lesson Plan Duration : 15 weeks

**** Work Load (Lecture/Practical) per week (in hours): Lectures Theory-02, Practicals-02**

Week	Theory		Practical	
	Lecture Day	Topic	Practical Day	Topic
1 st	1 st	Current approaches for the characterization and identification of phytopathogenic bacteria	1 st	Pathogenic studies and race Identification.
	2 nd	Ultra structure and biology of bacteria		
2 nd	3 rd	Ultra structure and biology of bacteria	2 nd	Plasmid profiling of Bacteria.
	4 th	Current trends in the taxonomy of phytopathogenic prokaryotes		
3 rd	5 th	Current trends in the taxonomy of phytopathogenic prokaryotes	3 rd	Fatty acid profiling of Bacteria.
	6 th	Role of enzymes in disease development		
4 th	7 th	Role of toxins in disease development	4 th	RAPD profiling of bacterial and variability status.
	8 th	Role of exopolysaccharides and polypeptide signals in disease development		
5 th	9 th	Mechanism of bacterial wilt (<i>Ralstonia solanacearum</i>) development	5 th	Endospore.
	10 th	Mechanism of bacterial wilt (<i>Ralstonia solanacearum</i>) development		
6 th	11 th	Mechanism of bacterial soft rot (<i>Erwinia spp.</i>) development	6 th	Flagellar staining.
	12 th	Mechanism of crown gall (<i>Agrobacterium tumefaciens</i>) formation		
7 th	13 th	Mechanism of crown gall (<i>Agrobacterium tumefaciens</i>) formation	7 th	Test for secondary metabolite production.
	14 th	Host bacterial pathogen interaction		
8 th	15 th	Quorum sensing phenomenon	8 th	Cyanides.
	16 th	Bacterial type III secretion system		
9 th	17 th	HR/SR reactions R-genes	9 th	EPS.
	18 th	Avr-genes, hrp genes and effector protein		
10 th	19 th	Molecular variability among phytopathogenic prokaryotes and possible host defense mechanism (s)	10 th	Siderophores.
	20 th	Molecular variability among phytopathogenic prokaryotes and possible host defense mechanism (s)		
11 th	21 st	Genetic engineering for management of bacterial plant pathogens	11 th	Specific Detection of Phytopathogenic Bacteria using
	22 nd	Gene silencing		

				species/pathov r specific Primers.
12 th	23 th	RNA technology	12 th	-do-
	24 th	Epidemiology of bacterial plant diseases		
13 th	25 th	Development of diagnostic kit for bacterial diseases	13 th	Basic techniques in diagnostic kit development.
	26 th	Beneficial prokaryotes viz., endophytes, PGPR, phylloplant bacteria		
14 th	27 th	Beneficial prokaryotes viz., endophytes, PGPR, phylloplant bacteria	14 th	Molecular tools to identify Phytoendosymb ionts.
	28 th	Role of beneficial prokaryotes in disease management		
15 th	29 th	Endosymbionts for host defense	15 th	-do-
	30 th	Endosymbionts for host defense		

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***Name of the Faculty : Dr. Anil Kumar**
Discipline : Plant Pathology
Semester : 2nd Semester (2017-18)
Subject : Advanced mycology (Pl. Path. 601) Cr. hrs: 2+1
Lesson Plan Duration : 15 weeks

**** Work Load (Lecture/Practical) per week (in hours): Lectures Theory-02, Practicals-02**

Week	Theory		Practical	
	Lecture Day	Topic	Practical Day	Topic
1 st	1 st	General introduction of mycology	1 st	Study of conidiogenesis- phialides
	2 nd	Historical development of mycology		
2 nd	3 rd	Advanced in mycology	2 nd	Study of conidiogenesis- phialides
	4 th	Recent taxonomic criteria used in mycology		
3 rd	5 th	Morphological criteria for classification of fungi	3 rd	Studies of porospores and arthospores
	6 th	Serological and chemical taxonomy		
4 th	7 th	Molecular and numerical taxonomy	4 th	Studies of porospores and arthospores
	8 th	Interaction between the groups		
5 th	9 th	Phylogeny, micro condition, conidiogenesis and sporulating structures of fungi imperfecti	5 th	Study of fruiting bodies of Ascomycotina
	10 th	Phylogeny, micro condition, conidiogenesis and sporulating structures of fungi imperfecti		
6 th	11 th	Phylogeny, micro condition, conidiogenesis and sporulating structures of fungi imperfecti	6 th	Study of fruiting bodies of Ascomycotina
	12 th	Morphology and reproduction of representative plant pathogenic genera from different groups of fungi		
7 th	13 th	Morphology and reproduction of representative plant pathogenic genera from different groups of fungi	7 th	Study of fruiting bodies of Ascomycotina
	14 th	Morphology and reproduction of representative plant pathogenic genera from different groups of fungi		
8 th	15 th	Sexual reproduction in different groups of fungi	8 th	Study of fruiting bodies of Ascomycotina
	16 th	Sexual reproduction in different groups of fungi		
9 th	17 th	Population biology of fungi	9 th	Identification of fungi up to species level
	18 th	Population biology of fungi		
10 th	19 th	Pathogenic variability/vegetative compatibility	10 th	Identification of fungi up to species level
	20 th	Pathogenic variability/vegetative compatibility		
11 th	21 st	Heterokaryosis	11 th	Identification of fungi up to species level
	22 nd	Parasexual cycle		
12 th	23 th	Parasexual cycle	12 th	Study of hyphal anastomosis
	24 th	Sex hormones in fungi		

13 th	25 th	Pleomorphism and speciation in fungi	13 th	Study of hyphal anastomosis
	26 th	Pleomorphism and speciation in fungi		
14 th	27 th	Mechanism of nuclear inheritance	14 th	Study of hyphal anastomosis
	28 th	Mechanism of extra-nuclear inheritance		
15 th	29 th	Mechanism of extra-nuclear inheritance	15 th	Morphology of representative plant pathogenic genera from different groups of fungi
	30 th	Biodegradation		

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Name of faculty : Dr. Surjeet Singh, Dr. Satish Kumar and Dr. Rakesh Chugh
 Discipline : Plant Pathology
 Semester : 2nd Semester (2017-18)
 Subject : Mushroom Production Technology (Pl. Path. 517) Cr. hrs: 2+1
 Lesson Plan : 15 weeks

Work Load (Lecture/Practical) per week (in hours): Theory Lecture: 02, Practical: 02

Week	Theory		Practical	
	Lecture Day	Topic	Practical Day	Topic
1 st	1 st	Historical development and present status of mushroom cultivation	1 st	Pure culture preparation of white button mushroom
	2 nd	Taxonomy and classification of mushrooms		
2 nd	3 rd	Edible and poisonous mushroom	2 nd	Pure culture preparation of oyster mushroom
	4 th	Food, medicinal value and uses of mushrooms		
3 rd	5 th	Food, medicinal value and uses of mushrooms	3 rd	commercial spawn preparation
	6 th	Life cycle of cultivated mushrooms and strain improvement		
4 th	7 th	Life cycle of cultivated mushrooms and strain improvement	4 th	commercial spawn preparation
	8 th	Pure culture and methods for maintaining the cultures		
5 th	9 th	Preparation of commercial spawn and facilities required for establishing commercial spawn laboratory	5 th	commercial spawn preparation
	10 th	Preparation of commercial spawn and facilities required for establishing commercial spawn laboratory		
6 th	11 th	Compost and different methods of composting	6 th	composting for button mushroom
	12 th	Short and Indoor methods of composting, qualities of good compost and testing of compost		
7 th	13 th	Properties and uses of spent mushroom substrate	7 th	composting for button mushroom
	14 th	Logistics for setting up mushroom farm		
8 th	15 th	Maintenance of environment in the cropping rooms	8 th	composting for button mushroom
	16 th	Cultivation technology of white button mushroom		
9 th	17 th	Cultivation technology of white button mushroom	9 th	cultivation of white button mushrooms
	18 th	Cultivation technology of oyster mushroom		
10 th	19 th	Cultivation technology of white milky mushroom	10 th	cultivation of oyster mushrooms
	20 th	Cultivation technology of shiitake mushroom		
11 th	21 st	Cultivation of specialty (<i>Ganoderma lucidum</i>) mushroom	11 th	cultivation of milky mushrooms
	22 nd	Cultivation of specialty (<i>Ganoderma lucidum</i>) mushroom		
12 th	23 th	Diseases of cultivated mushrooms and their management	12 th	disease/competitor moulds of

	24 th	Diseases of cultivated mushrooms and their management		mushroom
13 th	25 th	Competitor moulds and abnormalities of cultivated mushrooms	13 th	disease/competitor moulds of mushroom
	26 th	Insect pests and nematodes of mushroom and their management		
14 th	27 th	Post harvest processing and value addition of mushrooms	14 th	post harvest processing
	28 th	Post harvest processing and value addition of mushrooms		
15 th	29 th	Application of biotechnology for mushroom improvement	15 th	post harvest processing
	30 th	Economics of mushroom cultivation		

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Name of faculty : **Dr. Satish Kumar and Dr. Man Mohan Singh (Section-A)**
Dr. Rakesh Chugh and Dr. Dalvinder P. Singh (Section-B)
Dr. Vinod Malik and Dr. Rakesh Punia (Section-C)
Dr. S.P. Goyal, Dr. Mahavir Singh and Dr. Harbinder Singh (COA, Kaul)

Discipline : **Plant Pathology**

Semester : **2nd Semester (2017-18)**

Subject : **Pl. Path. 202 (Diseases of Field Crops and Their Management) Cr. hrs: 2+1**

Lesson Plan : **15 weeks**

**** Work Load (Lecture/Practical, each Section) per week (in hours): Theory Lecture: 02**

Practical: 04

Week	Theory		Practical	
	Lecture Day	Topic	Practical Day	Topic
		Economic importance, symptoms, cause, epidemiology , disease cycle and integrated management of following diseases of important field crops		
1 st	1 st	Wheat: Rusts, loose smut and flag smut	1 st	Studies on symptomatology of diseases of wheat and field visit
	2 nd	Wheat: Karnal bunt, hill bunt and powdery mildew		
2 nd	3 rd	Wheat: Tundu and black point	2 nd	Studies on symptomatology of diseases of barley and field visit
	4 th	Barley: Rusts, loose smut, covered smut and stripe disease		
3 rd	5 th	Rice: Bacterial leaf blight, Bacterial leaf streak, blast and brown leaf spot	3 rd	Studies on symptomatology of diseases of rice and field visit
	6 th	Rice: Bakane, stem rot, false smut, sheath blight and sheath rot		
4 th	7 th	Rice: Tungro, rice dwarf and khaira disease	4 th	Studies on symptomatology of pearl millet and field visit
	8 th	Pearlmillet: Downy mildew, ergot, smut and rust		
5 th	9 th	Sorghum: Grain smut, loose smut, head smut, long smut and leaf spots	5 th	Studies on symptomatology of diseases of sorghum and field visit
	10 th	Maize: Common smut, head smut, brown spot and stalk rot (Pythium and bacterial),		
6 th	11 th	Maize: Rust, maydis leaf blight, banded leaf and sheath blight	6 th	Studies on symptomatology of diseases of maize and field visit
	12 th	Cotton: Angular leaf spot, wilt and root rot		
7 th	13 th	Cotton: Leaf curl, myrothecium leaf spot and grey mildew	7 th	Studies on symptomatology of diseases of
	14 th	Sugarcane: Red rot, whip smut, wilt and grassy shoot		

				cotton and field visit
8 th	15 th	Sugarcane: Ratoon stunting, pine apple and mosaic disease	8 th	Studies on symptomatology of diseases of sugarcane, tobacco and field visit
	16 th	Tobacco: Mosaic and downy mildew		
9 th	17 th	Rapeseed-mustard: White rust, alternaria blight and downy mildew	9 th	Studies on symptomatology of diseases of rapeseed-mustard and field visit
	18 th	Rapeseed-mustard: Powdery mildew, club root, phyllody, sclerotinia stem rot and black rot		
10 th	19 th	Groundnut: Tikka , collar rot, rust, charcoal rot and bud necrosis (PBNV)	10 th	Studies on symptomatology of diseases of groundnut, sesamum and field visit
	20 th	Sesamum: Phytophthora blight, phyllody, charcoal rot and root rot		
11 th	21 st	Sunflower: Rust, downy mildew, powdery mildew, rhizopus head rot, root rot, sclerotinia rot/wilt, apical chlorosis and bacterial stalk rot	11 th	Studies on symptomatology of diseases of sunflower, linseed, castor and field visit
	22 nd	Linseed: Rust, powdery mildew and alternaria blight		
12 th	23 th	Castor: Alternaria blight, bacterial leaf blight and botrytis gray rot	12 th	Studies on symptomatology of diseases of gram/chickpea and field visit
	24 th	Gram/chickpea: Ascochyta blight, wilt, root rot and stunt		
13 th	25 th	Mungbean/ urdbean: Root rot, cercospora leaf spot, bacterial leaf spot, yellow mosaic and leaf crinkle	13 th	Studies on symptomatology of diseases of mungbean/urdbean, pigeon pea and field visit
	26 th	Pigeon pea: Wilt, phytophthora blight and sterility mosaic		
14 th	27 th	Soybean: Rust, root rot and yellow mosaic	14 th	Studies on symptomatology of diseases of soybean and field visit
	28 th	Guar: Alternaria blight, bacterial blight and root rot		
15 th	29 th	Berseem: Stem rot and root rot	15 th	Studies on symptomatology of diseases of guar, berseem, oats and field visit
	30 th	Oats: Rust, loose smut and covered smut		

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Name of faculty : Dr. Anil Kumar and Faculty of Entomology.
Discipline : Plant Pathology
Semester : 2nd Semester (2017-18)
Subject : Insect vectors of plant viruses and other pathogens (Pl. Path. 514/ENT 514)
Cr. hrs: 1+1

Lesson Plan : 15 weeks

**** Work Load (Lecture/Practical) per week (in hours): Theory Lecture: 01 Practical: 02**

Week	Theory		Practical	
	Lecture Day	Topic	Practical Day	Topic
1 st	1 st	History of developments in the area of insects as vectors of plant pathogens	1 st	Identification of common vectors of plant pathogens-aphids
2 nd	2 nd	Important insect vectors and their characteristics	2 nd	Identification of common vectors of plant pathogens-aphids
3 rd	3 rd	Mouth parts and feeding processes of important vectors, efficacy of transmission	3 rd	Identification of common vectors of plant pathogens-leafhoppers
4 th	4 th	Transmission of plant viruses and fungal pathogens	4 th	Identification of common vectors of plant pathogens-leafhoppers
5 th	5 th	Relation between viruses and their vectors	5 th	Identification of common vectors of plant pathogens-whiteflies
6 th	6 th	Relation between viruses and their vectors	6 th	Identification of common vectors of plant pathogens-whiteflies
7 th	7 th	Transmission of plant viruses by aphids	7 th	Identification of common vectors of plant pathogens-whiteflies

8th	8th	Transmission of plant viruses by whiteflies	8th	Identification of common vectors of plant pathogens- thrips
9th	9th	Transmission of plant viruses by mealy bugs and thrips	9th	Identification of common vectors of plant pathogens- thrips
10th	10th	Transmission of mycoplasma by leaf hoppers and plant hoppers	10th	Identification of common vectors of plant pathogens- beetles
11th	11th	Transmission of mycoplasma by leaf hoppers and plant hoppers	11th	Identification of common vectors of plant pathogens- nematodes
12th	12th	Transmission of bacteria by leaf hoppers and plant hoppers	12th	Culturing and handling of vectors
13th	13th	Transmission of plant viruses by psyllids,	13th	Demonstration of virus transmission through vectors- aphids
14th	14th	Transmission of plant viruses by beetles and mites	14th	Demonstration of virus transmission through vectors- leafhoppers
15th	15th	Epidemiology and management of insect transmitted diseases through vector management	15th	Demonstration of virus transmission through vectors- whiteflies

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Name of faculty : Dr. Narender Singh and Dr. Kishor Chand
Discipline : Plant Pathology
Semester : 2nd Semester (2017-18)
Subject : Pl. Path. 509: Diseases of vegetable and spice crops Cr. hrs: 2+1
Lesson Plan : 15 weeks

**** Work Load (Lecture/Practical) per week (in hours): Theory Lecture: 02 Practical: 02**

Week	Theory		Practical	
	Lecture Day	Topic	Practical Day	Topic
1 st	1 st	Nature and concept of vegetable diseases	1 st	Symptoms of damping off of vegetable crops
	2 nd	Prevalence of important diseases of vegetable crops		
2 nd	3 rd	Host pathogen interaction of important diseases of vegetable and spice crops	2 nd	Identification of diseases based on the symptoms of leaf spot
	4 th	Factors affecting disease development		
3 rd	5 th	Symptoms, epidemiology and management of onion	3 rd	Identification of diseases based on the symptoms of root rot and wilt
	6 th	Symptoms, epidemiology and management of garlic		
4 th	7 th	Symptoms, epidemiology and management of spinach	4 th	Identification of diseases based on symptoms in bulb crops
	8 th	Symptoms, epidemiology and management of methi (fenugreek)		
5 th	9 th	Symptoms, epidemiology and management of dhania (coriander)	5 th	Identification of diseases based on symptoms in Leafy vegetables
	10 th	Symptoms, epidemiology and management of potato		
6 th	11 th	Symptoms, epidemiology and management of tomato)	6 th	Identification of diseases based on symptoms in Crucifers
	12 th	Symptoms, epidemiology and management of crucifers		
7 th	13 th	Symptoms, epidemiology and management of Protected cultivation crops	7 th	Identification of diseases based on symptoms in Cucurbits
	14 th	Symptoms, epidemiology and management of carrot		
8 th	15 th	Symptoms, epidemiology and management of peas	8 th	Identification of diseases based on symptoms in Solanaceous vegetables
	16 th	Symptoms, epidemiology and management of Beans		
9 th	17 th	Symptoms, epidemiology and management of bottle gourd	9 th	Identification of diseases based on symptoms protected cultivation crops
	18 th	Symptoms, epidemiology and management of bitter gourd		
10 th	19 th	Symptoms, epidemiology and management of ridge gourd	10 th	Identification of

	20 th	Symptoms, epidemiology and management of pumpkin		diseases based on symptoms in root vegetables
11 th	21 st	Symptoms, epidemiology and management of okra	11 th	Identification of diseases based on symptoms in cumin
	22 nd	Symptoms, epidemiology and management of chilli		
12 th	23 th	Symptoms, epidemiology and management of brinjal	12 th	Identification of diseases based on symptoms in coriander and turmeric
	24 th	Symptoms, epidemiology and management of black pepper		
13 th	25 th	Symptoms, epidemiology and management of Cumin	13 th	Identification of diseases based on symptoms in fennel
	26 th	Symptoms, epidemiology and management of Coriander		
14 th	27 th	Symptoms, epidemiology and management of Turmeric	14 th	Symptoms of damping off of vegetable crops
	28 th	Symptoms, epidemiology and management of Fennel		
15 th	29 th	Symptoms, epidemiology and management of Fenugreek	15 th	Identification of diseases based on symptoms in coriander
	30 th	Symptoms, epidemiology and management of Ginger		

Proforma

Name of faculty : Dr. Rakesh Sangwan and Dr. Kishor Chand
Discipline : Plant Pathology
Semester : 2nd Semester (2017-18)
Subject : Pl. Path. 516: Integrated Plant Disease Management Cr. hrs: 2+1
Lesson Plan : 15 weeks

**** Work Load (Lecture/Practical) per week (in hours): Theory Lecture: 02 Practical: 02**

Week	Theory		Practical	
	Lecture Day	Topic	Practical Day	Topic
1 st	1 st	Introduction, definition and concept of integrated disease management	1 st	Identification of biological control agents
	2 nd	Tools of integrated disease management		
2 nd	3 rd	Components of integrated disease management	2 nd	Identification of various agrochemicals
	4 th	Limitations and implications of integrated disease management		
3 rd	5 th	Development of IDM: Roadmap	3 rd	Orientation of different IDM approaches
	6 th	Basic principles of integrated disease management		
4 th	7 th	Cultural practices of disease management	4 th	Orientation of different IDM approaches
	8 th	Biological control of disease management		
5 th	9 th	Chemical control of plant diseases	5 th	Different cultural practices at farm fields
	10 th	Current status of biological control agents		
6 th	11 th	Major diseases of rice	6 th	Demonstration of IPM components of rice crop
	12 th	Integrated management of rice diseases		
7 th	13 th	Major diseases of wheat	7 th	Demonstration of IPM components of wheat crop
	14 th	Integrated management of wheat		
8 th	15 th	Major diseases of cotton	8 th	Demonstration of IPM components of cotton crop
	16 th	Integrated management of cotton diseases		
9 th	17 th	Major diseases of sugarcane	9 th	Demonstration of IPM components of sugarcane crop
	18 th	Integrated management of sugarcane diseases		
10 th	19 th	Major diseases of chickpea	10 th	Demonstration of IPM components of chickpea
	20 th	Integrated management of chickpea diseases		
11 th	21 st	Major diseases of rapeseed-mustard	11 th	Demonstration of IPM components of
	22 nd	Integrated management of rapeseed-mustard diseases		

				rapeseed mustard crop
12 th	23 th	Major diseases of pearl millet	12 th	Demonstration of IPM components of pearl millet crop
	24 th	Integrated management of pearl millet		
13 th	25 th	Major diseases of <i>Kharif</i> pulses	13 th	Demonstration of IPM components of kharif pulses
	26 th	Integrated management of <i>Kharif</i> pulses		
14 th	27 th	Major diseases of vegetable crops	14 th	Demonstration of IPM components of vegetable crops
	28 th	Integrated management of vegetable diseases		
15 th	29 th	Major diseases of fruit crops	15 th	Demonstration of IPM components of fruit crops
	30 th	Integrated management of fruit crop diseases		

Proforma

Name of the Faculty : Dr. Hawa Singh and Dr. Rakesh Sangwan

Discipline : Plant Pathology

Semester : 2nd Semester (2017-18)

Subject : Chemicals in plant disease management (Pl. Path. 511) Cr. hrs: 2+1

Lesson Plan Duration : 15 weeks

** Work Load (Lecture/Practical) per week (in hours): Lectures-02, Practicals-02

Week	Theory		Practical	
	Lecture Day	Topic	Practical Day	Topic
1 st	1 st	History and development of chemicals	1 st	Acquaintance with formulation of different fungicides and plant protection appliances
	2 nd	History and development of chemicals		
2 nd	3 rd	Definition of pesticides and related terms	2 nd	Formulation of fungicides
	4 th	Advantages and disadvantages of chemicals		
3 rd	5 th	Classification of chemicals used in plant disease control	3 rd	Formulation of fungicides
	6 th	Classification of chemicals used in plant disease control		
4 th	7 th	Characteristics of chemicals	4 th	Formulation of bactericides
	8 th	Formulation of chemicals		
5 th	9 th	Formulation of chemicals	5 th	Formulation of bactericides
	10 th	Mode of action and application of different fungicides		
6 th	11 th	Mode of action and application of different fungicides	6 th	<i>In vitro</i> evaluation techniques
	12 th	Chemotherapy and phytotoxicity of fungicides		
7 th	13 th	Chemotherapy and phytotoxicity of fungicides	7 th	<i>In vitro</i> evaluation techniques
	14 th	Handling, storage and precautions to be taken while using fungicides		
8 th	15 th	Handling, storage and precautions to be taken while using fungicides	8 th	Preparation of different concentrations of chemicals including botanical pesticides based on active ingredients against pathogens
	16 th	Handling, storage and precautions to be taken while using fungicides		
9 th	17 th	Compatibility with other agrochemicals	9 th	Persistence, compatibility with other agrochemicals
	18 th	Compatibility with other agrochemicals		
10 th	19 th	Persistence, cost-benefit ratio, factors affecting fungicides	10 th	Persistence, compatibility

	20 th	Persistence, cost-benefit ratio, factors affecting fungicides		with other agrochemicals
11 th	21 st	Persistence, cost-benefit ratio, factors affecting fungicides	11 th	Detection of naturally occurring fungicide resistant mutants of pathogens
	22 nd	General account of plant protection appliances		
12 th	23 th	General account of plant protection appliances	12 th	Detection of naturally occurring fungicide resistant mutants of pathogens
	24 th	General account of plant protection appliances		
13 th	25 th	Environmental pollution	13 th	Detection of naturally occurring fungicide resistant mutants of pathogens
	26 th	Environmental pollution		
14 th	27 th	Residues and health hazards	14 th	Methods of application of chemicals
	28 th	Residues and health hazards		
15 th	29 th	Fungicidal resistance in plant pathogens and its management	15 th	Methods of application of chemicals
	30 th	Fungicidal resistance in plant pathogens and its management		

Proforma

Name of faculty : **Dr. Rajender Singh Beniwal and Dr Kishor Chand** (Section-A)
(Section-B)

: **Dr. S.P. Goyal, Dr. Rakesh Mehra and Dr. Narender Yadav(COA, Kaul)**

Discipline : **Plant Pathology**

Semester : **2nd Semester (2017-18)**

Subject : **Pl. Path. 301 (Diseases of Horticultural Crops and Their Management) Cr.**
hrs: 2+1

Lesson Plan : **15 weeks**

**** Work Load (Lecture/Practical, each Section) per week (in hours): Theory Lecture: 02**

Practical: 04

Week	Theory		Practical	
	Lecture Day	Topic	Practical Day	Topic
		Economic importance, symptoms, cause, disease cycle and integrated management of horticultural crops		
1 st	1 st	Citrus: gummosis/foot rot, canker and dieback / anthracnose	1 st	Studies on cause and symptomatology of citrus diseases at experimental orchard
	2 nd	Citrus: twig blight, citrus greening, tristeza and exocortis		
2 nd	3 rd	Mango: Malformation, powdery mildew, anthracnose/dieback, bacterial leaf spot/ blight and black tip	2 nd	Studies on cause and symptomatology of mango diseases at experimental orchard
	4 th	Apple: Scab, powdery mildew, collar rot, rust, brown rot, fire blight and mosaic / chlorosis		
3 rd	5 th	Banana: Panama wilt, sigatoka, moko wilt, bunchy top, chlorosis and mosaic	3 rd	Studies on cause and symptomatology of sapota and papaya diseases at experimental orchard
	6 th	Grapevine: Downy mildew, powdery mildew, anthracnose/dieback and bunch rot/grey mold		
4 th	7 th	Pomegranate: Bacterial leaf spot/ fruit rot and leaf spot Sapota : Pestotatia leaf spot and sooty mold	4 th	Studies on cause and symptomatology of guava and ber diseases at experimental orchard
	8 th	Papaya: Foot rot, phytophthora root rot, anthracnose, ring spot, mosaic and leaf curl		
5 th	9 th	Guava: Wilt, anthracnose/dieback and Zn deficiency Ber: Powdery mildew and leaf spots(Phoma Alternaria and Cercospora)	5 th	Studies on cause and symptomatology of
	10 th	Potato: Late blight, early blight, wart, black scurf,		

		blackleg, brown rot and viral diseases		pomegranate and grapevine diseases at experimental orchard
6 th	11 th	Tomato: Nursery diseases, early and late blight, buck eye rot, septoria leaf spot, fusarium wilt, bacterial wilt, leaf curl, mosaic and sunscald	6 th	Studies on cause and symptomatology of potato diseases at field visit
	12 th	Tomato: fusarium wilt, bacterial wilt, leaf curl, mosaic and sunscald		
7 th	13 th	Chilli : Phytophthora leaf blight, anthracnose/ dieback, fusarium wilt, bacterial spot wilt and viral diseases	7 th	Studies on cause and symptomatology of crucifer and brinjal diseases at field visit
	14 th	Cucurbits: Downy mildew, powdery mildew, anthracnose, cercospora leaf spot, bacterial wilt and cucumber mosaic		
8 th	15 th	Okra/Bhindi: Fusarium wilt, cercospora/ Pseudocercospora leaf spot, root/collar rot, powdery mildew and yellow vein mosaic	8 th	Studies on cause and symptomatology of tomato diseases at field visit
	16 th	Brinjal: Phomopsis blight, fruit rot, bacterial wilt and little leaf		
9 th	17 th	Crucifer: Club rot, downy mildew, stalk rot, wire stem black rot and mosaic	9 th	Studies on cause and symptomatology of diseases of chilli at field visit
	18 th	Onion /Garlic: Downy mildew, purple blotch, stemphyllium blight, fusarium basal rot, onion smut, onion smudge and onion yellow dwarf		
10 th	19 th	Pea: Rust, powdery mildew, fusarium wilt/root rot, Ascochyta blight, bacterial blight and mosaic	10 th	Studies on cause and symptomatology of diseases of cucurbits at field visit
	20 th	Bean: Web blight, root rot, anthracnose,angular leaf spot, bacterial blight and common mosaic		
11 th	21 st	Turmeric: Rhizome rot, Taphira leaf blotch and leaf spot	11 th	Studies on symptomatology of diseases of okra/bhindi at field visit
	22 nd	Oilpalm: Crown rot, Ganoderma bud rot and red ring		
12 th	23 th	Tea: Root rot, blister blight, rust, leaf spot (Cercospora) and dieback/anthracnose	12 th	Studies on cause and symptomatology of diseases of onion,garlic and pea at field visit
	24 th	Mulberry: Powdery mildew and mosaic		
13 th	25 th	Coconut: Bud rot, stem breeding, wilt/root rot and cadang cadang	13 th	Studies on cause and

	26 th	Rose: Powdery mildew, rust, black spot, grey mold, crown gall and mosaic		symptomatology of diseases of rose, chrysanthemum and jasmine at orchard/field visit
14 th	27 th	Chrysanthemum: Leaf spot, powdery mildew, grey mould rust, fusarium wilt and bacterial blight	14 th	How to prepare Bordeaux mixture/paste and its application/ demonstration in experimental orchard.
	28 th	Jasmine: Leaf blight, leaf spot, rust, wilt/root rot, myrothecium leaf spot, anthracnose and mosaic		
15 th	29 th	Betelvine: Foot rot, leaf spot, anthracnose and powdery mildew	15 th	How to prepare herbarium and preserve diseases samples.
	30 th	Coffee: Root rot, blister blight, rust, leaf spot (Cercospora) and dieback/anthracnose		

Proforma

Name of faculty: Dr. Naresh Mehta, Dr. Narender Singh, Dr. Dalvinder P. Singh and (Section-A)
 Dr. Naresh Mehta and Dr. Promil Kapoor (Section-B)
 Dr. Vinod Malik and Dr. Man Mohan Singh (Section-C)
 Dr. S.P. Goyal, Dr. Narender Yadav and Dr. Harbinder Singh (COA, Kaul)

Discipline : Plant Pathology

Semester : Second Sem. (2017-18)

Subject : Pl. Path. 102 (Fundamentals of Plant Pathology) Cr. hrs: 3+1

Lesson Plan : 15 weeks

**** Work Load (Lecture/Practical, each Section) per week (in hours): Theory Lecture: 3 Practical:**

4

Week	Lecture day	Theory	Practical day	Practical
1.	1 st	Introduction: Importance, scope and objectives of Plant Pathology	1 st	Acquaintance with various laboratory equipments and microscopy
	2 nd	History of Plant Pathology with special reference to Indian work		
	3 rd	History of Plant Pathology with special reference to Indian work		
2.	4 th	Terms and concept in Plant Pathology	2 nd	Preparation of media
	5 th	Terms and concept in Plant Pathology		
	6 th	Important plant pathogenic organism, different groups: fungi, bacteria, fastidious vesicular bacteria, phytoplasmas, spiroplasmas, viruses, viroids, algae, protozoa and phanerogamic parasites with examples of diseases caused by them		
3.	7 th	Nomenclature and binomial classification : Rules of nomenclature, classification of fungi, key to division and sub-division	3 rd	Isolation and Koch's postulates
	8 th	General characters of fungi, somatic structures, types of the fungal thalli, fungal tissues, modification of thallus		
	9 th	Reproduction in fungi		

4.	10 th	Nature and classification of plant pathogens : Fungi, bacteria, fastidious vascular bacteria	4 th	Isolation and Koch's postulates
	11 th	Nature and classification of plant pathogens : phytoplasmas, spiroplasmas, virus, viroids		
	12 th	Nature and classification of plant pathogens : algae, protozoa and phanerogamic parasites with examples of important diseases caused by them		
		Detailed studies on different genera as follows		
5.	13 th	<i>Pythium, Phytophthora</i> and <i>Albugo</i>	5 th	Study of symptoms of various plant diseases
	14 th	<i>Peronospora, Sclerospora</i> and <i>Peronosclerospora,</i>		
	15 th	<i>Pseudoperonospora, Plasmopara</i> and <i>Bremia</i>		
6.	16 th	<i>Mucor, Rhizopus</i>	6 th	General study of different structures of fungi and representative fungal genera
	17 th	<i>Aspergillus, Penicillium, Oidium</i> and <i>Oidiopsis</i>		
	18 th	<i>Ovalariopsis, Phyllactinia, Uncinula</i> and <i>Podosphaera</i>		
7.	19 th	<i>Puccinia, Uromyces</i> and <i>Hemileia</i>	7 th	General study of different structures of fungi and representative fungal genera
	20 th	<i>Sphacelotheca, Ustilago</i> and <i>Tolyposporium</i>		
	21 st	<i>Agaricus, Pleurotus</i> and <i>Ganoderma</i>		
8.	22 nd	<i>Septoria, Colletotrichum, Pestalotiopsis, Pyricularia</i>	8 th	General study of different structures of fungi and representative fungal genera
	23 rd	<i>Trichoderma, Fusarium, Helminthosporium, Drechslera Alternaria, Stemphyllium, Cercospora</i>		
	24 th	<i>Phaeoisariopsis, Rhizoctonia</i> and		

		<i>Sclerotium</i>		
9.	25 th	Bateria and mollicutes: general morphological characters, basic methods of classification and reproduction	9 th	General study of different structures of fungi and representative fungal genera
	26 th	Bacteria : <i>Xanthomonas, Pseudomonas, Erwinia, Clavibacter, Agrobacterium</i>		
	27 th	Viruses: nature, architecture, multiplication and transmission		
10.	28 th	Survival and dispersal of plant pathogens	10 th	Staining and identification of different plant pathogenic bacteria
	29 th	Survival and dispersal of plant pathogens		
	30 th	Pathogenesis, cause and classification of plant diseases		
11.	31 st	Pathogenesis, cause and classification of plant diseases	11 th	Transmission of plant viruses
	32 nd	Defense mechanism in plants : Structural and biochemical (pre and post infection)		
	33 rd	Defense mechanism in plants : Structural and biochemical (pre and post infection)		
12.	34 th	Plant disease epidemics, factors responsible for epidemics	12 th	Study of phanerogamic plant parasites
	35 th	Plant disease epidemics, factors responsible for epidemics		
	36 th	Plant disease forecasting		
13.	37 th	Study of phanerogamic plant parasites	13 th	Study of fungicides and their formulations
	38 th	Principles of plant disease control: Avoidance, exclusion, eradication, protection and therapy		

	39 th	Plant quarantine and inspection – quarantine rules and regulations,		
14.	40 th	Host plant resistance, role & mechanism of biological control	14 th	Methods of pesticides/bio-pesticides applications and their safe use
	41 st	Use of integrated plant disease management (IDM): concept, advantages and importance		
	42 nd	Use of integrated plant disease management (IDM): concept, advantages and importance		
15.	43 rd	Classification, mode of action and formulations of fungicides and antibiotics	15 th	Calculation of fungicide sprays concentrations
	44 th	Classification, mode of action and formulations of fungicides and antibiotics		
	45 th	Classification, mode of action and formulations of fungicides and antibiotics		

Proforma

***Name of the Faculty : Dr. Satish Kumar and Dr. Rakesh Chugh**

Discipline : Plant Pathology

Semester : 2nd Semester (2017-18)

Subject : Pl. Path. 203 Plant Protection (For Home Science students) Cr. hrs: 0+2

Lesson Plan Duration : 15 weeks

**** Work Load (Lecture/Practical) per week (in hours): Lectures Theory-00, Practicals-12 section**

Week	Lecture day	Theory	Practical day	Practical
1.		NIL	1 st	Concept, importance of plant diseases and their management
2.		NIL	2 nd	Study of various type of symptoms of plant diseases
3.		NIL	3 rd	Causes of plant diseases
4.		NIL	4 th	Acquaintance of various formulation of fungicides, preparation of fungicides solutions
5.		NIL	5 th	Methods of application of fungicides and antibiotics
6.		NIL	6 th	Concept, importance of plant diseases and their management
7.		NIL	7 th	Causes, symptoms and control of diseases of Wheat (rust, loose smut, Karnal bunt)
8.		NIL	8 th	Causes, symptoms and control of diseases of Rice (brown leaf spot. Bacterial leaf blight)
9.		NIL	9 th	Causes, symptoms and control of diseases of Pulses (gram blight, gram wilt, yellow mosaic of mungbean)
10.		NIL		Causes, symptoms and control of diseases of Sugarcane (red rot, smut, wilt & grassy shoot disease)
11.		NIL	10 th	Causes, symptoms and control of diseases of Bajra (downy mildew, smut, ergot)
12.		NIL	11 th	Causes, symptoms and control of diseases of Vegetables (early and late blight of potato and tomato, black scurf of potato, leaf curl. leaf roll and mosaic of tomato and potato, pea powdery mildew, downy and powdery mildew of cucurbits, yellow vein mosaic of okra, little leaf of brinjal, mosaic and leaf curl of chillies, anthracnose of chillies).
13.		NIL	12 th	Fruits (mango malformation, ber powdery mildew. citrus canker, grape powdery mildew, guava wilt).

Proforma

Name of faculty : Dr. A.S. Rathi and Dr. Rajender Singh Beniwal
 Discipline : Plant Pathology
 Semester : 2nd Semester (2017-18)
 Subject : Pl. Path. 604 (Molecular basis of host pathogen interactions) Cr. hrs: 2+1

Lesson Plan : 15 weeks

** Work Load (Lecture/Practical, each Section) per week (in hours): Theory Lecture: 02

Practical: 02

Week	Theory		Practical	
	Lecture Day	Topic	Practical Day	Topic
1 st	1 st	Importance of biotechnological tools in Plant Pathology	1 st	Fungi culture
	2 nd	Role of biotechnological tools in Plant Pathology		
2 nd	3 rd	Basic concepts to study host pathogen relationship.	2 nd	Protein isolation from fungi
	4 th	Principles to study host pathogen relationship.		
3 rd	5 th	Molecular basis of host-pathogen interaction-fungi.	3 rd	DNA isolation from fungi
	6 th	Molecular basis of host-pathogen interaction- bacteria and viruses.		
4 th	7 th	Plant pathogen recognition system	4 th	Bacteria culture
	8 th	Signal transduction		
5 th	9 th	Induction of defense responses-pathogenesis related proteins.	5 th	Protein extraction
	10 th	Induction of defense responses- Hypersensitive Reaction		
6 th	11 th	Induction of defense responses- reactive oxygen species	6 th	DNA isolation from bacteria
	12 th	Role of phytoalexins		
7 th	13 th	Systemic acquired resistance	7 th	plasmids extraction
	14 th	Programmed cell death		
8 th	15 th	Viral induced gene silencing	8 th	PCR analysis for fungi
	16 th	Genetic basis of gene-for-gene hypothesis		
9 th	17 th	Molecular basis of gene-for-gene hypothesis	9 th	PCR analysis for bacteria
	18 th	R-gene expression		
10 th	19 th	Transcription profiling	10 th	DNA isolation from viruses
	20 th	Mapping of resistance genes		
11 th	21 st	Cloning of resistance genes	11 th	RNA isolation from viruses
	22 nd	Marker-aided selection		
12 th	23 th	Pyramiding of R genes	12 th	PCR analysis for virus
	24 th	Gene silencing		
13 th	25 th	Biotechnology for disease management	13 th	DNA electrophoresis
	26 th	Development of disease resistance plants using plant tissue culture approaches		
14 th	27 th	Development of disease resistance plants using genetic engineering approaches	14 th	Protein electrophoresis
	28 th	Different methods of gene transfer		
15 th	29 th	Biosafety issues related to GM crop	15 th	Bacterial transformation
	30 th	Biosafety issues related to useful microbe		