

Rama University, Kanpur

Ref: RU/FASAI/Pathol/02

Dated: 24-05-2019

Faculty of Agricultural Sciences and Allied Industries

Minutes of Meeting

Boards of Studies 2

A meeting of Boards of Studies of FASAI, Department Plant Pathology was held on 24-05-2019 in Conference room. The following members were present:

1. Dr. S. P. Singh

- Chairperson

2. Dr. Udai Bhan Singh

- Member

3. Mr. Omendra Sharma

- Member

The following members agreed to review the minutes

1. Prof. Udit Narain

- External Member

2. Dr. S.K. Biswas

- External Member

Agenda:

**1. Review of the existing programs and their curricula**

S. No.	Item No.	Existing	Recommendation /Action Taken
1	A. BOS/2018/06/11 MSPP-102: Plant Virology	Virus-cell interactions Biological, serological and nucleo-based techniques for the detection of virus and virus like pathogens, and was not included	Virus-cell interactions and Biological, serological and nucleo-based techniques for the detection of virus and virus like pathogens, was included
	B. MSPP-304 Epidemiology and forecasting of plant Diseases	Information's needed for disease forecasting was not included	Information's needed for disease forecasting was included
	C. MSPP- 202 Diseases of fruits	Diseases of Cash crops- cotton, sugarcane was not included.	Diseases of Cash crops- cotton, sugarcane was included.

	<p>Plantation And Ornamental Crops</p> <p>D.MSPP-301 Chemicals in Plant Disease Management</p> <p>E. MSPP-305 Plant Quarantine</p>	<p>environmental pollution, residues and health hazards, fungicidal resistance in plant pathogens and its management was not included.</p> <p>WTO regulations; non-tariff barriers; Pest risk analysis, good laboratory practices for pesticide laboratories; pesticide industry; Sanitary and Phytosanitary measures was not included.</p>	<p>environmental pollution, residues and health hazards, fungicidal resistance in plant pathogens and its management was included.</p> <p>WTO regulations; non-tariff barriers; Pest risk analysis, good laboratory practices for pesticide laboratories; pesticide industry; Sanitary and Phytosanitary measures was included.</p>
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## 2. Recommendation on New courses under the Institute

S. No.	Item No.	Feedback from Faculty/Student	Recommendation /Action Taken
1			

## 3. Consideration of the curricula of the new programs prepared by the faculty

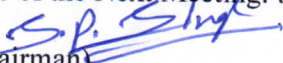
S. No.	Item No.	Feedback from Faculty/subject experts/Industries	Recommendation /Action Taken
1	NA	NA	NA

## 4. Review of Teaching Process

S. No.	Item No.	Existing	Recommendation /Action Taken
1	NA	NA	NA

The meeting concluded with a vote of thanks to the chair.

Date of the Next Meeting: to be decided and conveyed later

  
(Chairman)

Encl.: Recommended Curricula attached for consideration and approval.


CC:

1. Dean Academics Office
2. Registrar Office

**RAMA UNIVERSITY UTTAR PRADESH, KANPUR**  
**Faculty of Agricultural Sciences and Allied Industries**  
**Department of Plant Pathology**  
**Program: Master of Science (M.Sc.)**

**Report on Feedback on Curriculum by Stakeholders (2019-2020)**

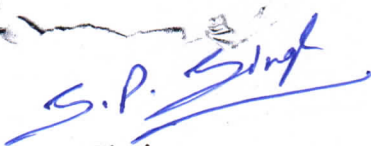
- The external experts reviewed the syllabus and suggested that Mushroom production Technology should be include in curriculum.
- The alumni recommended concentrating more on practical skills in field application.
- The faculty suggested including the botanicals and bio control agents in the syllabus.

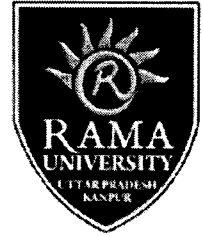
  
BoS Chairman

**RAMA UNIVERSITY UTTAR PRADESH, KANPUR**  
**Faculty of Agricultural Sciences and Allied Industries**  
**Department of Plant Pathology**  
**Program: Master of Science (M.Sc.)**

**Action Taken Report based on Feedback at BoS held on 24.05.2019**

- The external experts reviewed the syllabus and suggested that Mushroom production Technology should be include in curriculum. That will be included in next session
- The practical approaches for disease forecasting will be include in next session
- For eco friendly approaches the role of bio controle agents and botanicals should be included in next session

  
BoS Chairman



**EVALUATION SCHEME**

**&**

**SYLLABUS**

**FOR**

**PLANT PATHOLOGY**

**w.e.f 2019-2020**



**Evaluation Scheme:**

**M.Sc.(Ag.) Plant Pathology FIRST YEAR (SEMESTER-I)**

S.N.	Subject Code	Subject Name	Period			Evaluation Scheme			Subject Total	Credit Hours
			L	T	P	CE	MTE	ETE		
<b>Theory subjects</b>										
1	MSPP-101	Mycology	2	0	0	20	20	60	100	2
2	MSPP-102	Plant Virology	2	0	0	20	20	60	100	2
3	MSPP-103	Plant Bacteriology	2	0	0	20	20	60	100	2
4	MSPP-104	Principles of Plant Pathology	3	0	0	20	20	60	100	3
5	MAS-104	Computer Application	2	0	0	20	20	60	100	2
<b>Practical's / Project</b>										
1	MSPP-151	Mycology	0	0	1	30	20	50	100	1
2	MSPP-152	Plant Virology	0	0	1	30	20	50	100	1
3	MSPP-153	Plant Bacteriology	0	0	1	30	20	50	100	1
4	MAS-153	Computer Application	0	0	1	30	20	50	100	1
<b>Total</b>			<b>11</b>	<b>0</b>	<b>4</b>	<b>220</b>	<b>180</b>	<b>500</b>	<b>900</b>	<b>15</b>

**M.Sc.(Ag.) Plant Pathology FIRST YEAR (SEMESTER-II)**

S.N.	Subject Code	Subject Name	Period			Evaluation Scheme			Subject Total	Credit Hours
			L	T	P	CE	MTE	ETE		
<b>Theory subjects</b>										
1	MSPP-201	Principles of Plant disease management	2	0	0	20	20	60	100	2
2	MSPP-202	Diseases of fruits, plantation and ornamental crops	2	0	0	20	20	60	100	2
3	MSPP-203	Diseases of vegetables and spices crops	2	0	0	20	20	60	100	2
4	MAS- 205	Experimental Design	2	0	0	20	20	60	100	2
<b>Practical's / Project</b>										
1	MSPP-251	Principles of Plant disease management	0	0	1	30	20	50	100	1
2	MSPP-252	Diseases of fruits, plantation and ornamental crops	0	0	1	30	20	50	100	1
3	MSPP-253	Diseases of vegetables and spices crops	0	0	1	30	20	50	100	1
4	MAS- 255	Experimental Design LAB	0	0	1	30	20	50	100	1
<b>Total</b>			<b>8</b>	<b>0</b>	<b>4</b>	<b>200</b>	<b>160</b>	<b>440</b>	<b>800</b>	<b>12</b>



**M.Sc.(Ag.) Plant Pathology SECOND YEAR (SEMESTER-III)**

S.N.	Subject Code	Subject Name	Period			Evaluation Scheme			Subject Total	Credit Hours
			L	T	P	CE	MTE	ETE		
<b>Theory subjects</b>										
1	MSPP-301	Chemicals in Plant disease management	2	0	0	20	20	60	100	2
2	MSPP-302	Biological control of plant Diseases	2	0	0	20	20	60	100	2
3	MSPP-303	Integrated Diseases management	2	0	0	20	20	60	100	2
4	MSPP-304	Epidemiology and forecasting of plant Diseases	2	0	0	20	20	60	100	2
5	MSPP-305	Plant quarantine	2	0	0	20	20	60	100	2
6	PGS-301	History of Agriculture	1	0	0	20	20	60	100	1
<b>Practical's / Project</b>										
1	MSPP-351	Chemicals in Plant disease management	0	0	1	30	20	50	100	1
2	MSPP-352	Biological control of plant Diseases	0	0	1	30	20	50	100	1
3	MSPP-353	Integrated Diseases management	0	0	1	30	20	50	100	1
4	MSPP-354	Epidemiology and forecasting of plant Diseases	0	0	1	30	20	50	100	1
<b>Total</b>			<b>11</b>	<b>0</b>	<b>4</b>	<b>240</b>	<b>200</b>	<b>560</b>	<b>1000</b>	<b>15</b>

**M.Sc.(Ag.) Plant Pathology SECOND YEAR (SEMESTER-IV)**

S.N.	Subject Code	Subject Name	Period			EVALUATION SCHEME			Subject Total	Credit
			L	T	P	CE	MTE	ETE		
<b>Theory Subjects</b>										
1	MSPP- 400	Comprehensive exam	0	0	0	0	0	200	200	0
<b>Practical subjects</b>										
1.	MSPP-401	Master's Seminar	0	0	1	0	0	100	100	1
2.	MSPP-402	Master's Research (Research Work & Thesis/project)	0	0	2	200	0	300	500	20
<b>Total</b>			<b>0</b>	<b>0</b>	<b>3</b>	<b>220</b>	<b>0</b>	<b>330</b>	<b>550</b>	<b>21</b>



**Evaluation Scheme:**

L-Lecture, T-Tutorial, P- Practical, CE- Continuous Evaluation, MTE-Mid Term Examination, ETE-End Term Examination

• **Course without practical components**

For Continuous Evaluation (CE) is such as: 20 Marks

- 1 Attendance: 5 Marks
- 2 Assignments/Quiz / Seminar/Term paper /Project :15Marks

MTE - Mid Term Examination: 20 Marks

- a. First Mid Term Examination: 10 marks
- b. Second Mid Term Examination: 10 marks

ETE - End Term Examination: 60 Marks

• **Course with practical components only**

For Continuous Evaluation (CE) is such as: 30 Marks

Conduct / Perform/Execution /Practical File/ Viva-Voice

MTE - Mid Term Examination: 20 Marks

- a. First Mid Term Examination: 10 marks
- b. Second Mid Term Examination: 10 marks

ETE - End Term Examination: 50 Marks

**Convener**

Signature:  .....

Name : Dr. S. P. Singh

Date :

**Internal Members**

Signature:1.....  



Name: Dr. Udai Bhan Singh

Date:

2.....  


Mr. Omendra Sharma

**External Members**

Signature: 1.....  


2.....  




## Semester-I

### MSPP 101: MYCOLOGY

Course objective:-	L	T	P	CR
1. Discuss the importance of fungi in various ecological roles.	3	2	1	3
2. Demonstrate an understanding of how fungi impact human affairs .				
3. Outline the higher taxonomy of the fungi and how the fungi relate to other organisms.				
4. Discuss the characteristics of the major classes and orders within the fungal kingdom.				
5. Demonstrate a working knowledge of how fungi grow and reproduce, and where and how they can be isolated.				

#### Detail Contents

Unit : 1 – 20%

Unit : 2 - 20%

Unit : 3 - 40%

Unit : 4 - 10%

#### Unit 1:

To study the nomenclature, classification and characters of fungi. Theory Introduction, definition of different terms, basic concepts.

#### Unit 2

Importance of mycology in agriculture, relation of fungi to human affairs, history of mycology. Concepts of nomenclature and classification, fungal biodiversity, reproduction in fungi.

#### Unit 3



The comparative morphology, ultrastructure, characters of different groups of fungi up to generic level: (a) Myxomycota and (b) Eumycota- i) Mastigomycotina ii) Zygomycotina, iii) Ascomycotina, iv) Basidiomycotina, v) Deuteromycotina.

#### Unit 4

Lichens types and importance, fungal genetics and variability in fungi.

#### Practical

Detailed comparative study of different groups of fungi; collection, identification and preservation of specimens. Isolation and identification of plant pathogenic fungi.

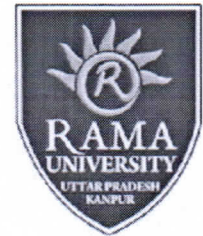
#### Course Learning Outcomes (CLO)

1. Assessment methods may include written and practical examinations, homework assignments and discussion activities.
2. Student knowledge application, laboratory performance, problem solving skills, punctuality and attendance, participation, and communication.
3. Skill is assessed in each laboratory exercise utilizing an evaluation rubric that includes cognitive, psychomotor and affective learning domains.

#### Mapping of course outcome with programme outcome and programme specific outcome

PO & PSO	PO <sub>1</sub>	PO <sub>2</sub>	PO <sub>3</sub>	PO <sub>4</sub>	PO <sub>5</sub>	PSO <sub>1</sub>	PSO <sub>2</sub>	PSO <sub>3</sub>	PSO <sub>4</sub>	PSO <sub>5</sub>
CO										
CO <sub>1</sub>	3	2	2	2	2	3	3	1	-	3
CO <sub>2</sub>	2	3	-	3	1	3	3	-	1	3
CO <sub>3</sub>	3	2	3	1	3	3	3	1	1	3
Average	2.7	2.7	1.7	2	2	3	3	0.7	0.7	3

Text books:-



Ainsworth GC, Sparrow FK & Susman HS. 1973. The Fungi An Advanced Treatise. Vol. IV (A & B). Academic Press, New York. Alexopoulos CJ, Mims CW & Blackwell M.2000.

Introductory Mycology. 5th Ed. John Wiley & Sons, New York. Mehrotra RS & Arneja KR. 1990.

An Introductory Mycology. Wiley Eastern, New Delhi. Sarbhoy AK. 2000. Text book of Mycology. ICAR, New Delhi. Singh RS. 1982. Plant Pathogens The Fungi. Oxford & IBH, New Delhi.

Webster J. 1980. Introduction to Fungi. 2nd Ed. Cambridge Univ. Press, Cambridge, New York.

**Reference books:-**

An Introductory Mycology. Wiley Eastern, New Delhi. Sarbhoy AK. 2000. Text book of Mycology. ICAR, New Delhi. Singh RS. 1982. Plant Pathogens The Fungi. Oxford & IBH, New Delhi.

Webster J. 1980. Introduction to Fungi. 2nd Ed. Cambridge Univ. Press, Cambridge, New York.

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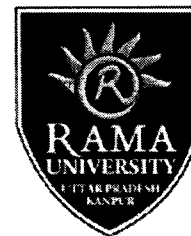
1. Spingho

2. BSH

3. CS

4. Ananya

Biswas



## MSPP 102 : VIROLOGY

Course objective:-	L	T	P	CR
	3	2	1	3

1. Discuss the importance of viruses in various ecological roles.
2. Demonstrate an understanding of how virus impact human affairs .
3. To acquaint with the structure, virus-vector relationship, biology and management of plant viruses.

### Detail Contents

Unit : 1 – 20%

Unit : 2 - 20%

Unit : 3 - 20%

Unit : 4 - 20%

Unit : 5 - 20%

### Unit 1

To acquaint with the structure, virus-vector relationship, biology and management of plant viruses.  
Theory History of plant viruses, composition and structure of viruses.

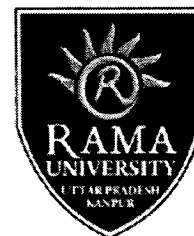
### Unit 2

Symptomatology of important plant viral diseases, transmission, chemical and physical properties, host virus interaction, virus vector relationship.

### Unit 3

Virus nomenclature and classification, genome organization, replication and movement of viruses. I. Virus-cell interactions . Biological, serological and nucleo-based techniques for the detection of virus and virus like pathogens.

### Unit 4



Isolation and purification, electron microscopy, protein and nucleic acid based diagnostics. Mycoviruses, phytoplasma arbo and baculoviruses, satellite viruses, satellite RNAs, phages, viroids, prions.

### Unit 5

Principles of the working of electron microscope and ultra-microtome. Origin and evolution, mechanism of resistance, genetic engineering, ecology, and management of plant viruses.

#### Practical

Study of symptoms caused by viruses ,transmission, assay of viruses, physical properties, purification, method of raising antisera, serologic.

#### Course Learning Outcomes (CLO)

- 1.Assessment methods may include written and practical examinations, homework assignments and discussion activities.
- 2.Explain the rationale behind the Baltimore classification system of viruses and present example viruses for each Baltimore group
3. Student knowledge application, laboratory performance, problem solving skills, punctuality and attendance, participation, and communication.

#### Mapping of course outcome with programme outcome and programme specific outcome

PO & PSO	PO <sub>1</sub>	PO <sub>2</sub>	PO <sub>3</sub>	PO <sub>4</sub>	PO <sub>5</sub>	PSO <sub>1</sub>	PSO <sub>2</sub>	PSO <sub>3</sub>	PSO <sub>4</sub>	PSO <sub>5</sub>
CO										
CO <sub>1</sub>	2	3	2	2	2	3	2	1	-	2
CO <sub>2</sub>	2	3	-	3	1	2	3	-	1	2
CO <sub>3</sub>	3	3	3	1	3	3	3	1	1	2
Average	2.3	3	1.7	2	2	2.7	2.7	0.7	0.7	3

#### Text books:-

Bos L. 1964. Symptoms of Virus Diseases in Plants. Oxford & IBH., New Delhi.

Brunt AA, Krabtree K, Dallwitz MJ, Gibbs AJ & Watson L. 1995. Virus of Plants: Descriptions and Lists from VIDE Database. CABI, Wallington.



**Reference books:-** Gibbs A & Harrison B. 1976. Plant Virology - The Principles. Edward Arnold, London. Hull R. 2002. Mathews Plant Virology. 4th Ed. Academic Press, New York.

Noordam D. 1973. Identification of Plant Viruses, Methods and Experiments. Oxford & IBH, New Delh

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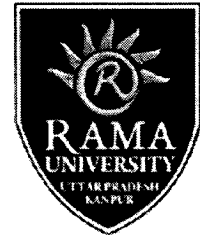
1. Sprush

2. bsingh

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4. masam

Abinas



## MSPP 103: BACTERIOLOGY

Course objective:-	L	T	P	CR
	3	2	1	3

1. Discuss the importance of bacteria in various ecological roles.
2. Demonstrate an understanding of how bacteria impact human affairs .
3. Outline the higher taxonomy of the bacteria and how the bacteria relate to other organisms.
4. Demonstrate a working knowledge of how bacteria grow and reproduce, and where and how they can be isolated.

### Detail Contents

**Unit : 1 – 20%**

**Unit : 2 - 20%**

**Unit : 3 - 20%**

**Unit : 4 - 20%**

#### Unit 1:

To acquaint with plant pathogenic prokaryote (procarya) and their structure, nutritional requirements, survival and dissemination.

#### Unit 2

Theory History and introduction to phytopathogenic procarya, viz., bacteria, MLOs, spiroplasmas and other fastidious procarya. Importance of phytopathogenic bacteria. Evolution,

#### Unit 3

classification and nomenclature of phytopathogenic procarya and important diseases caused by them. Growth, nutrition requirements, reproduction, preservation of bacterial cultures and variability among phytopathogenic procarya





## Unit 4

General biology of bacteriophages, L form bacteria, plasmids and bdellovibrios. Prokaryotic inhibitors and their mode of action against phytopathogenic bacteria. Survival and dissemination of phytopathogenic bacteria.

**Practical** Isolation, purification, identification and host inoculation of phytopathogenic bacteria, staining methods, biochemical and serological characterization, isolation of plasmid and use of antibacterial chemicals/antibiotics..

### Course Learning Outcomes (CLO)

1. Student will know about importance of isolation and identification methods, disease and management caused by bacteria and their role in biological cycle.
2. Demonstrate an understanding of how bacteria impact human affairs .
3. Outline the higher taxonomy of the bacteria and how the bacteria relate to other organisms.

### Mapping of course outcome with programme outcome and programme specific outcome

PO & PSO CO	PO <sub>1</sub>	PO <sub>2</sub>	PO <sub>3</sub>	PO <sub>4</sub>	PO <sub>5</sub>	PSO <sub>1</sub>	PSO <sub>2</sub>	PSO <sub>3</sub>	PSO <sub>4</sub>	PSO <sub>5</sub>
CO <sub>1</sub>	3	2	2	2	2	3	3	1	-	2
CO <sub>2</sub>	3	3	-	3	1	2	3	-	1	1
CO <sub>3</sub>	3	2	3	1	3	3	3	1	1	3
Average	3	2.7	1.7	2	2	2.7	3	0.7	0.7	2

### Text books:-

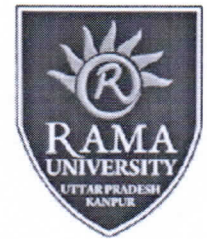
Goto M. 1990. Fundamentals of Plant Bacteriology. Academic Press, New York.

Jayaraman J & Verma JP. 2002. Fundamentals of Plant Bacteriology. Kalyani Publ., Ludhiana.

### Reference books:-

Mount MS & Lacy GH. 1982. Phytopathogenic Prokaryotes. Vols. I, II. Academic Press, New York.

Verma JP, Varma A & Kumar D. (Eds). 1995. Detection of Plant Pathogens and their Management. Angkor Publ., New Delhi.



Verma JP. 1998. The Bacteria. Malhotra Publ. House, New Delhi.

Signature:-

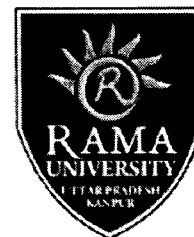
1. S. Singh

2. U. Singh

3. O. Singh

4. A. Singh

J. P. Verma



## MSPP-104 PRINCIPLES OF PLANT PATHOLOGY

L	T	P	CR
3	3	0	3

### Course objective:-

To educate about the nature, prevalence, etiology, factors affecting disease development and control measures of field and medicinal crop **diseases**. Detailed study of symptoms and host parasite relationship of important **diseases** of above mentioned crops.

### Detail Contents

**Unit : 1 – 20%**

**Unit : 2 - 20%**

**Unit : 3 - 20%**

**Unit : 4 - 20%**

**Unit : 5 - 20%**

### Unit 1:

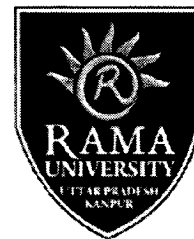
To introduce the subject of Plant Pathology, its concepts and principles. Theory Importance, definitions and concepts of plant diseases, history and growth of plant pathology, biotic and abiotic causes of plant diseases.

### Unit 2

Growth, reproduction, survival and dispersal of important plant pathogens, role of environment and host nutrition on disease development.

### Unit 3

Host parasite interaction, recognition concept and infection, symptomatology, disease development- role of enzymes, toxins, growth regulators; defense strategies- oxidative burst; Phenolics, Phytoalexins, PR proteins, Elicitors.



#### Unit 4

Altered plant metabolism as affected by plant pathogens. Genetics of resistance; 'R' genes; mechanism of genetic variation in pathogens;

#### Unit 5

molecular basis for resistance; marker-assisted selection; genetic engineering for disease resistance. Disease management strategies.

#### Course Learning Outcomes (CLO)

To study living, non-living and environmental causes of diseases or disorders of the plants

- To study the mechanism of plant disease development.
- To study interaction between host/susceptible and the pathogens.
- To develop systems of management of plant diseases and reducing losses caused by them.

#### Mapping of course outcome with programme outcome and programme specific outcome

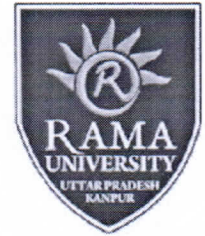
PO & PSO CO	PO <sub>1</sub>	PO <sub>2</sub>	PO <sub>3</sub>	PO <sub>4</sub>	PO <sub>5</sub>	PSO <sub>1</sub>	PSO <sub>2</sub>	PSO <sub>3</sub>	PSO <sub>4</sub>	PSO <sub>5</sub>
CO <sub>1</sub>	3	2	2	2	2	3	3	1	-	3
CO <sub>2</sub>	2	3	-	3	1	3	3	-	1	3
CO <sub>3</sub>	3	2	3	1	3	3	3	1	1	3
Average	2.7	2.7	1.7	2	2	3	3	0.7	0.7	3

#### Text books:-

Agrios GN. 2005. Plant Pathology. 5th Ed. Academic Press, New York.

Heitefuss R & Williams PH. 1976. Physiological Plant Pathology. Springer Verlag, Berlin, New York.

Mehrotra RS & Aggarwal A. 2003. Plant Pathology. 2nd Ed. Oxford & IBH, New Delhi.



**Reference books:-**

Singh RS. 2002. Introduction to Principles of Plant Pathology. Oxford & IBH, New Delhi.

Singh DP & Singh A. 2007. Disease and Insect Resistance in Plants. Oxford & IBH, New Delhi.

Upadhyay RK & Mukherjee KG. 1997. Toxins in Plant Disease Development and Evolving Biotechnology. Oxford & IBH, New Delhi.

**Signature:-**

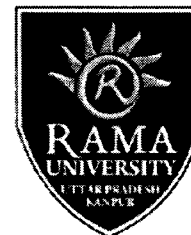
1. S. P. Singh

2. IB Singh

3. Am

4. Amran

Abhishek



**Semester-2**  
**MSPP-201 PRINCIPLES OF PLANT DISEASE MANAGEMENT**

<b>Course objective:</b>	<b>L</b>	<b>T</b>	<b>P</b>	<b>CR</b>
1. To acquaint with different strategies for management of plant diseases	<b>3</b>	<b>2</b>	<b>1</b>	<b>3</b>

**Detail Contents**

**Unit : 1 – 25%**

**Unit : 2 - 25%**

**Unit : 3 - 25%**

**Unit : 4 - 25%**

**Unit 1:**

To acquaint with different strategies for management of plant diseases. Theory Principles of plant disease management by cultural, physical, biological, chemical, organic amendments and botanicals methods of plant disease control,

**Unit 2**

integrated control measures of plant diseases. Disease resistance and molecular approach for disease management.

**Unit 3**

Foliage, seed and soil application of chemicals, role of stickers, spreaders and other adjuvants, health vis-a-vis environmental hazards, residual effects and safety measures.

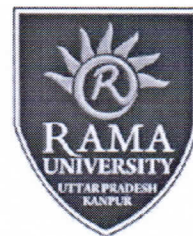
**Unit 4**

History of fungicides, bactericides, antibiotics, concepts of pathogen, immobilization, chemical protection and chemotherapy, nature, properties and mode of action of antifungal, antibacterial and antiviral chemicals.

**Practical** In vitro and in vivo evaluation of chemicals against plant pathogens; ED and MIC values, study of structural details of sprayers and dusters.

**Course Learning Outcomes (CLO)**

1. Students will know various laboratory methods of detection of plant pathogens and evaluation of .



2. To study interaction between host/susceptible and the pathogens.
3. To develop systems of management of plant diseases and reducing losses caused by them.

**Mapping of course outcome with programme outcome and programme specific outcome**

PO & PSO CO	PO <sub>1</sub>	PO <sub>2</sub>	PO <sub>3</sub>	PO <sub>4</sub>	PO <sub>5</sub>	PSO <sub>1</sub>	PSO <sub>2</sub>	PSO <sub>3</sub>	PSO <sub>4</sub>	PSO <sub>5</sub>
CO <sub>1</sub>	3	2	3	2	2	3	3	1	-	2
CO <sub>2</sub>	2	3	3	3	1	3	3	-	1	-
CO <sub>3</sub>	3	2	3	1	3	3	2	1	1	3
Average	2.7	2.7	3	2	2	3	2.7	0.7	0.7	1.7

**Text books:-**

Fry WE. 1982. Principles of Plant Disease Management. Academic Press, New York.

Hewitt HG. 1998. Fungicides in Crop Protection. CABI, Wallington.

Marsh RW. 1972. Systemic Fungicides. Longman, New York.

**Reference books:-**

Nene YL & Thapliyal PN. 1993. Fungicides in Plant Disease Control. Oxford & IBH, New Delhi.

Palti J. 1981. Cultural Practices and Infectious Crop Diseases. Springer- Verlag, New York.

Vyas SC. 1993 Handbook of Systemic Fungicides. Vols. I-III. Tata McGraw Hill, New Delhi.

**Signature:-**

1. S.P. Singh
  2. U.S. Singh
  3. B.S. Singh
  4. Sunanda
- A. Ranjan



## **MSPP-202 DISEASES OF FRUITS, PLANTATION AND ORNAMENTAL CROPS**

<b>L</b>	<b>T</b>	<b>P</b>	<b>CR</b>
<b>3</b>	<b>2</b>	<b>1</b>	<b>3</b>

**Course objective:-** Objective To acquaint with diseases of fruits, plantation, ornamental plants and their management

### **Detail Contents**

**Unit : 1 – 25%**

**Unit : 2 - 25%**

**Unit : 3 - 25%**

**Unit : 4 - 25%**

#### **Unit 1:**

To acquaint with diseases of fruits, plantation, ornamental plants and their management. Theory  
Introduction, symptoms and etiology of different fruit diseases.  
Diseases of Cash crops- cotton, sugarcane

#### **Unit 2**

Factors affecting disease development in fruits like apple, pear, peach, plum, apricot, cherry, walnut, almond, strawberry, citrus, mango, grapes, guava, ber, banana, pineapple, papaya, fig, pomegranate, date palm and management of the fruits diseases

#### **Unit 3**

Symptoms, mode of perpetuation of diseases of plantation crops such as tea, coffee, rubber and coconut and their management. Symptoms and life cycle of pathogens.

#### **Unit 4**

Factors affecting disease development of ornamental plants such as roses, gladiolus, tulip, carnation, orchids, marigold, chrysanthemum and their management.

### **Practical**





Detailed study of symptoms and host parasite relationship of representative diseases of plantation crops. Collection and dry preservation of diseased specimens of important crops

**Course Learning Outcomes (CLO)**

1. Students will know symptoms, etiology, disease cycle and management of major diseases of fruits, plantation and ornamental crops.
2. To study interaction between host/susceptible and the pathogens.
3. To develop systems of management of plant diseases and reducing losses caused by them.

**Mapping of course outcome with programme outcome and programme specific outcome**

PO & PSO CO	PO <sub>1</sub>	PO <sub>2</sub>	PO <sub>3</sub>	PO <sub>4</sub>	PO <sub>5</sub>	PSO <sub>1</sub>	PSO <sub>2</sub>	PSO <sub>3</sub>	PSO <sub>4</sub>	PSO <sub>5</sub>
CO <sub>1</sub>	2	2	2	2	2	3	3	1	-	2
CO <sub>2</sub>	3	3	-	3	1	3	3	-	1	3
CO <sub>3</sub>	1	2	3	1	3	3	3	1	1	1
Average	2	2.7	1.7	2	2	3	3	0.7	0.7	2

**Text books:-**

Gupta VK & Sharma SK. 2000. Diseases of Fruit Crops. Kalyani Publ., New Delhi.

Pathak VN. 1980. Diseases of Fruit Crops. Oxford & IBH, New Delhi.

**Reference books:-**

Singh RS. 2000. Diseases of Fruit Crops. Oxford & IBH, New Delhi.

Walker JC. 2004. Diseases of Vegetable Crops. TTPP, India.

**Signature:-**

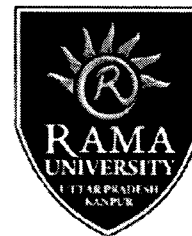
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## MSPP-203 DISEASES OF VEGETABLE AND SPICES CROPS

L	T	P	CR
3	2	1	3

**Course objective:-** To impart knowledge about symptoms, epidemiology of different diseases of vegetables and spices and their management.

### Detail Contents

**Unit : 1 – 25%**

**Unit : 2 - 25%**

**Unit : 3 - 25%**

**Unit : 4 - 25%**

#### Unit 1:

To impart knowledge about symptoms, epidemiology of different diseases of vegetables and spices and their management.

#### Unit 2

Theory Nature, prevalence, factors affecting disease development of bulb, leafy vegetable, crucifers, cucurbits and solanaceous vegetables.

#### Unit 3

Diseases of protected cultivation. Symptoms and management of diseases of different root, bulb, leafy vegetables, crucifers, cucurbits and solanaceous vegetable crops.

#### Unit 4

Symptoms, epidemiology and management of diseases of different spice crops such as black pepper, saffron, cumin, coriander, turmeric, fennel, fenugreek and ginger..

#### Practical

Detailed study of symptoms and host pathogen interaction of important diseases of vegetable and spice crops.

#### Course Learning Outcomes (CLO)

1. Students will know symptoms, etiology, disease cycle and management of major diseases of vegetable crops. Student knowledge application, laboratory performance, problem solving skills.
2. To study interaction between host/susceptible and the pathogens.



3. To develop systems of management of plant diseases and reducing losses caused by them.

**Mapping of course outcome with programme outcome and programme specific outcome**

PO & PSO CO	PO <sub>1</sub>	PO <sub>2</sub>	PO <sub>3</sub>	PO <sub>4</sub>	PO <sub>5</sub>	PSO <sub>1</sub>	PSO <sub>2</sub>	PSO <sub>3</sub>	PSO <sub>4</sub>	PSO <sub>5</sub>
CO <sub>1</sub>	1	-	2	2	2	3	3	2	2	3
CO <sub>2</sub>	-	1	-	3	1	3	3	3	1	3
CO <sub>3</sub>	1	1	3	1	3	3	3	1	3	3
Average	0.7	0.7	1.7	2	2	3	3	3	2	3

**Text books:-**

Chaube HS, Singh US, Mukhopadhyay AN & Kumar J. 1992. Plant Diseases of International Importance. Vol. II. Diseases of Vegetable and Oilseed Crops. Prentice Hall, Englewood Cliffs, New Jersey.

Gupta VK & Paul YS. 2001. Diseases of Vegetable Crops. Kalyani Publ., New Delhi

Sherf AF & McNab AA. 1986. Vegetable Diseases and their Control. Wiley Inter Science, Columbia.

Singh RS. 1999. Diseases of Vegetable Crops. Oxford & IBH, New Delhi.

**Reference books:-**

Gupta SK & Thind TS. 2006. Disease Problem in Vegetable Production. Scientific Publ., Jodhpur.

Walker JC. 1952. Diseases of Vegetable Crops. McGraw-Hill, New York.

**Signature:-**

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  2. UBS
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  4. Sunam
- S. Prasad



**Semester-3**  
**MSPP-301 CHEMICALS IN PLANT DISEASE MANAGEMENT**

L	T	P	CR
3	2	1	3

**Course objective:-** To impart knowledge on the concepts, principles and judicious use of chemicals in plant disease management.

**Detail Contents**

**Unit : 1 – 25%**

**Unit : 2 - 25%**

**Unit : 3 - 25%**

**Unit : 4 - 25%**

**Unit 1:**

To impart knowledge on the concepts, principles and judicious use of chemicals in plant disease management. Theory History and development of chemicals; definition of pesticides and related terms; advantages and disadvantages of chemicals.

**Unit 2**

Classification of chemicals used in plant disease control and their characteristics. Chemicals in plant disease control, viz., fungicides, bactericides, nematocides, antiviral chemicals and botanicals.; environmental pollution, residues and health hazards, fungicidal resistance in plant pathogens and its management

**Unit 3**

Formulations, mode of action and application of different fungicides; chemotherapy and phytotoxicity of fungicides. Handling, storage and precautions to be taken while using fungicides; compatibility with other agrochemicals, persistence, cost-benefit ratio, factor affecting fungicides.

**Unit 4:**

General account of plant protection appliances; environmental pollution, residues and health hazards, fungicidal resistance in plant pathogens and its management.

**Practical**



Acquaintance with formulation of different fungicides and plant protection appliances. Formulation of fungicides, bactericides and nematocides; in vitro evaluation techniques, preparation of different concentrations of chemicals including botanical pesticides based on active ingredients against pathogens; persistence, compatibility with other agro-chemicals; detection of naturally occurring fungicide resistant mutants of pathogen; methods of application of chemicals.

**Course Learning Outcomes (CLO)**

1. Students will know biological control of pests and weeds and conventional and industrial production of quality chemical -control. Chemicals used in plant disease control and their characteristics.
2. To study interaction between host/susceptible and the pathogens.
3. To develop systems of management of plant diseases and reducing losses caused by them.

**Mapping of course outcome with programme outcome and programme specific outcome**

PO & PSO	PO <sub>1</sub>	PO <sub>2</sub>	PO <sub>3</sub>	PO <sub>4</sub>	PO <sub>5</sub>	PSO <sub>1</sub>	PSO <sub>2</sub>	PSO <sub>3</sub>	PSO <sub>4</sub>	PSO <sub>5</sub>
CO										
CO <sub>1</sub>	3	2	2	2	3	3	3	1	-	2
CO <sub>2</sub>	2	3	-	3	3	3	3	-	1	1
CO <sub>3</sub>	3	2	3	1	3	3	3	1	1	3
Average	2.7	2.7	1.7	2	3	3	3	0.7	0.7	2

**Text books:-**

Bindra OS & Singh H. 1977. Pesticides - An Application Equipment. Oxford & IBH, New Delhi.  
 Nene YL & Thapliyal PN. 1993. Fungicides in Plant Disease Control. 3rd Ed. Oxford & IBH, New Delhi.  
 Torgeson DC (Ed.). 1969. Fungicides. Vol. II. An Advanced Treatise. Academic Press, New York.

**Reference books:-**

Vyas SC. 1993. Handbook of Systemic Fungicides. Vols. I-III. Tata McGraw Hill, New Delhi

**Signature:-**

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## **MSPP-302 BIOLOGICAL CONTROL OF PLANT DISEASES 3(2+1)**

**Course objective:-** To study principles and application of eco friendly and sustainable management strategies of plant diseases.

<b>Detail Contents</b>	<b>L</b>	<b>T</b>	<b>P</b>	<b>CR</b>
	<b>3</b>	<b>2</b>	<b>1</b>	<b>3</b>

**Unit : 1 – 25%**

**Unit : 2 - 25%**

**Unit : 3 - 25%**

**Unit : 4 - 25%**

### **Unit 1:**

To study principles and application of ecofriendly and sustainable management strategies of plant diseases. Theory Concept of biological control, definitions, importance, principles of plant disease management with bioagents, history of biological control, merits and demerits of biological control.

### **Unit 2**

Types of biological interactions, competition, mycoparasitism, exploitation for hypovirulence, rhizosphere colonization, competitive saprophytic ability, antibiosis, induced resistance, mycorrhizal associations, operational mechanisms and its relevance in biological control.

### **Unit 3**

Factors governing biological control, role of physical environment, agroecosystem, operational mechanisms and cultural practices in biological control of pathogens, pathogens and antagonists and their relationship, biocontrol agents, comparative approaches to biological control of plant pathogens by resident and introduced antagonists, control of soil-borne and foliar diseases.

### **Unit 4**

Compatibility of different bioagents. Commercial production of antagonists, their delivery systems, application and monitoring, biological control in IDM, IPM and organic farming system, biopesticides available in market. Quality control system of biocontrol agents.

### **Practical**

Isolation, characterization and maintenance of antagonists, methods of study of antagonism and antibiosis, application of antagonists against pathogen in vitro and in vivo conditions. Study of cfu/g.



### Course Learning Outcomes (CLO)

1. Students will know biological control of pests and weeds and conventional and industrial production of quality bio-control agents.
2. To study interaction between host/susceptible and the pathogens.
3. To develop systems of management of plant diseases and reducing losses caused by them.

### Mapping of course outcome with programme outcome and programme specific outcome

PO & PSO CO	PO <sub>1</sub>	PO <sub>2</sub>	PO <sub>3</sub>	PO <sub>4</sub>	PO <sub>5</sub>	PSO <sub>1</sub>	PSO <sub>2</sub>	PSO <sub>3</sub>	PSO <sub>4</sub>	PSO <sub>5</sub>
CO <sub>1</sub>	3	2	2	3	2	2	3	1	-	3
CO <sub>2</sub>	2	3	-	3	1	3	3	-	1	2
CO <sub>3</sub>	3	2	3	3	3	1	3	1	1	1
Average	2.7	2.7	1.7	3	2	2	3	0.7	0.7	2

#### Text books:-

Campbell R. 1989. Biological Control of Microbial Plant Pathogens. Cambridge Univ. Press, Cambridge.

Cook RJ & Baker KF. 1983. Nature and Practice of Biological Control of Plant Pathogens. APS, St. Paul, Mennisota.

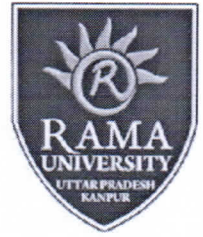
Fokkemma MJ. 1986. Microbiology of the Phyllosphere. Cambridge Univ. Press, Cambridge.

Gnanamanickam SS (Eds). 2002. Biological Control of Crop Diseases. CRC Press, Florida

#### Reference books:-

Heikki MT & Hokkanen James M (Eds.). 1996. Biological Control - Benefits and Risks. Cambridge Univ. Press, Cambridge.

Mukerji KG, Tewari JP, Arora DK & Saxena G. 1992. Recent Developments in Biocontrol of Plant Diseases. Aditya Books, New Delhi.



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1. S.P. Singh

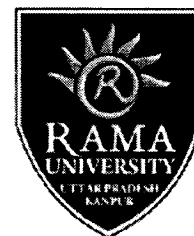
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## MSPP-303 INTEGRATED DISEASE MANAGEMENT

3(2+1)

L	T	P	CR
3	2	1	3

**Course objective:-** To emphasize the importance and need of IDM in the management of diseases of important crops.

### Detail Contents

**Unit : 1 – 50%**

**Unit : 2 - 50%**

#### Unit 1:

To emphasize the importance and need of IDM in the management of diseases of important crops. Theory Introduction, definition, concept and tools of disease management, components of integrated disease management- their limitations and implications.

#### Unit 2

Development of IDM- basic principles, biological, chemical and cultural disease management. IDM in important crops- rice, wheat, cotton, sugarcane, chickpea, rapeseedmustard, pearl millet, kharif pulses, vegetable crops and fruit crops.

#### Practical

Application of biological, cultural, chemical and biocontrol agents, their compatibility and integration in IDM; demonstration of IDM in certain crops as project work.

#### Course Learning Outcomes (CLO)

1. Students will know principles and utilization of integrated pest management of field crops.. Student knowledge application, laboratory performance, problem solving skills.
2. . To study interaction between host/susceptible and the pathogens.
3. To develop systems of management of plant diseases and reducing losses caused by them.



**Mapping of course outcome with programme outcome and programme specific outcome**

PO & PSO CO	PO <sub>1</sub>	PO <sub>2</sub>	PO <sub>3</sub>	PO <sub>4</sub>	PO <sub>5</sub>	PSO <sub>1</sub>	PSO <sub>2</sub>	PSO <sub>3</sub>	PSO <sub>4</sub>	PSO <sub>5</sub>
CO <sub>1</sub>	3	2	2	3	2	2	3	1	-	3
CO <sub>2</sub>	2	3	-	3	1	3	3	-	1	3
CO <sub>3</sub>	3	2	3	3	3	1	3	1	1	3
Average	2.7	2.7	1.7	3	2	2	3	0.7	0.7	3

**Text books:-**

Gupta VK & Sharma RC. (Eds). 1995. Integrated Disease Management and Plant Health. Scientific Publ., Jodhpur.

Mayee CD, Manoharachary C, Tilak KVBR, Mukadam DS & Deshpande Jayashree (Eds.).

2004. Biotechnological Approaches for the Integrated Management of Crop Diseases. Daya Publ. House, New Delhi

**Reference books:-**

Sharma RC & Sharma JN. (Eds). 1995. Integrated Plant Disease Management. Scientific Publ., Jodhpur.

**Signature:-**

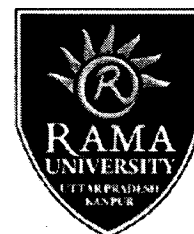
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## **MSPP-304 EPIDEMIOLOGY AND FORECASTING OF PLANT DISEASES**

**3(2+1)**

### **Course objective:-**

To acquaint with the principles of epidemiology and its application in disease forecasting.

### **Detail Conte**

**L T P CR**

**3 2 1 3**

**Unit : 1 – 25%**

**Unit : 2 - 25%**

**Unit : 3 - 25%**

**Unit : 4 - 25%**

### **Unit 1**

**Objective** To acquaint with the principles of epidemiology and its application in disease forecasting. Theory Epidemic concept and historical development, pathometry and crop growth stages, epidemic growth and analysis. Information's needed for disease forecasting

### **Unit 2**

Common and natural logarithms, function fitting area under disease progress curve and correction factors, inoculum dynamics, population biology of pathogens, temporal spatial variability in plant pathogens.

### **Unit 3**

Survey, surveillance and vigilance, crop loss assessment and models. Principles and pre-requisites of forecasting, systems and factors affecting various components of forecastings.

### **Unit 4**

some early forecasting, procedures based on weather and inoculum potential, modeling disease growth and disease prediction.

**Practical** Measuring diseases, spore dispersal and trapping, weather recording, survey, multiplication of inoculum, computerized data analysis, function fitting, model preparation and validation.



### Course Learning Outcomes (CLO)

1. Detailed knowledge on the subject to improve the farmer's condition by their contributions.
2. Detailed knowledge of cultivation practices, Soil, fertilizers, livestock's insect pest.
3. Economic associated with farming enterprises.

### Mapping of course outcome with programme outcome and programme specific outcome

PO & PSO	PO <sub>1</sub>	PO <sub>2</sub>	PO <sub>3</sub>	PO <sub>4</sub>	PO <sub>5</sub>	PSO <sub>1</sub>	PSO <sub>2</sub>	PSO <sub>3</sub>	PSO <sub>4</sub>	PSO <sub>5</sub>
CO										
CO <sub>1</sub>	3	2	2	2	3	3	3	1	-	3
CO <sub>2</sub>	2	3	-	3	3	3	2	-	1	3
CO <sub>3</sub>	3	2	3	1	3	3	1	1	1	3
Average	2.7	2.7	1.7	2	3	3	2	0.7	0.7	3

### Text books:-

Campbell CL & Madden LV. 1990. Introduction to Plant Disease Epidemiology. John Wiley & Sons. New York

Cowling EB & Horsefall JG. 1978. Plant Disease. Vol. II. Academic Press, New York.

Laurence VM, Gareth H & Frame Van den Bosch (Eds.). The Study of Plant Disease Epidemics. APS, St. Paul, Minnesota.

Nagarajan S & Murlidharan K. 1995. Dynamics of Plant Diseases. Allied Publ., New Delhi.

Thresh JM. 2006. Plant Virus Epidemiology. Advances in Virus Research 67, Academic Press, New York.

### Reference books:-

Van der Plank JE. 1963. Plant Diseases Epidemics and Control. Academic Press, New York.

Zadoks JC & Schein RD. 1979. Epidemiology and Plant Disease Management. Oxford Univ. Press, London

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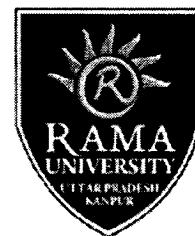
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## MSPP-305 PLANT QUARANTINE

2(2+0)

L	T	P	CR
2	2	0	2

**Course objective:-** To acquaint the learners about the principles and the role of Plant Quarantine in containment of pests and diseases, plant quarantine regulations and set-up.

### Detail Contents

**Unit : 1 – 20%**

**Unit : 2 - 20%**

**Unit : 3 - 20%**

**Unit : 4 - 20%**

**Unit : 5 - 20%**

#### Unit 1:

To acquaint the learners about the principles and the role of Plant Quarantine in containment of pests and diseases, plant quarantine regulations and set-up.

#### Unit 2

Theory Definition of pest, pesticides and transgenics as per Govt. notification; relative importance; quarantine – domestic and international. WTO regulations; non-tariff barriers; Pest risk analysis, good laboratory practices for pesticide laboratories; pesticide industry; Sanitary and Phytosanitary measures.

#### Unit 3

Quarantine restrictions in the movement of agricultural produce, seeds and planting material; case histories of exotic pests/diseases and their status.

#### Unit 4

Plant protection organization in India. Acts related to registration of pesticides and transgenics. History of quarantine legislations, PQ Order 2003. Environmental Acts, Industrial registration; APEDA, Import and Export of bio-control agents..

#### Unit 5



Identification of pest/disease free areas; contamination of food with toxigens, microorganisms and their elimination; Symptomatic diagnosis and other techniques to detect pest/pathogen infestations; VHT and other safer techniques of disinfection/salvaging of infected material. WTO regulations; non-tariff barriers; Pest risk analysis, good laboratory practices for pesticide laboratories; pesticide industry; Sanitary.

### Course Learning Outcomes (CLO)

1. Students will know planning, methodology and interpretation of data for making conclusion of field work and disease management.
2. Detailed knowledge on the subject to improve the farmer's condition by their contributions.
3. To develop systems of management of plant diseases and reducing losses caused by them.

### Mapping of course outcome with programme outcome and programme specific outcome

PO & PSO	PO <sub>1</sub>	PO <sub>2</sub>	PO <sub>3</sub>	PO <sub>4</sub>	PO <sub>5</sub>	PSO <sub>1</sub>	PSO <sub>2</sub>	PSO <sub>3</sub>	PSO <sub>4</sub>	PSO <sub>5</sub>
CO										
CO <sub>1</sub>	3	2	2	3	2	3	2	1	-	3
CO <sub>2</sub>	2	3	-	3	1	3	1	-	1	3
CO <sub>3</sub>	3	2	3	3	3	3	3	1	1	3
Average	2.7	2.7	1.7	3	2	3	2	0.7	0.7	3

#### Text books:-

Rajeev K & Mukherjee RC. 1996. Role of Plant Quarantine in IPM. Aditya Books.

#### Reference books:-

Rhower GG. 1991. Regulatory Plant Pest Management. In: Handbook of Pest Management in Agriculture. 2nd Ed. Vol. II. (Ed. David Pimental). CRC Press

*S. P. Singh*

*S. P. Banerjee*

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## **PGS -301 HISTORY OF AGRICULTURE**

**(1L+0P)**

<b>L</b>	<b>T</b>	<b>P</b>	<b>CR</b>
<b>1</b>	<b>0</b>	<b>0</b>	<b>1</b>

**Course objective:-** To learn about the evolution and achievements of agricultural science in India, lessons learnt and vision for future Agriculture in ancient India:

### **Detail Contents**

**Unit : 1 – 25%**

**Unit : 2 - 25%**

**Unit : 3 - 25%**

**Unit : 4 - 25%**

#### **Unit 1**

To learn about the evolution and achievements of agricultural science in India, lessons learnt and vision for future Agriculture in ancient India: archaeological findings and literature.

#### **Unit 2**

Ancient literature on: farm implements, forecast of weather and rains, types of lands, manure, irrigation, seed and sowing, pests and their management, horticulture and arboriculture, cattle management etc.

#### **Unit 3**

Agricultural research, education and extension in pre-and post-independent India. Green revolution, success, associated problems, lessons learnt.

#### **Unit 4**

Challenges to Indian agriculture: future needs and capabilities, environmental problems, international agriculture and partnership. Emerging scenario and expectations.



### Course Learning Outcomes (CLO)

1. Students will know about Agricultural research, education and extension in pre-and post-independent India.
2. environmental problems, international agriculture and partnership.
3. Emerging scenario and expectations

### Mapping of course outcome with programme outcome and programme specific outcome

PO & PSO	PO <sub>1</sub>	PO <sub>2</sub>	PO <sub>3</sub>	PO <sub>4</sub>	PO <sub>5</sub>	PSO <sub>1</sub>	PSO <sub>2</sub>	PSO <sub>3</sub>	PSO <sub>4</sub>	PSO <sub>5</sub>
CO										
CO <sub>1</sub>	3	2	2	2	2	3	3	1	-	3
CO <sub>2</sub>	2	3	-	3	1	3	3	-	1	3
CO <sub>3</sub>	3	2	3	1	3	3	3	1	1	3
Average	2.7	2.7	1.7	2	2	3	3	1	1	3

Text books:-

Reference books:-

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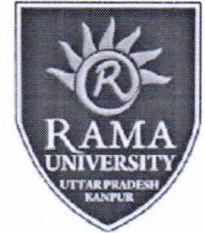
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## Semester-IV

### MSPP-400 Comprehensive Examination

**Objective :** To evaluate the knowledge gain by students.

### Course Learning Outcomes (CLO :

To enable the students to gain deeper knowledge , understanding capabilities in the context of the programme of study.

### Text books:-

Fry WE. 1982. Principles of Plant Disease Management. Academic Press, New York.

Hewitt HG. 1998. Fungicides in Crop Protection. CABI, Wallington.

Marsh RW. 1972. Systemic Fungicides. Longman, New York.

### Reference books:-

Nene YL & Thapliyal PN. 1993. Fungicides in Plant Disease Control. Oxford & IBH, New Delhi.

Palti J. 1981. Cultural Practices and Infectious Crop Diseases. Springer- Verlag, New York.

Vyas SC. 1993 Handbook of Systemic Fungicides. Vols. I-III. Tata McGraw Hill, New Delhi

### Signature:-

1. S.P. Singh

2. VBH

3. Q

4. S. Narain

S.P. Narain



**MSPP-401: Seminar**

**Course Objective:** To prepare synopsis of dissertation work.

**Course Learning Outcomes (CLO)**

Students will know about Agricultural research, education and extension in pre-and post-independent India.

**Mapping of course outcome with programme outcome and programme specific outcome**

PO & PSO	PO <sub>1</sub>	PO <sub>2</sub>	PO <sub>3</sub>	PO <sub>4</sub>	PO <sub>5</sub>	PSO <sub>1</sub>	PSO <sub>2</sub>	PSO <sub>3</sub>	PSO <sub>4</sub>	PSO <sub>5</sub>
CO										
CO <sub>1</sub>	3	2	2	3	2	3	2	1	-	3

**Text books:-**

**Reference books:-**

**Signature:-**

1. S.P. Singh

2. Wahne

3. B.

4. S. Kumar

A. Kumar



**MSAGP-402:** Synopsis, Research Work & Thesis.

**Course Objectives**

To know importance of dissertation work, utilization of theatrical principles in field and preparation and presentation of thesis report.

**Course Learning Outcomes (CLO)**

Student will able to carry out field experiments.

**Mapping of course outcome with programme outcome and programme specific outcome**

PO & PSO	PO <sub>1</sub>	PO <sub>2</sub>	PO <sub>3</sub>	PO <sub>4</sub>	PO <sub>5</sub>	PSO <sub>1</sub>	PSO <sub>2</sub>	PSO <sub>3</sub>	PSO <sub>4</sub>	PSO <sub>5</sub>
CO										
CO <sub>1</sub>	3	2	3	2	2	3	2	1	-	3

**Text books:-**

**Reference books:-**

**Signature:-**

1. S.P. Suroto

2. Bolu

3. [Signature]

4. [Signature]

[Signature]



### **List of Journals**

Annals of Applied Biology - Cambridge University Press, London  
Annual Review of Phytopathology - Annual Reviews, Palo Alto, California  
Annual Review of Plant Pathology - Scientific Publishers, Jodhpur  
Canadian Journal of Plant Pathology - Canadian Phytopathological Society, Ottawa  
Indian Journal of Biotechnology - National Institute of Science Communication and Information Resources, CSIR, New Delhi  
Indian Journal of Mycopathological Research- Indian Society of Mycology, Kolkata.  
Indian Journal of Virology - Indian Virological Society, New Delhi  
Indian Phytopathology - Indian Phytopathological Society, New Delhi  
Journal of Mycology and Plant Pathology - Society of Mycology and Plant Pathology, Udaipur  
Journal of Phytopathology - Blackwell Verlag, Berlin  
Mycologia - New York Botanical Garden, Pennsylvania  
Mycological Research - Cambridge University Press, London  
Physiological Molecular Plant Pathology - Academic Press, London

PG Syllabus, Department of Plant Pathology, UBKV [17]  
Phytopathology - American Phytopathological Society, USA  
Plant Disease - The American Phytopathological Society, USA  
Plant Disease Research - Indian Society of Plant Pathologists, Ludhiana  
Plant Pathology - British Society for Plant Pathology, Blackwell Publ.  
Review of Plant Pathology - CAB International, Wallingford  
Virology- New York Academic Press e-Resources

[www.shopapspress.org](http://www.shopapspress.org)

[www.apsjournals.apsnet.org](http://www.apsjournals.apsnet.org)

[www.apsnet.org/journals](http://www.apsnet.org/journals)

[www.cabi\\_publishing.org](http://www.cabi_publishing.org)

[www.springer.com/life+Sci/agriculture](http://www.springer.com/life+Sci/agriculture)

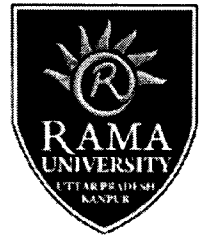
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[www.annual-reviews.org](http://www.annual-reviews.org)

### **Suggested Broad Topics for Masters and Doctoral Research**

Pathogenesis and characterization of plant pathogens  
Survey and surveillance  
Induction of resistance using biotic and abiotic elicitors  
Variability in plant pathogens  
Plant-Virus-Vector relationships  
Genome organization of plant pathogens



Dynamics of plant pathogen propagules and their biology  
Molecular tools in disease diagnosis  
Molecular mechanisms of pathogenesis in crops and seeds  
Rhizosphere in pathogenesis of seed-borne plant pathogens  
Transgenic resistance  
Development of disease prediction models in disease forecasting  
Integrated Disease Management  
Molecular Taxonomy of different plant pathogens  
Development of Rapid Diagnostic methods  
Development and Formulation of Improved Biocontrol Agent