

## Basic Information

**Course Code**

**Course Title**

Etiology of Plant Pathology

**Academic Year**

2022/2023

**Academic Program**

New Professional Diploma in Plant Clinic and  
Phytosanitary Technologies

**Hours/week**

Lectures: 1

Practical: 2 total: 2

**semester**

**Course Description:** This course is an introduction to plant pathology. Topics include: terminology; host-parasite interaction; introduction of plant diseases caused by: fungi, prokaryotes, viruses, parasitic higher plants, nematodes, flagellate protozoa and environmental factors.

### 1. Course Aims

1. To know the terminology of plant pathology, the development of the plant disease, the interaction between the host and the pathogen.
2. To be able to differentiate between plant diseases caused by different microbial groups, higher plants, nematodes, protozoa and different environmental factors.
3. To recognize the life cycle of the plant disease and the weak points in the cycle.
4. To be able to collect, preserve and identify plant diseases based on symptoms.
5. To be able to demonstrate Koch's postulates.

### 2. Intended Learning Outcomes

#### 2.1. Knowledge and Understanding

On successful completion of this course, the student should be able to:

- 2.1.1- Know the different symptoms and signs caused by each group of microbial pathogens.
- 2.1.2- Identify the plant pathogens both in the field and in the laboratory.
- 2.1.3- Recognize the symptoms of elements deficiency and various physical parameters that affect the plant health.
- 2.1.4- State the different methods used in plant pathology.
- 2.1.5- State the differences between systemic and localized infections.

#### 2.2. Intellectual Skills

By the end of this course, the student should be able to:

- 2.2.1- Use different sources (books, articles in journals and websites) for the identification of the pathogen.
- 2.2.2- Differentiate between the symptoms of different pathogenic groups (fungi, prokaryotes, algae, viruses, nematodes and protozoa).
- 2.2.3- Link between environmental factors and the outbreak of epidemics.
- 2.2.4- Determine the suitable means to detect, control and treat the different pathogenic agents

#### 2.3. Practical and Professional Skills

By the end of this course, the student should be able to:

- 2.3.1- Differentiate between healthy and diseased plants.
- 2.3.2- Differentiate between biotic and abiotic diseases.
- 2.3.3- Communicate with national and international researchers for information exchange and gain practical skills.

- 2.3.4- Gain the skills of examining the pathogen both in the field and in the laboratory and recognize the primary and the secondary infecting propagules.
- 2.3.5- Outline practical plans to control plant diseases on agricultural crops.
- 2.3.6- Isolate the pathogen in pure cultures and fulfill the Koch's postulates.

#### 2.4. General and Transferable Skills

By the end of this course, the student should be able to:

- 2.4.1- Writes and presents scientific reports.
- 2.4.2- Work independently or in a team.
- 2.4.3- Communicates with colleagues and the community.
- 2.4.4- Demonstrates self-learning and continuous capabilities to develop professional skills.

#### Course content

Topics	Total (hr)	Lectures (hr)	Practical (hr)
<b>Introduction to plant pathology; host-parasite interaction</b>	2	1	2
<b>Plant diseases caused by fungi-like (Myxomycetes and Straminopiles)</b>	2	1	2
<b>Plant diseases caused by fungi</b>	2	1	2
<b>Plant diseases caused by prokaryotes</b>	2	1	2
<b>Plant diseases caused by viruses</b>	2	1	2
<b>Plant diseases caused by parasitic higher plants</b>	2	1	2
<b>Plant diseases caused by nematodes</b>	2	1	2
<b>Plant diseases caused by flagellated protozoa</b>	2	1	2
<b>Environmental factors affected on plant diseases</b>	12	6	12
<b>Total</b>	28	14	28

#### Course Matrix for Achievement of Intended Learning Outcomes

	Topics	Hours	K & U					IS				P & PS						G & TS			
			1	2	3	4	5	1	2	3	4	1	2	3	4	5	6	1	2	3	4
1	Introduction to plant pathology; host-parasite interaction	2				√	√		√	√		√				√	√			√	√
2	Plant diseases caused by fungi-like	2	√	√		√			√	√	√	√	√	√							√
3	Plant diseases caused by fungi	2	√		√	√		√	√	√	√	√	√	√						√	√
4	Plant diseases caused by prokaryotes	2				√	√			√			√	√	√	√	√	√		√	√
5	Plant diseases caused by viruses	2			√	√	√	√	√	√	√	√			√	√				√	√
6	Plant diseases caused by parasitic higher plants	2	√		√	√		√	√	√	√	√	√					√	√		
7	Plant diseases caused by nematodes	2		√		√	√	√	√				√	√				√	√		
8	Plant diseases caused by flagellated protozoa	2	√	√		√		√	√		√		√	√	√	√	√	√	√		
9	Environmental factors affected on plant diseases	12	√	√	√			√	√		√			√	√	√	√	√	√	√	√

#### 4. Teaching and Learning Methods

Lectures:	Interactive lectures through: <ul style="list-style-type: none"> <li>▪ Teaching lectures to gain knowledge and understanding skills</li> <li>▪ Seminars</li> <li>▪ Group discussions</li> </ul>
Practical sessions:	<ul style="list-style-type: none"> <li>▪ Laboratory lessons (Practical sessions) to gain practical skills.</li> <li>▪ Field visits.</li> </ul>
Self-Learning activities:	<ul style="list-style-type: none"> <li>▪ Assays and scientific reports.</li> <li>▪ Analyze the results and reach specific conclusion.</li> <li>▪ Sample collection, preservation, examination and identification</li> </ul>

#### 5. Teaching and Learning Methods for Students of Limited Capabilities

- Special care during lectures and practical classes.
- Discuss their concerns and answer their questions during office hours.

6.1. Methods	6. Student Assessment			
	Intended Learning Outcomes Covered			
	KU	IS	PPS	GTS
Written exams	2.1.1/2.1.3/2.1.4/2.1.5	2.2.1/2.2.2/2.2.3/2.2.4	2.3.1/2.3.2/2.3.3/2.3.4/2.3.5	
Practical exams	2.1.1/ 2.1.2/2.1.3	2.2.3/2.2.4	2.3.1/2.3.2/2.3.3/2.3.4/2.3.5	2.4.2
Oral exams	2.1.1/2.1.2/2.1.3/2.1.4/2.1.5	2.2.1/2.2.2/2.2.3/2.2.4	2.3.1/2.3.2/2.3.3/2.3.4/2.3.5	2.4.1/2.4.2/2.4.3/2.4.4
Student activities	2.1.1/2.1.2/2.1.3/2.1.4/2.1.5	2.2.1/2.2.2/2.2.3/2.2.4	2.3.1/2.3.2/2.3.3/2.3.4/2.3.5	2.4.1/2.4.2/2.4.3/2.4.4

KU, knowledge and understanding; IS, intellectual skills; PPS, practical and professional skills; GTS, general and transferable skills

#### 6.2. Exam Description

Written exams	<ul style="list-style-type: none"> <li>▪ Short essays</li> <li>▪ Drawing</li> <li>▪ Multiple choice questions</li> <li>▪ Comparisons</li> <li>▪ Giving the scientific term</li> <li>▪ Complete sentences</li> </ul>
Practical exams	<ul style="list-style-type: none"> <li>▪ Identify pathogens by examining diseased plant samples, cultures and microscope slides.</li> </ul>
Oral exams	<ul style="list-style-type: none"> <li>▪ The exam committee involves at least 3 examiners</li> <li>▪ Each evaluates the student by giving a separate score</li> </ul>

	<ul style="list-style-type: none"> <li>▪ The scores are then averaged</li> <li>▪ The student randomly selects question cards</li> </ul>
Student activities	<ul style="list-style-type: none"> <li>▪ Self-learning activities are evaluated throughout the course.</li> </ul>

<b>6.3. Assessment Schedule</b>		<b>6.4. Weighing of Assessments</b>
<b>Exams and activities</b>	Week (in each semester)	<b>Total (%)</b>
Semester work exam	4 <sup>th</sup> , 8 <sup>th</sup> and 12 <sup>th</sup>	10
Student activities	Throughout the semester	10
Final written exam	15 <sup>th</sup>	50
Final Practical exam	15 <sup>th</sup>	20
Final oral exam	15 <sup>th</sup>	10
<b>Total</b>		<b>100</b>

## **7. List of References**

### **7.1. Course Notes**

Course notes will be given at the beginning of each lecture

### **7.2. Essential Books**

Agrios, G.N. 2005. Plant Pathology. 5th edition. Academic Press.

### **7.3. Recommended Books**

1. Alexopoulos, C.J., C.W. Mims and M. Blackwell. 1996. Introductory Mycology. 4th edition, John Wiley and Sons, Inc., New York, USA
2. Heitefuss R & Williams PH. 1976. Physiological Plant Pathology. Springer Verlag, Berlin, New York.
3. Khan, J.A. and J. Dijkstra. 2002. Plant Virus as Molecular Pathogens. The Haworth Press Inc. USA.
4. Mehrotra, R.S. and A. Agarwal. 2003. Plant Pathology. 2nd Edition. TATA McGraw Hill. Pub. Company Ltd. New Delhi.
5. Singh, R.S. 1982. Plant Pathogens: The Fungi. Oxford and IBH Publishing Company, New Delhi, India.
6. Singh, R.S. 1989. Plant Pathogens: The Prokaryotes. Oxford and IBH Publ. Company, New Delhi, India.
7. Singh RS. 2002. Introduction to Principles of Plant Pathology. Oxford & IBH, New Delhi.
8. Trigiano, R.N., M.T. Windham and A.S. Windham. 2008. Plant Pathology: Concepts and Laboratory Exercises. 2nd edition. CRC Press.
9. Vidhyasekram, P. 2004. Concise Encyclopedia of Plant Pathology. Food product Press and Haworth Press Inc. Binghamton, New York, USA.

### **7.4. Periodicals, websites, ..... etc.**

- Journal of Plant Disease
- Journal of Plant Pathology
- Canadian Journal of Plant Pathology
- Journal of phytopathology

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