Basic Information

Course Code		
Course Title	**Field diagnosis of plant disease caused by fungi**	
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 provides an update of field diagnosis of plant disease caused by fungi, the taxonomy of fungi, host specificity, and their diagnosis based on a molecular approach as a preliminary step towards developing or upgrading and sustainable diagnosis strategies.

1. Course Aims

1.1. Know symptoms of plant diseases caused by fungi.
1.2. Learn a field survey of plant diseases caused by fungi.
1.3. Understand preliminary diagnostic of fungal diseases in the field.
1.4. Know early conventional molecular fungal detection of plant diseases.
1.5. Aware of serological fungal detection assays of plant diseases.
1.6. Recognize taxonomy and field diagnosis of fungi caused diseases in some plants.

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 on plant organs caused by fungi.
2.1.2. List the field survey of fungal diseases.
2.1.3. Understand early and direct molecular detection of fungal diseases infected plants in the field.
2.1.4. Know serological fungal detection assays of plant diseases.
2.1.5. Recognize pathogenic effects and toxicity of fungi infected plants.

2.2. Intellectual Skills

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

2.2.1. Distinguish between symptoms on plant organs caused by fungi.
2.2.2. Recommend pathogenic effects and toxicity of fungi infected plants.
2.2.3. Evaluate the effective method for diagnosis of plant diseases caused by fungi.

2.3. Practical and Professional Skills

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

2.3.1. Deal with more symptoms caused by fungi, and how to diagnose them.
2.3.2. Use different methods to ensure the fungal agent caused the infection.
2.3.3. Estimate the taxonomy of phytopathogenic fungi caused diseases in plants.
2.3.4. Use different tools to know the pathogenicity and toxicity of fungi.

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	Lectures (hr)	Practical (hr)	Total (hr)
Common symptoms of plant diseases caused by fungi.	1	2	2
Fungal diseases of foliage, flower, fruit, root, crown and stem	1	2	2
Conducting a field survey of plant diseases caused by fungi.	1	2	2
Preliminary diagnostic equipment of plant diseases caused by fungi in the field.	1	2	2
Conventional fungal detection assays of plant diseases in the field.	1	2	2
Serological fungal detection assays of plant diseases in the field.	1	2	2
Early conventional molecular fungal detection of plant diseases.	1	2	2
Real-time PCR methods for quantify fungal pathogens.	1	2	2
Taxonomy and field diagnosis of fungi caused diseases in citrus trees.	1	2	2
Taxonomy and field diagnosis of fungi caused diseases of maize.	1	2	2
Taxonomy and field diagnosis of fungi caused diseases of grapevines.	1	2	2
Taxonomy and field diagnosis of fungi caused diseases of potatoes.	1	2	2
Detection of pathogenic effects of	1	2	2
Detection of toxicity of fungal strains.	1	2	2
Total	14	28	28

Course Matrix for Achievement of Intended Learning Outcomes

			K & U					I S				P & P S						G & T S			
	Topics	**Hours**	1	2	3	4	5	1	2	3	4	1	2	3	4	5	6	1	2	3	4
1	Common symptoms of plant diseases caused by fungi.	2				√	√		√	√		√				√	√			√	√
2	Fungal diseases of foliage, flower, fruit, root, crown and stem	2	√	√		√				√	√	√	√	√	√						√
3	Conducting a field survey of plant diseases caused by fungi.	2	√		√	√		√	√	√		√	√	√	√					√	√
4	Preliminary diagnostic	2				√	√				√			√	√	√	√	√		√	√

	equipment of plant diseases caused by fungi in the field.																			
5	Conventional fungal detection assays of plant diseases in the field.	2			√	√	√	√	√	√		√	√			√	√			√	√
6	Serological fungal detection assays of plant diseases in the field.	2	√		√	√		√	√	√		√	√	√	√			√	√		
7	Early conventional molecular fungal detection of plant diseases.	2		√		√	√	√	√	√				√	√			√	√		
8	Real-time PCR methods for quantify fungal pathogens.	2	√	√		√		√	√		√			√	√	√	√	√	√		
9	Taxonomy and field diagnosis of fungi caused diseases in citrus trees.	2	√	√	√			√	√		√				√	√	√	√	√	√	√
	Taxonomy and field diagnosis of fungi caused diseases of maize.	2	√		√	√	√	√	√				√	√			√	√	√		√
	Taxonomy and field diagnosis of fungi caused diseases of grapevines.	2	√		√	√	√	√	√				√	√			√	√	√		√
	Taxonomy and field diagnosis of fungi caused diseases of potatoes.	2	√	√		√		√	√		√			√	√	√	√	√	√	√	√
	Detection of pathogenic effects of	2	√	√		√		√	√		√			√	√	√	√	√	√	√	√
	Detection of toxicity of fungal strains.	2	√	√		√		√	√		√			√	√	√	√	√	√	√	√

4. Teaching and Learning Methods	
Lectures:	Interactive lectures through: ▪ Teaching lectures to gain knowledge and understanding skills ▪ Seminars ▪ Group discussions
Practical sessions:	▪ Laboratory lessons (Practical sessions) to gain practical skills. ▪ Field visits.
Self-Learning activities:	▪ Assays and scientific reports. ▪ Analyze the results and reach specific conclusion. ▪ Sample collection, preservation, examination and identification.

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	▪ Short essays ▪ Drawing ▪ Multiple choice questions ▪ Comparisons ▪ Giving the scientific term ▪ Complete sentences
Practical exams	▪ Identify pathogens by examining diseased plant samples, cultures and microscope slides.
Oral exams	▪ The exam committee involves at least 3 examiners ▪ Each evaluates the student by giving a separate score ▪ The scores are then averaged ▪ The student randomly selects question cards
Student activities	▪ Self-learning activities are evaluated throughout the course.

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

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. Khanchouch K., Pane A., Chriki A., Cacciola S. O. (2017). Major and Emerging Fungal Diseases of Citrus in the Mediterranean Region. DOI: 10.5772/66943
3. Plant Pathogens & Principles of Plant Pathology. ICAR e-Course, For B.Sc (Agriculture) and B.Tech (Agriculture).
4. Singh, R.S. 1982. Plant Pathogens: The Fungi. Oxford and IBH Publishing Company, New Delhi, India.
5. Burgess L. W., Knight T. E., Tesoriero L., Phan H. T. (2008). Diagnostic manual for plant diseases in Vietnam. Australian Centre for International Agricultural Research.
6. Mancini V., Murolo S., Romanazzi G. Diagnostic methods for detecting fungal pathogens on vegetable seeds. Plant Pathology (2016) 65, 691–703
7. Dayarathne M. C., Mridha A.U. and Wang Y. (2020). Diagnosis of Fungal Plant Pathogens Using Conventional and Molecular Approaches. DOI: 10.5772/intechopen.94980.

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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