Basic Information		
Course Code		
Course Title	Field diagnosis of plant disese caused by nemtodes	
Academic Year	2022/2023	
Academic Program	New Professional Diploma in Plant Clinic and Phytosanitary Technologies	
Hours/week	Lectures: 2	Practical: 2 total: 3
semester		

Course Description: This course introduces students to the field diagnosis of plant parasitic nematodes. To acquaint the students with basic and applied aspects of plant parasitic nematodes. Sampling, extraction, staining and identification of nematodes from soil and infected plant materials. Preparation of temporary and permanent slides to study morphological features of nematodes. Staining of nematodes and their egg masses in roots. Demonstration of nematode inflicted foliage and root symptoms.

1. Course Aims

1. To understand the morphology of nematodes as it relates to their taxonomic position and their ability to cause diseases of plants.
2. To Know the physiological functions of nematodes and their role in etiology of infections.
3. To understand the ecological factors that influence nematode populations and disease development.
4. To detect field diagnosis plant nematode symptoms
5. To aware soil and plant sampling
6. To recognize preparation of temporary and permanent slides to study morphological features of nematodes
7. To learn staining of nematodes and their egg masses in roots.
8. To describe demonstration of nematode inflicted foliage and root symptoms.
9. To describe the role of nematodes in disease complexes.
10. To manage the principles of controlling nematode diseases of 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- Mention the different species of nematodes their host plants
2.1.2- Understand the plant nematode symptoms
2.1.3- Know the study of morphological features of plant parasitic nematodes
2.1.4- Recognize the damage types caused by plant parasitic nematode on different crops
2.1.5- Lists the different methods used to detection and diagnoses of plant parasitic nematode

2.2. Intellectual Skills

By the end of this course, the student should be able to
2.2.1- Conclude the methods of identify nematode species affecting plants
2.2.2- Evaluate the appreciate methods for detect different genera of nematodes on agricultural crops
2.2.3- Assess the using of integrated nematode detection methods program

2.3. Practical and Professional Skills

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

2.3.1- Distinguish between the symptoms of various nematode genus and determine the time of their occurrence

2.3.2- Determine the seasons of outbreak of nematodes and how to reduce their damage

2.3.3- Utilize standard laboratory procedures and techniques in experimental applications in applied nematodes

2.3.4- Plans programs to manage nematodes on agricultural crops

2.4. General and Transferable Skills

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

2.4.1- Writes and presents specialized reports to explains different phenomena

2.4.2- Think independently, and solve problems on scientific basis

2.4.3- Communicates with colleagues and works in a research team

2.4.4- Identify roles, tasks, and set clear guidelines and performance indicators

2.4.5- Demonstrates self-learning and continuous capabilities to develop professional skills

2.4.6- Address the community linked problems with considerable attention to the community ethics and traditions

Course content

Topics	Total (hr)	Lectures (hr)	Practical (hr)
Introduction to plant-parasitic nematodes	2	1	2
The structure and organization of nematodes	4	2	4
Reproduction, development, and survival of plant-parasitic nematodes	4	2	4
Symptoms and signs of nematode infections	4	2	4
Diagnosis of nematode diseases	4	2	4
Sampling, extraction, staining and identification of nematodes from soil and infested plant materials	4	2	4
Detection and identification	2	1	2
Preparation of temporary and permanent slides to study morphological features of nematodes; Staining of nematodes and their egg masses in roots	2	1	2
Demonstration of nematode inflicted foliage and root symptoms.	2	1	2
Total	28	14	28

Course Matrix for Achievement of Intended Learning Outcomes

	Topics	Hours	K & U								I S								P & PS							G & TS			
			1	2	3	4	5	6	7	8	1	2	3	4	5	6	7	8	1	2	3	4	5	6	7	1	2	3	4
1	Introduction to plant-parasitic nematodes	2																											
2	The structure and organization of nematodes	4																											

3	Reproduction, development, and survival of plant-parasitic nematodes	4																										
4	Symptoms and signs of nematode infections	4																										
5	Diagnosis of nematode diseases	4																										
6	Sampling, extraction, staining and identification of nematodes from soil and infested plant materials	4																										
7	Detection and identification	2																										
8	Preparation of temporary and permanent slides to study morphological features of nematodes; Staining of nematodes and their egg masses in roots	2																										

9	Demonstration of nematode inflicted foliage and root symptoms.	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 reporting in different topics • Analyze the results and reach specific conclusion • Sample collection, preservation, examination and identification

5. Teaching and Learning Methods for Students of Limited Capabilities

- Additional revisions for previously taught and difficult topics
- Providing a summary for previous chapter at the end of each one
- Following up student feedbacks

6.1. Methods	6. Student Assessment			
	Intended Learning Outcomes Covered			
	KU	IS	PPS	GTS
Written 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		
Practical exams			2.3.1/2.3.2/2.3.3/2.3.4	
Oral exams		2.2.1/2.2.2/2.2.3		2.4.1/2.4.2/2.4.3/2.4.4/2.4.5/2.4.6
Student activities				2.4.1/2.4.2/2.4.3/2.4.4/2.4.5/2.4.6

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/information • Reasons for what comes
Practical exams	• Slideshow exams • Practical case studies • Exams on plants of the faculty farm
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 semester

	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

1. Agrios, G.N. 2005. Plant Pathology. 5th edition. Academic Press.
2. Bridge, J. and J.L. Starr. 2007. Plant Nematodes of agriculture

7.3. Recommended Books

1. Dropkin, H.V. 1980. Introduction to Plant Nematology. A Wiley-Interscience Publication, New York.
2. Hunt, D.J. 1993. Aphelenchida, Longidoridae and Trichodoridae: Their Systematics and Bionomics. CABI Publishing.
3. Noe, P. J. 2003. Plant-parasitic Nematodes. pp 61-67. In: Plant Pathology: Concepts and Laboratory Exercises. R. N. Trigiano, M. T. Windham, and A. S. Windham. (Eds.). CRC Laboratory Press, USA.
4. Noe, P.J. 2003. Pathogenicity and Isolation of Plant-parasitic Nematodes. pp 69-73. In: Plant Pathology: Concepts and Laboratory Exercises. R. N. Trigiano, M. T. Windham, and A. S. Windham. (Eds.). CRC Press, USA.
5. Saeed, M. 1990. Development of Phytonematology in Pakistan. pp 515-525. In: Progress in Plant Nematology. S. K. Saxena, A. Rashid, and R. M. Khan. (Eds.). CBS Publications Pvt. Ltd. Delhi.
6. Siddiqui, M.R. 2000. Tylenchida: Parasites of Plants and Insects. 2nd ed. Wallingford, CABI Publishing.

7.4. Periodicals, websites, ….. etc.
• Journal of plant disease • Journal of phytopathology • Journal of Nematology

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