Form: Course Syllabus	Form Number	EXC-01-02-02A
	Issue Number and Date	2963/2022/24/3/2 5/12/2022
	Number and Date of Revision or Modification	2/(10/12/2023)
	Deans Council Approval Decision Number	50/2023
	The Date of the Deans Council Approval Decision	26/12/2023
	Number of Pages	06

1.	Course title	Plant Nematology
2.	Course number	0606327
3.	Credit hours	3
	Contact hours (theory, practical)	3 Credit hours, 2 theory Tuesday and Thursday 8:30-9:30 , practical Thursday 11:30-2:30
4.	Prerequisites/corequisites	-
5.	Program title	X BSc ☐ MSc ☐ PhD in Plant Protection
6.	Program code	
7.	Awarding institution	The University of Jordan
8.	School	School of Agriculture
9.	Department	Plant Protection
10.	Course level	BSc
11.	Year of study and semester (s)	Second semester -2024/2025
12.	Other department (s) involved in teaching the course	-
13.	Main teaching language	English
14.	Delivery method	☐ Face to face learning **X** Blended ☐Fully online
15.	Online platforms(s)	XMoodle **X** Microsoft Teams ☐Skype ☐Zoom ☐Others……
16.	Issuing/Revision Date	25.02.2024

17. Course Coordinator:

Name: Dr. Luma Al Banna

Contact hours: **Mon** and Wednesday 8-9

OR by Appointment

Office number: 176

Phone number: 22530

Emaillalbanna@ju.edu.jo

18. Other Instructors:

Name:
Office number:
Phone number:
Email:
Contact hours:
Name:
Office number:
Phone number:
Email:
Contact hours:

19. Course Description:

Principles of plant nematology, taxonomic position, morphological and anatomical characteristics, biological activities, symptomology, economical damage, interaction with other disease agents, most important species of plant parasitic nematodes in Jordan, methods of control

20. Program Intended Learning Outcomes: (To be used in designing the matrix linking the intended learning outcomes of the course with the intended learning outcomes of the program)

A- Aims:

Students will learn basic nematode morphology and anatomy, disease cycle, and management of plant-parasitic nematodes

21. Course Intended Learning Outcomes: (Upon completion of the course, the student will be able to achieve the following intended learning outcomes)

A. Knowledge and Understanding: Student is expected to

A1. Know what are nematodes, their morphology, biology, and systematic

A2. Know what symptoms and signs do nematodes cause .

A3. Recognize how do nematode survive and spread.

A4. Understand the control measures that are used to manage plant nematode diseases

B. Intellectual Analytical and Cognitive Skills: Student is expected to

B1. Recognize methods used to isolate and identify nematodes.

B2. Evaluate different methods of control measures**.**

C. Subject- Specific Skills: Students is expected to

C1.Diagnose nematodes and distinguish them.

C2. Distinguish nematode symptoms in the plants.

D. Transferable Key Skills: Students is expected to

D1. Integrate different approaches for nematode disease management in the field.

D2. Work within a team

Program Learning Outcomes (PLOs)

1. Implementing advanced concepts and processes in various disciplines in plant protection.

2. Extracting information and research results in plant protection.

3. Planning, conducting and analyzing the results of scientific research.

4. Communicate effectively with supervisors and colleagues verbally and in writing.

5. Employing the acquired experience and skills in developing production, research and extension at various levels in the public and private sectors in Jordan and the world.

6. Participate efficiently in the scientific work team.

7. Publishing research in the field of plant protection in peer-reviewed scientific journals.

8. Commitment to the ethics and compliance responsibilities of being an agricultural engineer, especially in relation to the agricultural sector, environment and society

22. The matrix linking the intended learning outcomes of the course with the intended learning outcomes of the program:

PLOs / SLOs of the course	1	2	3	4	5	6	7	8	9
A1.Know what are nematodes, their morphology, biology, and systematics.	√								
A2. Know what symptoms and signs do nematodes cause (nematode pathology).	√								
A3. Recognize how do nematode survive and spread.	√								
A4. Understand the control measures that are used to manage plant nematode diseases				√					
B1. Recognize methods used to isolate and identify nematodes		√							
B2. Evaluate different methods of control measures					√				
C1.Diagnose nematodes and distinguish them.		√							
C2. Distinguish nematode symptoms in the plants		√							
D1 Integrate different approaches for nematode disease management in the field.					√				
D2 Work within a team							√	√	√

23. Topic Outline and Schedule:

Week	Lecture	Topic	Intended Learning Outcome	Learning Methods	Platform	Synchronous / Asynchronous Lecturing	Evaluation Methods	Resources
1	1.1	Introduction to Nematology	A1	Face to Face		Synchronous	Mid & final	1
	1.2	Introduction to Nematology	A1	Face to Face		Synchronous	Mid & final	1
2	2.1	Morphology of nematodes Cuticle	A1	Face to Face		Synchronous	Mid & final	1
	2.2	Digestive system	A1	Face to Face		Synchronous	Mid & final	1
3	3.1	Digestive system	A1	Face to Face		Synchronous	Mid & final	1
	3.2	Reproductive system	A1	Face to Face		Synchronous	Mid & final	1
4	4.1	Reproductive system	A1	Face to Face		Synchronous	Mid & final	1

	4.2	Excretory system	A1	Face to Face		Synchronous	Mid & final	1
5	5.1	Nervous system	A1	Face to Face		Synchronous	Mid & final	1
	5.2	History of Nematodes	A1	Face to Face		Synchronous	Mid & final	1,
6	6.1	Classification of nematodes	A1	Face to Face		Synchronous	Mid & final	1,2
	6.2	Types of nematode parasitism	A1	Face to Face		Synchronous	Mid & final	1,2
7	7.1	Nematicides	A4	Face to Face		Synchronous	Mid & final	1,2
	7.2	Biology, pathology management of plant parasitic nematodes Root Parasites A.Sedentary endoparasites (biology, pathology, management) 1.*Meloidogyne* spp.	A2-A4; B1-B2; C1-C2; D1-D2	Face to Face		Synchronous	Mid & final, Presentation	1-9
8	8.1	1.*Meloidogyne* spp. contd.	A2-A4; B1-B2; C1-C2; D1-D2	Face to Face		Synchronous	Mid & final, Presentation	1,2, 3,4,5
	8.2	2. *Globodera* and *Heterodera* spp	A2-A4; B1-B2; C1-C2; D1-D2	Face to Face		Synchronous	Final	1,2,6
9	9.1	2. *Heterodera* spp Contd	A2-A4; B1-B2; C1-C2; D1-D2	Face to Face		Synchronous	Final	1,2
	9.2	Midterm Thursday						
10	10.1	B.Sedentary ectoparasites 1. *Tylenchulus* spp. 2.*Rotylenchulus* sp	A2-A4; B1-B2; C1-C2; D1-D2	Face to Face		Synchronous	Final	1,2 ,8
	10.2	C.Migratory endoparasites 1. *Pratylenchus* spp. 2. *Radopholus* spp	A2-A4; B1-B2; C1-C2; D1-D2	Face to Face		Synchronous	Final	1,2,7
11	11.1	3. *Hirshmanniella* spp. 4. *Naccobus* spp	A2-A4; B1-B2; C1-C2; D1-D2	Face to Face		Synchronous	Final	1,2
	11.2	D. Migratory Ecto-parasite (biology, pathology, management) 1. *Tylenchus* spp 2. *Tylenchorhynchus* spp	A2-A4; B1-B2; C1-C2;	Face to Face		Synchronous	Final	1,2 ,

		3. *Belonolaimus* spp.	D1-D2					
12	12.1	4. *Criconemoides* sp 5. *Hemicycliophora* spp.	A2-A4; B1-B2; C1-C2; D1-D2	Face to Face		Synchronous	Final	1,2
	12.2	6. *Xiphinema* spp. 7. *Longidorus* spp. 8. *Trichodorus*	A2-A4; B1-B2; C1-C2; D1-D2	Face to Face		Synchronous	Final	1,2,9
13	13.1	E.Migratory Ecto-endo nematodes (biology, pathology, management) 1. *Helicotylenchus* spp. 2. *Rotylenchus* spp. 3. *Scutellonema* spp	A2-A4; B1-B2; C1-C2; D1-D2	Face to Face		Synchronous	Final	1,2
	13.2	Foliar nematodes (Biology, pathology, management) 1.*Ditylenchus* spp. 2.*Anguina* spp.	A2-A4; B1-B2; C1-C2; D1-D2	Face to Face		Synchronous	Final	1,2
14	14.1	3.*Aphelnchoides* spp. 4. *Rhadenaphelenchus* sp	A2-A4; B1-B2; C1-C2; D1-D2	Face to Face		Synchronous	Final	1,2
	14.2	5. *Bursaphelenchus* sp.	2-9	Face to Face		Synchronous	Final	1,2
15	15.1	Nematode –pathogen interaction	A1	Face to Face		Synchronous	Final	1,2,
	15.2	Insect parasitic nematodes	A!	Face to Face		Synchronous	Final	1,2

24. Evaluation Methods:

Opportunities to demonstrate achievement of the ILOs are provided through the following assessment methods and requirements:

Opportunities to demonstrate achievement of the SLOs are provided through the following assessment methods and requirements:

Evaluation Activity	Mark	Topic(s)	SLOs	Period (Week)	Platform
First Mid-Term Exam	20%	W1-w8	A2-A4; B1-B2; C1-C2; D1-D2	**9th week**	

Presentation	9%	W7-W14	D1	At the end of each topic	
Final Exam	35%	W1-W15 all topics	A2-A4; B1-B2; C1-C2; D1-D2	Will be announced from registrar	
Quizzes	3 %	W1-W15 all topics	A2-A4; B1-B2; C1-C2; D1-D2	At the end of each topic	
Lab Midterms open	5%	W1-W15 all topics	D1, C1-C2	**6th week**	
Lab Midterm closed	5%	W1-W15 all topics	A2, B1, C1-C2, D1	**9th week**	
Lab. Notebook	8%	All practical sessions	A2, B1, C1-C2, D1	Every Lab session	
Lab. Final Exam	15%	All practical sessions	A2, B1, C1-C2, D1	**Last week**	

25. Course Requirements:

(e.g.: students should have a computer, internet connection, webcam, account on a specific software/platform…etc.):

Students should have a computer, internet connection, and account on Microsoft teams to have access to course materials and some course activities.

26. Course Policies:

A- Attendance policies:
<15% , <20% with a permission ; medical report

B- Absences from exams and submitting assignments on time:

- **Assignments will not be accepted after deadline**
- **Absence of exams with a medical report must be submitted following regulations and a makeup exam will be scheduled within one week**

C- Health and safety procedures:

- **Mask must be worn all the time in class and lab**
- **Social distancing**

E- Grading policy: According to university regulations

From (%)	To (%)	Scale	Mark	Result
0	35	0	H	Fail
40	43	0.75	D-	Fail
44	50	1	D	Accepted
51	54	1.5	D+	Accepted
55	58	1.75	C-	Good
59	65	2	C	Good
66	69	2.5	C+	Good
70	73	2.75	B-	Very Good
74	80	3	B	Very Good
81	84	3.5	B+	Very Good
85	88	3.75	A^-	Excellent
89	100	4	A	Excellent

F- Available university services that support achievement in the course: Literature room and Data show, Teaching laboratory, etc.

27. References:

A- Required book(s), assigned reading and audio-visuals:
Main References:

1. Dropkin, V.H. 1989. Introduction to plant nematology. John Wiley & Sons. New York. 304

Other References:

2. Whitehead, A. G.1997. Plant Nematode Control CABI Publishing.
3. أبو غربية ، وليد. 1994. نيماتودا تعقد الجذور في الأردن. منشورات الجامعة الأردنية.
4. *Kayani*, M. Z., Mukhtar, T., & Hussain, *M. A.* (2012). Evaluation of nematicidal effects of *Cannabis sativa* L. and *Zanthoxylum alatum* Roxb. against root-knot nematodes, *Meloidogyne incognita*. Crop Protection, 39, 52–56. https://doi.org/10.1016/J.CROPRO.2012.04.005.
5. Khan, M. R., Mehboob, A., and U. Khan, U. 2010. Interaction Of The Entomopathogenic Nematode *Steinernema masoodi* And The Root-Knot Nematode *Meloidogyne Incognita* On Tomato Nematol. Medit. (2010), 38: 177-183 177
6. Kosuke S., Akiyama, R. Yuya Okamura Y.Ogawa, C., Masuda Y., Sakata I., , Bunta Watanabe B., et al. 2023. Solanoeclepin B, a hatching factor for potato cyst nematode.Sci. Adv.9,eadf4166(2023).DOI:10.1126/sciadv.adf4166
7. Rostad, H.E., Reen, R.A., Mumford, M.H., Zwart, R.S. & Thompson, J.P. (2022) Resistance to root-lesion nematode *Pratylenchus neglectus* identified in a new collection of two wild chickpea species (*Cicer reticulatum* and *C. echinospermum*) from Turkey. *Plant Pathology*, 71, 1205–1219. Available from: https://doi.org/10.1111/ppa.13544
8. Oliveira,C.,Inserra,R. & Desaeger,J.(2023). First Report of Direct Damage Caused by the Stubby-Root Nematode, *Nanidorus minor*, to Strawberry (*Fragaria x ananassa*), in Florida. Journal of Nematology,55(1) -. https://doi.org/10.2478/jofnem-2023-0016
9. Sandoval-Ruiz R. and Grabau Z. (2023) Reniform Nematanagement Using Winter Crop Rotation and Residue Incorporation Methods in Greenhouse Experiments. Journal of Nematology, Vol.55 (Issue 1), pp. -. https://doi.org/10.2478/jofnem-2023-0035

commended books, materials, and media:Videos In class and will be deposited on elearning

10.

- movie embryonic development
- Video nerves nematodesURL
- Video nematode movement URL
- website morphologyURL
- video historyURL
- MovieRoot knot nematode
- Dr Waleed RKN movie
- MovieRoot cystnematodeFile

- Movie Nematophaghus nematodes1File
- Movie Nematophaghus nematodes2File
- Soybean cyst nematodeURL
- website Pinewilt nematodeURL
- Video to manage nematodes on potatoURL
- Syngenta nematicidesURL
- nematicides in FloridaURL

28. Additional information:

Concerns or complaints should be expressed in the first instance to the module lecturer; if no resolution is forthcoming, then the issue should be brought to the attention of the module coordinator (for multiple sections) who will take the concerns to the module representative meeting. Thereafter, problems are dealt with by the Department Chair and if still unresolved the Dean and then ultimately the Vice President. For final complaints, there will be a committee to review grading the final exam.

Name of the Instructor or the Course Coordinator:	Signature:	Date:
……	……..……	……..……
Name of the Head of Quality Assurance Committee/ Department	Signature:	Date:
…….	……..……	……..……
Name of the Head of Department	Signature:	Date:
…….	……..……	……..……
Name of the Head of Quality Assurance Committee/ School or Center	Signature:	Date:
…….	……..……	……..……
Name of the Dean or the Director	Signature:	Date:
…….	……..……	……..……