The University of Jordan

الجامعة الاردنية

Form: Course Syllabus	Form Number	EXC-01-02-02A
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	The Date of the Deans Council Approval Decision	26/12/2023
	Number of Pages	06

1	Course title	Herbicides
2	Course number	0606452
3	Credit hours	3
	Contact hours (theory, practical)	2,1
4	Prerequisites/corequisites	Biology 1
5	Program title	BSc. In Plant protection
6	Program code	
7	Awarding institution	
8	School	School of Agriculture
9	Department	Department of Plant Protection
10	Level of course	Fourth
11	Year of study and semester (s)	
12	Other department (s) involved in teaching the course	
13	Main teaching language	English
14	Delivery method	X Face to face learning ☐Blended ☐Fully online
15	Online platforms(s)	☐Moodle ☐Microsoft Teams ☐Skype ☐Zoom ☐Others……
16	Issuing/Revision Date	March 08, 2024

17. Course Coordinator

Name: Dr. Wisam M. Obeidat

Office hours: Tuesday, and Thursday: 10:30 a.m.- 11:30 a.m.

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18. Other instructors:

Name: Eng. Ismail Ibrahim

Office hours:

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19 Course Description:

This course deals with herbicides, definition, relevant terminology, registration, storage, formulations, mixtures, herbicides classification, methods of application and consideration, chemical drift and managements, selectivity, mode and mechanism of action, persistence in the environment, fate of herbicides molecules and degradation, herbicides in the plants, herbicides in the soil, herbicides chemical groups, detailed chemical weed control in major crop groups including "cereals, vegetables and fruit trees", chemical control of noxious weeds.

20 Course aims and outcomes:

Program Learning Outcomes (PLOs):

Upon successful completion of this course, students will be able to:

1. Demonstrate a depth in understanding of the fundamental knowledge and skills required in the field of Plant Protection sciences, which include weeds, insects, mites, fungi, bacteria, viruses and nematodes.
2. Identify and distinguish harmful and beneficial weeds, insects, mites, fungi, bacteria, and nematodes.
3. Predict the outbreaks of pests and determine the level of infection based on skills gained in the field of Plant Protection Sciences.
4. Recognize different techniques (biological, chemical, cultural, and physical) in pest control.
5. Design and develop appropriate management strategies of pests in an environmentally friendly manner.
6. Participate efficiently in agricultural projects in the field of pest management in various public and private sectors in Jordan and worldwide.
7. Communicate effectively in written, oral, and graphical forms.
8. Employ the gained skills in communication and serving different communities.

Commit to ethics and compliance responsibilities for being an agricultural engineer, especially with regard to the agricultural sector, environment and society

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A- Aims:

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

B- Students Learning Outcomes (SLOs):

Upon successful completion of this course, students will be able to:

PLOs / SLOs of the course	1	2	3	4	5	6	7	8	9
1. Have an idea on the importance of herbicides in weed control. Be able to identify & categorize herbicides according to different classification methods, which enable students to know better these chemicals and the role they have on the environment and food production.	√	√							
2. Know the role of different ecological factors on the effectiveness of these herbicides and their fate in the environment. Able to control different weed species in different plants.	√	√			√				
3. Have an idea on the fate of herbicides in plants and soils. Familiarized with the available herbicides in Jordan's markets and in neighboring countries and their uses in weed control.	√	√	√		√				
4. Know the most used herbicides available locally. Get familiar with herbicides, and their uses and application for weed control in different crops and other uncultivated places. Students are familiar with all types of sprayers, parts, uses, and calibration.				√	√		√		√
5. Keep up to date with any progress in chemical weed control research and recent developments in herbicide development and methods of herbicides application.				√	√	√	√	√	√
6. Become familiar with all herbicides, equipment's and tools available in local markets and to farmers which used in weed control. Practice chemical weed control in the field.				√	√	√	√	√	√
7. Know on loss of herbicides molecules after application or persistence in the environment and management.				√	√	√	√	√	√
8. Know how to direct farmers in the field to achieve successful chemical weed control operations and safe application of the herbicides to farmers, and environment.				√	√	√	√	√	√
9. How to collect information and samples of herbicides, know all necessary information on their uses in different crops for different types of weeds, methods of application and requirements. Train farmers on herbicides application in their field and on uses of sprayers and tools.			√	√	√	√	√	√	

21. Topic Outline and Schedule:

Week	Lecture	Topic	Intended Learning Outcome	Learning Methods Face to Face (FF) Blended (B) Fully Online (FO)	Platform MS teams (MS) Moodle (M))	Lecturing Synchronous (S) Asynchronous (AS)	Evaluation Methods Assignment (A) Exam (E) Presentation (P) Quiz (Q) Report (R)	Resources
1	1.1	Introduction to course contents and requirements		FF	MS	S	E	1
	1.2	Herbicide definition, importance and , characteristics		FF	MS	S	E	1
2	2.1	Advantages and disadvantages of chemical weed control		FF	MS	S	E	1
	2.2	Herbicides mixtures and examples		FF	MS	S	E	1
3	3.1	Herbicides formulations and surfactants		FF	MS	S	E	1
	3.2	Herbicides classification		FF	MS	S	E	1
4	4.1	Herbicides selectivity		FF	MS	S	E	1
	4.2	Herbicides applications and requirements		FF	MS	S	E	1
5	5.1	Herbicides in the plants		FF	MS	S	E	1
	5.2	Herbicides in the plants		FF	MS	S	E	1
6	6.1	Herbicides in the soil		FF	MS	S	E	1

	6.2	Herbicides in the soil		FF	MS	S	E	1
7	7.1	Herbicides chemical groups		FF	MS	S	E	1
	7.1	Herbicides chemical groups		FF	MS	S	E	1
8	8.1	**Midterm Exam**						
	8.2	Chemical weed control in cereal crops		FF	MS	S	E	2
9	9.2	Chemical weed control in vegetable crops		FF	MS	S	E	2
	9.2	Chemical weed control in fruit trees		FF	MS	S	E	2
10	10.1	Chemical control of noxious weeds		FF	MS	S	E	2
	10.2	Chemical control of noxious weeds		FF	MS	S	E	2
11	11.1	Herbicides Selectivity		FF	MS	S	E	2
	11.2	Herbicides: Formulations, surfactants		FF	MS	S	E	2
12	12.1	Herbicides: Formulations, surfactants		FF	MS	S	E	2

	12.2	Herbicide behaviour in soil and plants		FF	MS	S	E	2
13	13.1	Herbicide behaviour in soil and plants		FF	MS	S	E	2
	13.2	Herbicides: Chemical groups		FF	MS	S	E	2
14	14.1	Herbicides: Chemical groups		FF	MS	S	E	2
	14.2	Herbicide Resistance and its Management		FF	MS	S	E	2
Final Exam based on university schedule								

21. LABORATORY OUTLINE

Week	Topic	Intended Learning Outcome	Learning Methods Face to Face (FF) Blended (B) Fully Online (FO)	Platform MS teams (MS) Moodle (M))	Lecturing Synchronous (S) Asynchronous (AS)	Evaluation Methods Assignment (A) Exam (E) Presentation (P) Quiz (Q) Report (R)	Resources
1	Introduction to the lab and requirements		FF	MS	S	E	1
2	Herbicides samples, formulations, lables and technical bulletins, surfactants		FF	MS	S	E	1
3	Sprayers and spreaders, types and their parts		FF	MS	S	E	1

4	Sprayers calibration		FF	MS	S	E	1
5	Application of general and selective herbicides in cropped and non-cropped area		FF	MS	S	E	1
6	Application of contact and translocated herbicides of different types		FF	MS	S	E	1
7	Pre-transplanting soil applied herbicides		FF	MS	S	E	1
8	Post emergence applied herbicides		FF	MS	S	E	1
9	Control of noxious perennial weeds		FF	MS	S	E	1
10	General weed control in non-cropped area		FF	MS	S	E	1
11	Weed control in fruit trees with different herbicides		FF	MS	S	E	1
12	Evaluation of herbicides treatments		FF	MS	S	E	1

22. Teaching Methods and Assignments:

Development of ILOs is promoted through the following teaching and learning methods:

Learning through lectures, field trips, practical part of this course and laboratory work, weed samples collection, slides on weed species in farm land and natural habitats, literature review, all weed species samples and information on each species are displayed in the laboratory.

23. Evaluation Methods and Course Requirements:

Homework, Quiz, Exam, pre-lab quiz…etc
Each student is required to collect and process certain number of common weed species in agricultural land. Complete information is required on each species. Most recent literature on these species should be consulted. Students are asked to submit a lab reports on each exercise practiced during the laboratory session. Weed collection should be submitted by the end of the semester and before the final exam.

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

Evaluation Activity	Mark	Topic(s)	Period (Week)	Platform
Mid. Term Exam (end of modules 1)	20		6-7th week	
Lab Mid Exam	10			
Notebook	3			
Assignment	2			
Lab. Reports	5			
Quizzes or other suggested alternative activity	5		Weakly expected, up to 3 quizzes but the highest 2 are considered	
Students' seminar	5			
Lab Final Exam	10			
Presentations	5			
Final Exam (theoretical and practical)	35		As scheduled by the university	

24. 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**

D- Honesty policy regarding cheating, plagiarism, misbehavior:

E- Grading policy:

From (%)	To (%)	Scale	Mark	Result
0	38	0	H	Fail
39	41	0.75	D-	Fail
42	47	1	D	Accepted
48	50	1.5	D+	Accepted
51	53	1.75	C-	Good
54	59	2	C	Good
60	62	2.5	C+	Good
63	65	2.75	B-	Very Good
66	71	3	B	Very Good
72	74	3.5	B+	Very Good
75	80	3.75	A^-	Excellent
81	100	4	A	Excellent

F- Available university services that support achievement in the course:

25. Required equipment: (Facilities, Tools, Labs, Training….)

Class room equipped with Smart board and computer, Teaching Lab with fresh and dry samples of weeds, sprayers and calibration tools.

26. References:

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5. Fletcher, W.W. and Kirkwood R.C. (1982). *Herbicides and Plant Growth Regulators.* Granada, London, PP. 93-99.
6. Foy, C.L. and Pritchard, D.W. (eds.). (1996). *Pesticide Formulation and Adjuvant Technology*. CRC Press, Boca Raton, Florida.
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8. Hance, R.J. (1980). *Interaction between Herbicides and the Soil*. Academic Press. London
9. Hatfield, J.L., Buhler, D.D. and Stewart, B.A. (eds.). (1998). *Integrated Weed and Soil Management.* Sleeping Bear Press. USA.
10. Hatzios, K.K. and Penner, D. (1982). *Metabolism of Herbicides in Higher Plants*. Burgess Publishing, Minneapolis.
11. LeBaron, H.M. and Gressel, J. (eds.). (1982). *Herbicide Resistance in Plants*. John Wiley & Sons. New York, USA.
12. McWhorter, C.G., and Gebhardt, M.R. (eds.). (1987). Methods of Applying Herbicides. No. 4, *Monograph Series of the Weed Science Society of America*, Lawrence, Kansas.
13. Powles, S.B. and Holtum, J.A.M. (eds.). (1994). *Herbicide Resistance in Plants. Biology and Biochemistry*. Lewis Publishers, Boca Raton, Florida.
14. Qasem, J.R. (2003). *Weeds & their Control*. Deanship of Academic Research, University of Jordan, Amman, Jordan. 628 PP. (Reference in Arabic).
15. Schnoor, J.L. (1992). *Fate of Pesticides and Chemicals in the Environment*. John Wiley-Interscience, New York.
16. Weed Science Society of America. (1979). *Herbicide Handbook*. 4th Edition. Champaign, IL.
17. Weed Science Society of America.(1994) *Herbicide Handbook,* 7th Edition. K.S. Lawrence.

27. Additional information:

Name of Course Coordinator: Dr. Wisam Obeidat-Signature: ---------- Date: March 08, 2024

Head of Curriculum Committee/Department: ---------- Signature: ----------

Head of Department: ---------- Signature: ----------

Head of curriculum committee/Faculty: ---------- Signature: ----------