

## Basic Information

**Course Code**

**Course Title**

**Weed biology and control**

**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 examination and discussion of the various components related to the biology/ecology and management of weeds in both crop and non-crop ecosystems. Formal lectures, as well as slides, videos, web-based resources, field trips, and hands-on laboratory sessions, are used to present and facilitate the learning of course material. The first part of the course focuses on those biological/ecological factors that govern seed dormancy, plant growth, population dynamics, competitiveness, reproduction, and survival. Close attention is given to the accurate identification of plants and to characteristics that make weeds particularly competitive and/or undesirable in a given environment. The second part of the course examines the various strategies that are currently being employed to control weeds in different habitats including their benefits and drawbacks. Important aspects of chemical control including classification, mode of action, selectivity, symptomology, and resistance will also be presented. The use of integrated approaches to weed management in different ecosystems is explored. Controversial issues related to the adoption of herbicide tolerant crops (i.e. GMO's) as well as to the health and environmental concerns over herbicide use will be presented and discussed.

### 1. Course Aims

By the end of this course, the student should be

1. Be able to identify and understand the major biological factors and ecological principles that influence weed growth, population dynamics, invasiveness, and survival.
2. Become familiar with the various strategies currently being used to control and/or suppress weeds in different crop and non-crop systems..
3. Become familiar with the classification, mode of action, selectivity, and symptomology of commonly used herbicides.
4. Be able to calculate and apply the appropriate amount of a given herbicide that is required to treat a specific area using a backpack sprayer.
5. Be able to appreciate the diversity and impact that weeds have in different ecosystem.
6. To Develop weed management programs for common weeds in both urban landscape and agricultural crop settings.
7. To Describe future challenges facing weed management, including but not limited to social expectations, herbicide resistance, and economics.

### 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 groups of weed plants their host plants
- 2.1.2- Understand weed identification and why understanding life cycle and classification matters.
- 2.1.3- Know Weed reproduction, dispersal, and germination.

- 2.1.4- Recognize Weed ecology and interferences with crops  
 2.1.5- Lists the different methods used to detection and diagnoses of weed plant

### 2.2. Intellectual Skills

- By the end of this course, the student should be able to
- 2.2.1- Conclude the methods of identify weed affecting plants  
 2.2.2- Evaluate the appreciate methods for detect different weed plant on agricultural crops  
 2.2.3- Evaluation of the use of an integrated program to reduce the spread of weed plants on economic crops

### 2.3. Practical and Professional Skills

- By the end of this course, the student should be able to
- 2.3.1- Analysis and interpretation of herbicide label.  
 2.3.2- Observe and dissect various weed vegetative parts under dissecting scope. Plant various  
 2.3.3- Utilize alternative weed control techniques based on published papers.  
 2.3.4- Plans programs to manage weeds 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 percentage of infection and the actual disease severity  
 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)
Course introduction, weed definition, and significance. Noxious and invasive weed species. What makes a plant a weed?	2	1	2
Discuss weed identification and why understanding life cycle and classification matters.	4	2	4
Weed reproduction, dispersal, and germination.	4	2	4
Weed ecology and interferences with crops.	4	2	4
Overview of weed control methods: prevention, mechanical control, cultural practices, biological control, and chemical control	4	2	4
Herbicide chemistry and modes of action and behavior in soil and plants.	4	2	4
Weed control programs in row crops	2	1	2
Weed control programs in specialty crops, ornamentals, and aquatic sites.	2	1	2
Weed control programs in turfgrass, pastures, and rangeland	2	1	2
Total	28	14	28

### 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 reporting in different topics</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**

- 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	<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/information</li> <li>• Reasons for what comes</li> </ul>
Practical exams	<ul style="list-style-type: none"> <li>• Inclusion bodies slideshow exams</li> <li>• Practical case studies</li> <li>• Exams on plants of the faculty farm</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> <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 semester</li> </ul>

<b>6.3. Assessment Schedule</b>	<b>6.4. Weighing of Assessments</b>
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<b>Exams and activities</b>	<b>Week (in each semester)</b>	<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**

- Anderson, W.P. 1996. Weed Science: Principles and Applications. Third Edition. West Publishing, Minneapolis/St.Paul. 388 p.
- Aldrich, R.J. & R.J. Kremer. 1997. Principles in Weed Management. Second Edition. Iowa State University Press, Ames, Iowa. 455 p.
- Bouchard, C.J. & R. Néron. 1999. Identification Guide to the Weeds of Quebec. CPVQ, Québec, Canada. 253 pp. [available for purchase from instructor].
- DiTommaso, A. & A.K. Watson. 2003. Weed Identification, Biology and Management. Software program. McGill University. Montréal, Québec, Canada.
- Liebman, M., C.L. Mohler & C.P. Staver. 2001. Ecological Management of Agricultural Weeds. Cambridge University Press, Cambridge, U.K. 532 p.
- Radosevich, S.R., J.S. Holt & C. Ghersa. 2007. Ecology of Weeds and Invasive Plants: Relationship to Agriculture and Natural Resource Management. Third Edition. John Wiley & Sons, New York. 454 p.
- Ross, M.A. & C.A. Lembi. 2008. Applied Weed Science: Including the Ecology and Management of Invasive Plants. Third Ed. Pearson Education, 576 p

### **7.3. Recommended Books**

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

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

- Journal of plant disease
- Journal of phytopathology
- International Journal of Virology

#### **Course coordinator:**

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#### **Head of Department:**

Prof. Dr.