

Course Unit	Plant Protection and Biocontrol		Field of study	Plant Protection	
Bachelor in	Agronomic Engineering		School	School of Agriculture	
Academic Year	2022/2023	Year of study	2	Level	1-2
Type	Semestral	Semester	2	ECTS credits	6.0
Code	9086-307-2204-00-22				
Workload (hours)	162	Contact hours	T 30	TP -	PL 30
			TC -	S -	E -
			OT 20	O -	

T - Lectures; TP - Lectures and problem-solving; PL - Problem-solving, project or laboratory; TC - Fieldwork; S - Seminar; E - Placement; OT - Tutorial; O - Other

Name(s) of lecturer(s) Álvaro José Lopes César

### Learning outcomes and competences

At the end of the course unit the learner is expected to be able to:

1. Knowing and understanding the mechanisms of toxicity, absorption, distribution and biotransformation of toxic substances.
2. Knowing the principles of integrated plant protection under the crop protection and agricultural production.
3. Knowing toxicological and ecotoxicological characteristics of pesticides. Knowing the aspects of legal standards and safety requirements for marketing, transportation and handling of pesticides.
4. Know and be able to select the most appropriate control methods, for use in every situation, so responsible and safe for the user, consumer and environment.

### Prerequisites

Before the course unit the learner is expected to be able to:

Students must have knowledge in biology, plant physiology and plant health.

### Course contents

Toxicology of xenobiotics. The crop protection. Concept of integrated plant protection The methods to control the enemies of cultures. Importance of control methods. Side effects, advantages and limitations of control methods. Chemical control; application of pesticides. Toxicology and ecotoxicology of pesticides. Legal and security aspects important for marketing, transportation and handling of pesticides. Soil solarization. Biological control. Other methods to control crop enemies.

### Course contents (extended version)

1. General principles of toxicology.
  - Absorption, distribution and biotransformation of toxic substances.
  - Mechanisms of toxicity, evaluation of toxicities of toxic substances.
2. The agricultural production and harmful enemies of crops. Integrated plant protection.
3. The components of integrated protection. Advantages of integrated plant protection.
4. Control methods and its importance against the crops enemies. Side effects of the control methods.
5. Chemical control. Toxicology and ecotoxicology of pesticides Fundamental concepts.
  - Formulation of pesticides. Composition. Classification of pesticides.
  - Routes of penetration of pesticides. Modes of action of pesticides.
  - Effectiveness. Persistence.
  - Toxicity. Maximum residue limit Range safety. Re-entry interval.
  - Side effects. Security and trade, transportation and handling of pesticides.
  - Techniques and equipment for applying pesticides.
6. Soil solarization.
  - Description of the method. Enemies fought. Cultures in which it is used.
  - Mechanisms involved. Side effects. The advantages and limitations.
7. Biological control.
  - Importance of organisms used in biological control against crop enemies, including the arthropods.
  - Predator and parasitoid insects, predator mites, entomopathogenic bacteria, viruses, fungi.
  - Life cycle. Enemies to fight. Advantages, limitations and care in their use in crop protection.
  - Side effects.
  - Other organisms used in biological control in crop protection.
8. Other tools used in crop protection.

### Recommended reading

1. Amaro, P. 1982. Introdução à protecção integrada. Lisboa 276 pp.
2. Driesche, R. 1996. Biological Control. Chapman & Hall. 539 pp.
3. Howes, P. 1998. Insect pheromones and their use in pest management. Chapman & Hall, 369 pp.
4. Klaassen, Curtis D.; Watkins, B., John, 2001. Toxicologia A Ciência Básica dos Toxicos De Casarett & Doull's. Mcgraw-Hill de Portugal, Lda. 5ª Edição, 864 pp.
5. Matthews, G & Thornhill, E. 1994. Pesticide application equipment for use in agriculture. Vol. I, II Manually carried equipment. FAO, Rome. 160pp, 140pp.

### Teaching and learning methods

Lectures and practical classes in laboratories, field. Literature search or documentary for drafting work.

### Assessment methods

1. Alternative 1- Final Written Exam - 100% - (Regular, Student Worker) (Final)
2. Alternative 2 - Final Written Exam - 100% - (Regular, Student Worker) (Supplementary, Special)

### Language of instruction

Portuguese

### Electronic validation

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13-12-2022	20-12-2022	20-12-2022	20-12-2022