

Bachelor in Forestry and Natural Environment Engineering

Course information

Year 2020-21

GENERAL SPECIFICATIONS				
English name				
Integrated Pest Management				
Spanish name				
Control Integrado de Plagas				
Code		Type		
606510302		Optativo		
Time distribution				
	Total	In class	Out class	
Working hours	112,5	45	67.5	
ECTS:				
Standard group		Small groups		
	Classroom	Lab	Practices	Computer classroom
2.9		1.1	0.5	
Departments		Knowledge areas		
Agroforestry Sciences		Environmental Technologies		
Year		Semester		
4º		2º		

TEACHING STAFF			
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SPECIFIC INFORMATION OF THE COURSE
1. Contents description
1.1. In English:
<ul style="list-style-type: none"> • Insect population dynamic. • Silvicultural , biological and chemical treatments: Integrated control in forested areas
1.2. In Spanish
<ul style="list-style-type: none"> • Dinámica de poblaciones de insectos. • Tratamientos selvícolas, biológicos y químicos: Control integrado en áreas forestales.
2. Background
2.1.Situation within the Degree:
<p>Integrated Pest and Disease Control in Forestry is an elective course in the fourth year, which is based on other basic and complementary subjects, such as plant anatomy and physiology, zoology and forest fauna, climatology and edaphology, ecology, botany, forestry and reforestation, forest management, etc. It is the logical continuation of the compulsory subject "Forest's pests and diseases ".</p>

2.2. Recommendations:

3. Objectives (as result of teaching):

The general objective of this course is to incorporate Integrated Pest Management into the management tools that the Forestry and Natural Environment Engineer must use in his professional activity.

For the achievement of this particular objective it is necessary:

- To provide the methodological basis for linking the causes of forest pests and diseases and their epidemiological development
- Describe methods for measuring and analysing the density of pests and diseases and their impact on forest resources.
- Establish evaluation criteria for the different population situations, to be applied in the management of forest pests and diseases.
- Know and analyse the types of pest control: biological, chemical, physical, mechanical and forestry control.

Achieving these objectives as learning outcomes ensures that students have the ability to solve problems, make decisions, apply knowledge in practice, work in teams, analyse and synthesise (G01,G02,G04,G05,G07). These objectives also enable students to transmit information, ideas, problems and solutions to a specialized and non-specialized audience (CB4).

4. Skills to be acquired

4.1. Specific Skills:

4.2. General Skills:

Achieving these objectives as learning outcomes ensures that students have the ability to solve problems, make decisions, apply knowledge in practice, work in teams, analyse and synthesise (G01,G02,G04,G05,G07). These objectives also enable students to transmit information, ideas, problems and solutions to a specialized and non-specialized audience (CB4).

5. Training Activities and Teaching Methods

5.1. Training Activities:

- Theory Sessions on the contents of the Program.
- Troubleshooting Sessions.
- Practical Sessions in Specialized Laboratories or in Computer Science Classrooms.
- Field Sessions to approach the Industrial reality

5.2. Teaching Methods:

- Participatory Master Class.
- Development of Internships in Specialized Laboratories or Computer Classrooms in small groups.
- Development of Field Practices in small groups.

- Problem Solving and Practical Exercises.
- Individual or Collective Tutoring. Direct teacher-student interaction.
- Conferences and Seminars.
- Evaluations and Exams.

5.3. Development and Justification:

The didactic method used will be the main lesson, because although the number of students is expected to be relatively low, the teaching load of the subject is not very high, so it is essential to have a good preparation of the classes and a perfect organization of the teaching. This activity strengthens the general competencies G01, G02 and G07.

However, this teaching method will be completed with the debate, so that the students are involved in the preparation and defence of a specific subject. This subject is eminently technical, in other words, it is based on learning for decision making and for medium and long-term planning. In general, this type of practice is intended to enable students to interact strongly with the content, to relate it to previous knowledge, to draw conclusions and to understand the activity they carry out.

Troubleshooting techniques and algorithmic processes shall be employed. Before each class, the teacher will deliver the problem statements and the material necessary for their resolution: theoretical explanations, tables, formulas, etc., as well as the objectives of the topic and the recommended bibliography. This makes it possible for the student to try to solve problems before going to class. In this activity we will work on the competencies G01, G02, G04, G05 and G07.

Seminars, exhibitions and debates: The aim of the seminars is to bring students closer to the current problems related to the discipline. For this purpose, professionals will participate in the work related aspects of forest health and forest fires, whether they belong to the administration or to the private company. Emphasis will be placed on contrasting, through discussion, the issues raised in the seminars with those already addressed in the theoretical and practical classes, in order to encourage cognitive conflict.

Field sessions: During the field trip, technical visits will be made to areas of special interest (either because they lack them in our immediate surroundings or because of their intrinsic value), where the technical staff in charge of their management will give explanations on the most significant aspects.

Work in small groups: Given the social relevance of the problems related to forest health, and the need to provide explanations or public reports in which forest technicians sometimes find themselves, this activity is intended for students to prepare, in groups, a brief expository material related to forest pathology, and specifically on a specific pathology. This activity aims to encourage and deepen the capacity to process specific information and syntheses for the presentation of the problem addressed, from the point of view of the technical point of view, in a clear and brief manner. This training activity brings to fruition the general competence (G20), which is defined in the terms "ability to work in multidisciplinary teams", since each of the members of the team contributes different points of view, as well as the basic competence (CB4), since they have to demonstrate their ability to transmit information on the subject matter. With this activity we work on the acquisition of transversal competences (T01 and T02), as well as some general ones such as G07 and Basic ones such as CB4.

6. Detailed Contents:

TOPIC 1: INTEGRATED PEST MANAGEMENT CONCEPTS (IPM)

1.1 The origin and historical evolution

1.2.- Definition of concepts

1.3.- Objectives of Integrated Pest Management (IPM)

1.4.- Advantages and disadvantages of integrated pest management (IPM)

TOPIC 2: ECOLOGY OF FOREST INSECTS AND FUNGI

- 2.1.- Ecology of forest insects
- 2.2.- Components of the Population System
 - 2.2.1.- Properties of individuals
 - 2.2.2.- Properties of the medium
 - 2.2.3.- Population processes
 - 2.2.4.- Status and conditions of the population
- 2.3.- Factors that determine population changes

TOPIC 3: MONITORING OR SAMPLING

- 3.1.- Definition of concepts
- 3.2.- Visual inspections
- 3.3.- Pheromone traps
- 3.4.- Capture traps by physical means

TOPIC 4: DECISION-MAKING

- 4.1.- Considerations prior to treatment
 - 4.1.1.- Definition of Forest stands
 - 4.1.2.- Definition of Tolerance Threshold
- 4.2.- Damage assessment
 - 4.2.1.- Economic evaluation
 - 4.2.2.- Bio-ecological assessment
 - 4.2.3.- Evaluation of social factors
- 4.3.- Criteria for the choice of treatment

TOPIC 5: PREVENTIVE MEASURES AND NATURAL CONTROL

- 5.1.- Preliminary considerations
- 5.2.- Forestry practices
 - 5.2.1.- Establishment of the mountain
 - 5.2.2.- Mountain growth
- 5.3.- Mechanical or physical methods
 - 5.3.1.- Habitat destruction
 - 5.3.2.- Habitat modification

TOPIC 6: CHEMICAL CONTROL

- 6.1.- Introduction
- 6.2.- Phytosanitary products
 - 6.2.1.- Definition, classes and properties
 - 6.2.2.- Types of insecticides
 - 6.2.3.- Forms of application

TOPIC 7: TERRESTRIAL TREATMENTS

- 7.1.- Introduction
- 7.2.- Manual land treatments
 - 7.2.1- Endotherapy
 - 7.2.2- Installation of mass traps
 - 7.2.3- Installation of nests
- 7.3.- Mechanized land treatments

TOPIC 8: AERIAL TREATMENTS

- 8.1.- Conditions for execution
- 8.2.- Parameters that determine the quality of execution
- 8.3.- Cost estimates

TOPIC 9: BIOLOGICAL CONTROL

- 9.1.- Definition of concepts
- 9.2.- Biotechnical methods
- 9.3.- Biological methods

9.4.- Analysis of cases

9.4.1.- *Rhyacionia buoliana*

9.4.2.- *Gonipterus scutellatus*

9.4.3.- *Phoracantha semipunctat*

THEME 10: LEGISLATIVE MEASURES

10.1.- Introduction

10.2.- Quarantines

10.3.- Repression and suspension.

10.4.- Laws and regulations concerning forest pests and diseases

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INTERNSHIP PROGRAM

Practice 1: Introduction to IPM and forest insect population dynamics

Practice 2: Analysis and assessment of the phytosanitary status of forest stands

Practice 3: Terrestrial treatments

Practice 4 Aerial treatments

Practice 5: Pheromone treatments and bait trees

7. Bibliography

7.1. Basic Bibliography

- BERRYMAN, A.A. (1986). FOREST INSECTS. PRINCIPLES AND PRACTICE OF POPULATION MANAGEMENT. PLENUM PRESS. NEW YORK. 279 PP.
- COULSON, R.N.; WITTER J.A. (1990). ENTOMOLOGÍA FORESTAL. ECOLOGÍA Y CONTROL. LIMUSA. MÉJICO. 751 PP.

7.2. Additional Bibliography:

8. Systems and Assessment Criteria

8.1. System for Assessment:

- Theory/problem examination
- Practice Defense
- Individual Student Tracking
- Practice exam

8.2. Assessment Criteria and Marks:

The continuous evaluation will consist of a theoretical part and a practical part.

The theoretical part will be evaluated by means of two tests that will make up 60% of the final mark. This test will may contain test, short or developmental questions.

The practical part will be evaluated by:

1. The completion of a practical case that will account for 30% of the grade.
2. The defence of the work carried out from the laboratory practices, which will represent 10% of the mark.

Once the course has been passed, the amount obtained from the individual monitoring of the student can be added up to maximum of 1.0 pts.

With the theoretical examination the evaluation of the acquisition of the basic contents is guaranteed to ensure the acquisition of basic and general skills. The practical test assesses the general competencies (G01, G02, G04, G05 and G07).

Transversal competences are implicitly assessed both in the previous work and in the assessment of the activities carried out by the student throughout the course (CT6 and CT1)

The CB4 competence is evaluated in the practical sessions in the presentation of the solution of the practical cases proposed by the teacher and in the student's response to questions that may be asked by their peers.

The final single evaluation will consist of an examination consisting of a theoretical part and a practical part. The first one will be made up of multiple choice and open questions. It will be 60 % of the grade. The practical part will consist of the resolution of a practical case that will account for 40% of the final grade.

The matriculation or honorary registration available according to quota, will be granted to the students with the highest final grade and always equal or higher than 9 in the ordinary I.