

# Bachelor in Forestry and Natural Environment Engineering

## Course information

Year 2019-20

GENERAL SPECIFICATIONS				
<b>English name</b>				
Integrated Control of Forest Pests and Diseases.				
<b>Spanish name</b>				
Control Integrado de Plagas y Enfermedades Forestales				
<b>Code</b>		<b>Type</b>		
606510302		elective		
<b>Time distribution</b>				
	<b>Total</b>	<b>In class</b>	<b>Out class</b>	
Working hours	112.5	45	67.5	
<b>ECTS: 4.5</b>				
<b>Standard group</b>		<b>Small groups</b>		
	<b>Classroom</b>	<b>Lab</b>	<b>Practices</b>	<b>Computer classroom</b>
<b>2.9</b>		1.1	0.5	0
<b>Departments</b>		<b>Knowledge areas</b>		
Agroforestry Sciences		Environmental Technologies		
<b>Year</b>		<b>Semester</b>		
4º		2º		

TEACHING STAFF			
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SPECIFIC INFORMATION OF THE COURSE
<b>1. Contents description</b>
1.1. In English:
<ul style="list-style-type: none"> <li>Insect population dynamic.</li> <li>Silvicultural , biological and chemical treatments: Integrated control in forested areas</li> </ul>
1.2. In Spanish
<ul style="list-style-type: none"> <li>Dinámica de poblaciones insectos.</li> <li>Tratamientos selvícolas, biológicos y químicos: Control integrado en áreas forestales.</li> </ul>
<b>2. Background</b>
2.1.Situation within the Degree:
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 ".
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:

CB4: That the students can transmit information, ideas, problems and solutions to an audience as much as possible specialized as well as non-specialized

G01: Troubleshooting capability

G02: Decision-making capacity

G04: Ability to apply knowledge in practice

G05: Ability to work in a team

G07: Capacity for analysis and synthesis

T01: Use and mastery of a second language.

T02: Knowledge and improvement in the field of ICTs

### 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: TREATMENTS I: 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: TREATMENTS II: CHEMICAL CONTROL**

- 6.1.- Introduction
- 6.2.- Manual ground treatments
  - 6.2.1.- Conditions for execution
  - 6.2.2.- Parameters that determine the quality of execution
  - 6.2.3.- Estimation of costs
- 6.3.- Mechanized ground treatments
  - 6.3.1.- Conditions for implementation
  - 6.3.2.- Parameters that determine the quality of execution
  - 6.3.3.- Estimation of costs
- 6.4.- Aerial treatments
  - 6.4.1.- Conditions for execution
  - 6.4.2.- Parameters that determine the quality of execution
  - 6.4.3.- Estimation of costs

**TOPIC 7: TREATMENTS III: BIOLOGICAL CONTROL**

- 7.1.- Definition of concepts
- 7.2.- Biotechnical methods
- 7.3.- Biological methods
- 7.4.- Analysis of cases
  - 7.4.1.- *Rhyacionia buoliana*
  - 7.4.2.- *Gonipterus scutellatus*
  - 7.4.3.- *Phoracantha semipunctata*

## **TOPIC 8: TREATMENTS IV: LEGISLATIVE MEASURES**

**8.1.- Introduction**

**8.2.- Quarantines**

**8.3.- Repression and suspension.**

**8.4.- Laws and regulations relating to forest pests and diseases**

## **TOPIC 9: EVALUATION OF TREATMENTS**

**9.1.- Pre-treatment operations**

**9.1.1.- Recognition of the area**

**9.1.2.- Signposting of the area**

**9.1.3.- Conditions of the plant protection product.**

**9.2.- Control of the application of the product.**

**9.3.- Efficiency control**

**9.3.1.- Sampling plots**

**9.3.2.- Sampling unit**

**9.2.3.- Signposting of plots.**

## **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 evaluation will consist of a theoretical part and a practical part.

The theoretical part will be assessed by means of an examination which will account for 60% of the mark final. The practical part will be evaluated by:

- The completion of a practical case study that will account for 30% of the grade. This assumption will be made on the day of the theoretical exam.
- The delivery of the laboratory practices, which will account for 10% of the grade.

To the final grade will be added the grade obtained from the individualized follow-up of the student up to a maximum of 1.0 pts.

The theoretical examination guarantees the evaluation of the acquisition of basic content to ensure the acquisition of basic and general skills. With the practical test evaluates the general competencies (G01, G02, G04, G05 and G07).

Cross-cutting competences are implicitly assessed in both the previous and the current work. evaluation of the activities carried out by the student throughout the course.

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 raised by peers.