

Bachelor in Forestry and Natural Environment Engineering

Course information

Year 2020-2021

GENERAL SPECIFICATIONS				
English name				
Forest Fire Prevention and Control				
Spanish name				
Prevención y Lucha contra Incendios Forestales				
Code		Type		
606510220		Compulsory		
Time distribution				
	Total	In class	Out class	
Working hours	150	60	90	
ECTS: 6				
Standard group		Small groups		
	Classroom	Lab	Practices	Computer classroom
	3,5	1,5	1	0
Departments		Knowledge areas		
Agroforestry Sciences		Agroforestry engineer		
Year		Semester		
3º		2º		

TEACHING STAFF			
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SPECIFIC INFORMATION OF THE COURSE
1. Contents description
1.1. In English:
Fire behavior in the forest ecosystems. Combustibility and flammability. Fire Prevention: action on fuel and determination of causes. Protection plans. Methods and organization for extinguishing forest fires. INFOCA plan.
1.2. In Spanish
Comportamiento del fuego en los ecosistemas forestales. Combustibilidad e inflamabilidad. Prevención de Incendios: actuación sobre combustibles y determinación de causas. Planes de defensa. Métodos y organización en la extinción de incendios forestales. Plan INFOCA.
2. Background
2.1. Situation within the Degree:
Forest fires are one of the main threats to the Spanish mountains, and particularly in mediterranean climates. In other subjects of the degree, the student has learned to

prevent and correct other threats that may arise in the forest stand: diseases, pests, erosion and so on. That, as in the case of fires, can endanger the persistence and sustainability of mountains and their resources.

In addition, the student has acquired through the *Silviculture and Harvesting Forestry*, and later with *Forest Management*, a solid knowledge on the management of forests; these principles will also be the basis, although applied in a more concentrated and intense way, for the prevention of forest fires.

2.2. Recommendations:

The student is recommended to have a good knowledge of treatments that must be carried out in each type of forest, as well as the characteristics of the machinery to be used. For this reason, the student should have taken the subjects "Forest Infrastructure and Machinery" and "Harvesting Forestry," as well as "Forest Botany" and "Silviculture".

3. Objectives (as result of teaching):

By the end of the course, the general objective is the student to know the theoretical and practical fundamentals of the prevention and control of forest fires.

As specific objectives, the student - once the subject has been completed - must have acquired the following knowledge and skills:

- Understand and identify all aspects related to fire behavior in forest ecosystems: their origin, evolution, behaviour, etc.
- Evaluate and assess the effects of fire on forest ecosystems.
- Know how to establish the correct measures for the prevention of forest fires and elaboration of plans of specific defense for that purpose.
- Knowledge and assessment of the causes of forest fires
- Know when to apply the different existing techniques in the extinction of fires.
- Establish personal security measures in fire control tasks.
- Know and understand the structure of the fight against forest fires in Andalusia. INFOCA plan.

4. Skills to be acquired

4.1. Specific Skills:

E12: Prevention and Control of Forest Fires

4.2. General Skills:

CB2. Know how to apply their knowledge to their work or vocation in a professional way. They should also possess the skills that are usually demonstrated through the elaboration and defence of arguments as well as in problem solving within their area of study.

G01: Ability to solve problems.

G02: Ability to make decisions.

G03: Organizational capacity and planning.

G04: Ability to apply knowledge in practice.

G05: Ability to work as a team.

G16: Sensitivity to environmental issues.

TC2. Develop a critical attitude, and being able to analyse and synthesize.

TC3. Develop an attitude of inquiry that permanently enables to review and deepen in the knowledge.

5. Training Activities and Teaching Methods

5.1. Training Activities:

- Theory sessions on the contents of the program.
- Practical sessions in specialized laboratories or in computing classrooms.
- Sessions practices.
- Academically supervised activities: seminars, conferences, work development, group tutorials, evaluation and self-evaluation activities.

5.2. Teaching Methods:

- Participatory Master Class.
- Development of practices in specialized laboratories or computer classrooms in small groups.
- Development of field practices in small groups.
- Individual or collective tutorials and direct interaction between the course instructor and students.
- Approach, realization, tutoring and presentation of works.
- Conferences and seminars.

5.3. Development and Justification:

1. Academic theory sessions

In the theoretical classes, the concepts included in the course program will be presented. As techniques, in addition to the master classes, other methodologies that encourage the participation of students in the normal development of the classes will be promoted. These classes will have a length of 1 or 1.5 hours (according to schedule and calendar). Development of competencies E12, G04, G16

2. Academic laboratory and computer sessions

In these sessions the student will develop various practical cases related to the extinction and prevention of forest fires, such as:

- Use of fire behavior simulators.
- Analysis of regulations and fire prevention and extinction measures.
- Identification and management of tools and equipment for individual protection in firefighting.

These cases will be developed by the student in class and later completed with work outside the classroom.

The student must present a report of the activities carried out. Development of competencies E12, G01, G02, G03,

3. Seminar, exhibitions and debates.

A seminar will be held on a specific topic of the subject taught by a forestry technician who develops his professional activity in the field of forest fires. Development competencies E12, G16

4. Work in small groups

Students must prepare a paper on a topic related to the subject in order to be presented in class. Development of competencies E12, CB2, G03, G05, TC1, TC2

5. Field Practices

A field trip is also programmed, where the student will receive explanations from the technicians who manage forest fires in the region visited. Competence development E12, G04, G16

6. Detailed Contents:

Block I. Behavior of fire and forest fires

- Lesson 1: General Concepts of Forest Fires
- Lesson 2: Factors determining fire behaviour
- Lesson 3: Historical Evolution of forest fires
- Lesson 4: Effects of fire on forest ecosystems
- Lesson 5: Fire simulators.

Block II: Forest fire prevention

- Lesson 6: Forest fire defense planning
- Lesson 7: Causes of forest fires
- Lesson 8: Action on forest fuels
- Topic 9: Fire detection

Block III: The extinction of forest fires

- Topic 10: Fire fighting
- Topic 11: Extinguishing tools and equipment
- Lesson 12: Organization of extinction. Emergency Management System
- Lesson 13: Personal security
- Lesson 14: Structure of the fight against forest fires in Andalusia. INFOCA Plan

7. Bibliography

7.1. Basic Bibliography

English bibliography

- Heikkilä, T.V.; Grönqvist, R.; Jurvélius, M. 1. Wildland fire management. Handbook for trainers. 2010. FAO, Rome. 250 pp
<http://www.fao.org/3/a-i1363e.pdf>
- Johnson, Edward A.; Miyanish, Kiyoko. Forest Fires. Behavior and Ecological Effects. 2001. Academic Press. 594 pp. <https://doi.org/10.1016/B978-0-123-86660-8.X5000-4>
- Parisien, Marc-André; Batllori, Enric; Miller, Carol and Parks, Sean A. Wildland Fire, Forest Dynamics, and Their Interactions. 2018. Forest. 330 pp.
<https://www.mdpi.com/books/pdfview/book/707>

Spanish bibliography

- Aguirre Briones, Felipe. 2006. Manual de formación de incendios forestales para cuadrillas. Gobierno de Aragón. Zaragoza
- Martínez Ruiz, Enrique. 1997. Manual del contrafuego: el manejo del fuego en la extinción de incendios forestales. TRAGSA Madrid
- Martínez Ruiz, Enrique. 2010. Manual de extinción de grandes y peligrosos incendios forestales. Mundi-Prensa. Madrid
- Morales Mesa, Ignacio. 2004. Prevención de riesgos en el trabajo forestal: seguridad en incendios forestales. Tecnos Madrid
- Vélez Muñoz, Ricardo. 2009. La defensa contra incendios forestales. Fundamentos y experiencias. McGraw-Hill/Interamericana de España. Madrid.

7.2. Additional Bibliography:

English bibliography

- National Wildfire Coordinating Group. Fire Behavior Field Reference Guide. 2014.
https://gacc.nifc.gov/oncc/docs/FBFRG_2014.pdf

- San-Miguel Ayanz, Jesus; Gitas, Ioannis; Camia, Andrea; Oliveira, Sandra. Advances in Remote Sensing and GIS applications in Forest Fire Management. 2011. <http://publications.jrc.ec.europa.eu/repository/bitstream/JRC66634/lbna24941enc.pdf>
- Thomas, Peter A.; McAlpine, Robert S.; Hirsch, Kelvin; Hobson, Peter. Fire in the Forest 2010. Cambridge University Press. 225 pp. <https://doi.org/10.1017/CBO9780511780189>

8. Systems and Assessment Criteria

8.1. System for Assessment:

- Theory / problems exam
- Defence of written works and reports
- Individual student tracking

8.2. Assessment Criteria and Marks:

Two different evaluation criteria are established: Continuous evaluation and final individual assessment.

It is emphasized that to take advantage of the final individual assessment, in accordance with paragraph 8.2 of the "Evaluation Regulation for Degrees and Official Master's Degree from the University of Huelva", the student, within the first two weeks of teaching of the subject, must inform the instructor. This communication will be made through the email address of the University of Huelva.

A. Continuous evaluation

A.1. Theoretical-practical exam

The theoretical-practical exam will consist of several questions with different qualifications on all the topics exposed in the theoretical and practical classes of the subject, and will be held at the end of the semester. Value on the final mark of the subject: 75%

Competencies: E12, CB2, G02, G03, G04, G16

Voluntary mid-term exam

In the second half of the semester, the student will have the option of taking a voluntary partial examination of the contents of Blocks I and II of the subject. This exam will be happen within the normal schedule of the subject, on a date agreed between the students and the course professor.

In order to participate in this partial exam, students must complete more than 70% attendance in the classes of the subject.

Passing (> 5,0) this voluntary partial exam will mean that the student will not be examined of those contents in the final exam.

A.2. Defense of practices and student participation

The student will get an overall rating regarding their participation in the activities of the subject (participation in class, realization of activities proposed by the course professor in the practical classes, assistance to practical fields and laboratory):

Value on the final grade for the subject: 15%

Competencies: E12, CB2, G01, G04, CT2.

A.3. Carrying out and oral defense of works

Students in groups of two must do a written work on a topic related to the contents of the subject. The topic must be previously approved by the course professor. After the delivery of the work, the students will make the presentation and defense of their work according to the previously established norms.

Value on the final grade for the subject: 15%

Competencies: E12, G03, G05, G16, CT1, CT3

Note: For students already enrolled previously in the subject, the grades in sections A.2 and A.3. will only be valid those obtained in the two previous courses

A.4. Final note of the subject

The final grade of the subject will be the sum of the different grades indicated above, weighted with their corresponding percentages.

Final grade = $0.70 \times A.1 + 0.15 \times A.2 + 0.15 \times A.3$

To pass the subject the student must obtain an overall score equal or higher than 5, and in any case, have obtained a minimum score of 4 points (on a scale of 10) in the theoretical-practical exam (A.1)

B. Final individual assessment

The final single evaluation is carried out in a single academic act on the day of the ordinary call of the subject.

This evaluation will consist in two tests:

B.1. Test 1. Written exam with diverse questions on all the topics exposed in the classes of the course. Value of this exam on the final grade of the subject: 60%

Competencies: E12, CB2, G02, G03, G04, G16

B.2. Test 2. This test will have one of the following two contents:

- Oral presentation of a topic or part(s) of a topic contained in the course's program.
Competencies: E12, CB2, G03, G16, CT1
- Realization and explanation of the results of a practice.

Competencies: E12, CB2, G03, G16, CT1

Value on the final grade for the subject: 40%

B.3. Final grade of the subject

The final grade of the subject will be the sum of the scores indicated above, weighted with their corresponding percentages.

Final grade = $0,60 \times B.1 + 0,40 \times B.2$

To pass the subject the student must obtain an overall score equal or higher than 5, and in any case have obtained a minimum score of 4 points (on a scale of 10) in the theoretical-practical exam (B.1)

C. Qualification with Honors

Students who obtain more than a 9.0 in the final grade of the subject will be eligible for the "Honor Roll".

In the event that there are more students than can obtain this qualification, a priority order will be established that will take into account the following criteria: 1. Highest final grade of the subject. 2. Higher qualification in the theoretical-practical exam