

# Bachelor in Forestry and Natural Environment Engineering

## Course information

Year 2019-20

GENERAL SPECIFICATIONS			
<b>English name</b>			
Silviculture			
<b>Spanish name</b>			
Selvicultura			
<b>Code</b>		<b>Type</b>	
606510208		Compulsory	
<b>Time distribution</b>			
	<b>Total</b>	<b>In class</b>	<b>Out class</b>
Working hours	150	60	90
<b>ECTS: 6</b>			
<b>Standard group</b>	<b>Small groups</b>		
	<b>Classroom</b>	<b>Lab</b>	<b>Practices</b>
3.5		1.5	1
<b>Departments</b>		<b>Knowledge areas</b>	
Agroforestry Sciences		Environmental Technologies/Agroforestry Engineering	
<b>Year</b>		<b>Semester</b>	
2 <sup>nd</sup>		2 <sup>nd</sup>	

TEACHING STAFF			
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\* Lecturer coordinator of the module but not teaching in the English version

SPECIFIC INFORMATION OF THE COURSE
<b>1. Contents description</b>
<b>1.1. In English:</b>
This module is focused in the silvicultural basis, working with main concepts related to forest stands and forest dynamics. Main silvicultural treatments are studied namely regeneration, cuttings and thinning, as well as their planning and execution by using practical simulations. Real examples of forests from Andalusia, Spain and other countries are used along the course. Students will work on books and presentation as well as other formats of information like pictures, videos, pieces of news, software, etc.
<b>1.2. In Spanish</b>
En esta asignatura se estudian las bases de la Selvicultura, trabajando en conceptos básicos de caracterización de masas forestales y dinámica de bosques a distintos niveles (incluyendo teoría, participación del alumnado en prácticas, debates y conferencias externas). Se estudian los principales tratamientos selvícolas, tanto cortas de regeneración como de mejora, y su planificación y ejecución a través de ejemplos prácticos. En toda la asignatura se utilizan numerosos ejemplos de sistemas forestales andaluces, españoles y de otros países, que se visualizan a través de fotografías, vídeos, noticias, programas, etc..

<b>2. Background</b>
2.1. Situation within the Degree:
This subject provides the scientific and technical bases for the sustainable management of forests, thus, it is a key module within the degree. The subject requires knowledge of other basic sciences (Ecology, Zoology, Botany, Statistics, etc.) and applied sciences (Dendrometrics and Inventory) for its correct understanding and application. Silviculture is the founding for drafting planning projects of forests, focused on the production of wood, cork, pine nuts, fruit, etc., as well as conservation (Protected Areas) and protection (preventive actions against forest fires or pests and diseases) along with its practical application (management).
2.2. Recommendations:
To take this module we recommend that the students have a background in some of the subjects: Forest Mensuration and Forest Inventory, Forest Ecology, Forest Botany, and Forest infrastructures and mechanization, as an important basis for the best understanding of the subject. However the most important things to take this course are love of forest and interest to learn about them.
<b>3. Objectives (as result of teaching):</b>
By the end of this course students will understand the theoretical foundations of Silviculture and the principles of Forest Management of temperate/Mediterranean forests (Skills CB2 and CB5). They will also develop team-working skills and decision making, facing different management situations in practical cases (Skills G02 and G05). They will acquire problem solving capacities bases on real data (Skills G01 and CB2) Working on case studies, students will acquire the capacities and abilities that will allow them to make decisions about forest management, and to solve the problems arising from the application of forest planning and silviculture. They will learn how to apply knowledge to professional work by means of field trips, seminars with technicians and debates (Skills CB2, CB5 and CT2). As cross skill, throughout the course, students must develop a growing sensitivity for environmental issues (G16 competence)

<b>4. Skills to be acquired</b>
4.1. Specific Skills:
C11: Silviculture Planning, management and sustainable use of timber and non-timber forest resources. Inventories of resources and application of Silviculture.
4.2. General and Cross Skills:
CB2: The students 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 defense of arguments and in problem solving within their area of study. CB5: The students have developed those learning skills required to undertake further studies with a high degree of autonomy. G01: Ability to solve problems. G02: Ability to take decisions. G05: Ability to work in a team. G16: Sensitivity for environmental issues. TC2. Develop a critical attitude, being able to analyse and synthesize.

## 5. Training Activities and Teaching Methods

### 5.1. Training Activities:

- Lectures on the module theoretical contents.
- Problem solving
- Practice sessions in lab or computer room
- Field practices and field visits to get a close view of forest professional activities.
- Academic activities conducted by the teachers: seminars, presentations, work on assignments, debates, group tutorials, evaluation and self-evaluation activities.

### 5.2. Teaching Methods:

- Lectures in a participative environment
- Practice sessions in labs or computer room.
- Field practices sessions in small groups.
- Problem solving and practical exercises.
- Group or individual tutorials (direct interaction student-teaching staff)
- Course assignments: Proposal, development, tutoring and presentation
- Seminars and Guest Lectures
- Evaluations, exams

### 5.3. Development and Justification:

Lectures on the theoretical bases of Silviculture, using Powerpoint presentations, including case studies (competences CB2). These case studies are selected by the lecturer to be solved by the students, including guided questionnaires (quizzes) (Competences C11, CB2, CB5, G02, G16 y TC2).

Practical activities designed to allow students to become familiar with different software and web applications that will be useful in the practice of Silviculture. (Competences CB2, CB5, G01, G02, G05 and G16).

Field trips to see “live” the silvicultural systems and forest management in the province Huelva and another Spanish region (a one-day trip in the province of Huelva plus a week trip to another Spanish area). (Competences C11, CB2, CB5, G02, G05, G16 and TC2).

Two debates organized and lead by the students. (Competences TC2, CB2, CB5, G01, G02, G05 and G16).

Quizzes written by the students throughout the semester.

A guest lecture and a seminar given by a Forest Engineer working in Silviculture related organization. (Competences TC2, CB2, CB5, G02 and G16).

Students will work in teams (competence G05) in solving problems posted by the lecturer, where they will need to merge basic knowledge of the subject with other related domains as Botany or Forest Mensuration, managing forest data and taking management decisions that will be discussed at the end of the session (Competences CB2, CB5, G01, G02, G05 and G16).

A Silviculture related assignment to be planned and developed with tutorial assistance; the assignment must be presented at the end of the semester. (Competences CB2, CB5,TC2, G01, G02, G05 and G16).

## 6. Detailed Contents:

### Lesson 1. What is Silviculture?

- Historical review
- Definition, aims and relevance of Silviculture
- Links between Silviculture and other sciences

- Some data about forest in Spain, Europe and the World

## **Lesson 2. Concepts of regeneration**

- Regeneration as a process
- Regeneration by vegetative methods
- Regeneration from seed
- Choosing between natural and artificial regeneration
- Use of exotic species

## **Lesson 3. Silvicultural systems**

- Silvicultural system as a plan for management
- Even and uneven-aged systems
- Reproduction methods
- Determining growth

## **Lesson 4. Thinning**

- Introduction
- Crown canopy classes and temperament
- Thinning intensity
- Thinning methods
  - Low thinning
  - Crow thinning
  - Mechanical thinning
- Thinning plan

## **Lesson 5. Clearcutting**

- Definition and characteristics
- Steps to follow in the planning and the carrying out of a clearcutting
- Classes of clearcutting
- Diminishing the impacts on landscape and ecology in clearcutting
- Values and limitations of clearcutting
- Some examples of clearcutting in Spain

## **Lesson 6. The shelterwood method**

- Definition
- Characteristics
- Selecting Seed trees
- Determining an appropriate level of residual stocking
- Removal cutting and seedling damage

## **Lesson 7. Uneven aged reproduction methods**

- The character of selection system
- Characterizing conditions in selection system stands
- Defining a residual structure
- Applying selection system
- Uneven aged reproduction methods
  - Single tree selection method
  - Group selection method
- Conditions for its application

<ul style="list-style-type: none"> <li>• Applications</li> </ul>
<p><b>Lesson 8. Complementary treatments</b></p> <ul style="list-style-type: none"> <li>• Pruning: <ul style="list-style-type: none"> <li>○ Artificial versus natural pruning</li> <li>○ Types of artificial pruning</li> </ul> </li> <li>• Other treatments</li> </ul>
<p><b>7. Bibliography</b></p>
<p>7.1. Basic Bibliography</p>
<p>Nyland, R.D. 2002. Silviculture. Concepts and Applications. Mc Graw Hill. Series in Forest Resources.</p>
<p>7.2. Additional Bibliography:</p>
<p>Bravo, F., Le May, V., Jandl, R., Von Gadow, K.(Eds.). 2008. Managing Forest Ecosystems: the Challenge of Climate Change. Springer</p> <p>Daniel, T.W.; Helms, J.A.; Baker, F.S. 1979. "Principles of Silviculture". Ed. Mc Graw Hill.</p> <p>De Turkheim, B., Bruchiamacchie. 2005. La Futaie irrégulière. Edisud.</p> <p>Hawley, R.; Smith, D. 1982. "Silvicultura práctica". Ed. Omega.Barcelona.</p> <p>Kelty, M., Larson, B., Oliver, CH. 1992. The Ecology and Silviculture of Mixed-Species Forests. Kluwer Academic Publishers. Dordrecht, Boston, London.</p> <p>Matthews, J.D. 1989. "Silvicultural systems". Oxford Science Publications. Oxford.</p> <p>O'Hara, K.L. 2014. Multiaged silviculture.Oxford University Press.</p> <p>Oldeman, R.A.A. 1990. "Forests: Elements of Silvology". Springer- Verlag. Berlín.</p> <p>Puettmann, K.J.; Coates, K.D., Messier, C. 2008. A critique of Silviculture. Managing for Complexity. Island Press</p> <p>Ren, H (ed). 2013. Plantations. Biodiversity, carbon sequestration and Restoration. Environmental Research Advances. Nova Publishers</p> <p>Smith, D.M. 1986. "The practice of Silviculture". Second edition. John Wiley and sons. Nueva York.</p> <p>West, P.W. 2006. Growing Plantation Forests. Springer.</p>

<p><b>8. Systems and Assessment Criteria</b></p>
<p>8.1. System for Assessment:</p> <ul style="list-style-type: none"> <li>• Exam on theoretical lessons, quizzes and problem solving</li> <li>• Assignment presentation.</li> <li>• Class involvement</li> </ul>
<p>8.2. Assessment Criteria and Marks:</p> <p>The exam will be graded out of 8.5 points, including 1.5 points for quizzes' presentation. A minimum score of 3 points is required in the exam. Competences evaluated will be CB2, CB5, G01 and G02.</p> <p>The presentation and defense of the Silvicultural Assignment and class involvement will be graded out of 1.5 points. Competences evaluated will be CB2, CB5, G01, G02, G05, G16 and CT2</p> <p>The appraisal pass is achieved with an overall total of 5 points and above. Class involvement and attendance will be evaluated as an extra value, to improve up to 10% the score.</p> <p>Students can be appraised by a single theoretical and practice exam in case they apply for it</p>

within the first month of class

'Final results will be given in terms of a numerical scale between 0 and 10 (including tenths), with the corresponding qualitative ratings below:

- ≤4.9: Fail (D)
- 5.0 - 6.9: Pass (C)
- 7.0 - 8.9: Pass with Merit (B)
- 9.0 - 10: Distinction (A)

Students graded with Distinction can be awarded "With Honors"; the number of students awarded "With Honors" cannot exceed 5% of the students enrolled in the subject in the academic year (unless the number of students enrolled is lower to 20, in which case one distinction can be awarded).

The grading system is subject to the Bachelor's Degree Exam Regulations of the University of Huelva (Normativa de Evaluación para las Titulaciones de Grado de la Universidad de Huelva). Please refer to:

<[http://www.uhu.es/sec.general/Normativa/Texto\\_Normativa/Normativa\\_de\\_Evaluacion\\_grados.pdf](http://www.uhu.es/sec.general/Normativa/Texto_Normativa/Normativa_de_Evaluacion_grados.pdf)>.

In particular, please note that make-up exams and other special circumstances will be subject to article 19 of these regulations.'