Course Unit	Advanced Silviculture			Field of study	Silviculture and Wildlife Management								
Master in	Management of Forest Resources			School	School of Agriculture								
Academic Year	2022/2023	Year of study	1	Level	2-1	ECTS credits	6.0						
Type	Semestral	Semester	2	Code	6363-352-1204-00-22								
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): Maria Sameiro Ferreira Patrício

Learning outcomes and competences

At the end of the course unit the learner is expected to be able to:
1. Show high level of technical competence in silviculture regarding to the production systems of the principal temperate forest species, their ecology and silvicultural management models.
2. The students have to obtain practical skills in forest production sustainability.
3. The students are expected to be able to: - Plan an afforestation considering the ecological, climatic and soil characteristics as well as the management objectives and make a forest management plan,
4. - Manage forest stands according to the quality of the site,
5. - Manage the composition in mixed stands,
6. - Apply techniques improving the natural regeneration. - Use techniques of close-to-nature silviculture

Prerequisites

Before the course unit the learner is expected to be able to:
1. The students should have basic Knowledge of soils, ecology, dendrology and phytosociology.
2. Know silvicultural techniques, statistics and computing science.

Course contents

Silvicultural systems. Ligniculture and arboriculture for timber. Broadleaves silviculture of rapid, medium and slow growth. Production systems of the principal temperate forest species. Growth and yield of the forest stands. Management composition in mixed stands. Management of natural regeneration. Pure or mixed uneven-aged stands. Close-to-nature silviculture.

Course contents (extended version)

1. Major silvicultural systems
2. Determinants of afforestation
   - Sustainable management and climate change
   - Selection of species
   - Adaptive silviculture
3. Hardwood silviculture for wood production
   - The value of the standing tree
   - The location in the stand
   - The vigour
   - The quality, size and form of the tree
   - Singularities and defects
4. The stands of hardwoods
   - Production targets
   - Technical aspects of the hardwood silviculture
   - Artificial and natural regeneration
   - Silvicultural treatments
   - Frame trees
   - Intermediate cuttings: cleanings, prunings, thinnings
5. Silvicultural management models for broadleaves
   - Silvicultural management models for coppice stands
   - Silvicultural management models for high forest stands
6. Ecology, Silviculture and yield of mixed stands
   - Types of mixtures
   - Complementarity and facilitation processes
   - Mixed stands with nitrogen fixing secundary species
   - Composition and proportions of the mixtures
   - Additive and substitutive designs
   - Types of yields
   - Silvicultural management models for mixed stands
7. Production systems of the major forest broadleaf species in Portugal
8. Ecology and silviculture of the chestnut
   - Forest and agroforest systems
   - High forest and coppice management
   - Silvicultural management models
9. Ecology and silviculture of the eucalyptus
   - Silvicultural management models
10. Ecology and silviculture of cork oak and holm
11. Ecology and silviculture of walnut
   - Growth and yield
12. Ecology and silviculture of cherry
13. Ecology and silviculture of other hardwoods
14. Silviculture of coniferous for wood production
   - Ecology and silviculture of pine
   - Ecology and silviculture of other softwoods
15. Continuous cover forestry, Close-to-nature silviculture

Recommended reading

1. Nyland R.D. et al. 2018. Silviculture: Concepts and Applications, 3rd Edition;Armand, G. , 1995. Feuillus Précieux. Conduite des plantations en ambiance forestière. IDF, Paris.
2. Becquey, 1997. Le noyers à bois. IDF Diffusion ; Boulet-Gercourt, 1997. Le merisier. 2ª ed. , Les guides du sylviculteur, IDF, Paris; Germain, E. , Prunet, J-P,

Recommended reading

Garcin, A. 1999. Le noyer. Édition Ctif
3. Bourgeois, C. , Sevrin, E. e Lemaire, J. , 2004. Le châtaignier un arbre, un bois. IDF, 2ª ed. , Paris. ; DGRF, 2006. Boas práticas de gestão em sobreiro e azinheira. DGRF, distribuição gratuita.
4. Florence, R. G. , 2004. Ecology and Silviculture of Eucalypt Forests. CSIRO Publishing. ; Hubert, M. e Courraud, R. , 1994. Élagage et taille de formation des arbres forestiers. IDF, Paris.
5. Bravo-Oviedo A..et al.(Eds.), 2018. Dynamics Silviculture and Management of Mixed Forests, Springer; Oliveira, A.C., Pereira, J.S., Correia A.V. 2000. A silvicultura do pinheiro bravo. Ed Centro Pinus

Teaching and learning methods

Theoretical lectures with multimedia support. Practical lessons of forest management plans based on growth and yield predictions. Fieldwork to practice technical skills of management techniques and case study. Field trips in the context of the subject's topics. Independent studies and reports on assignments. Quizzes

Assessment methods

1. Alternative 1 - (Regular, Student Worker) (Final)
   - Practical Work - 40%
   - Final Written Exam - 60%
2. Alternative 2 - (Regular, Student Worker) (Supplementary, Special)
   - Final Written Exam - 100%

Language of instruction

1. English
2. Portuguese

Electronic validation

Maria Sameiro Ferreira Patrício	Luís Filipe de Sousa Teixeira Nunes	Felícia Maria Silva Fonseca	Maria Sameiro Ferreira Patrício
09-12-2022	09-12-2022	09-12-2022	19-12-2022