

Syllabus

Course description

Course title	Forestry and Forest Ecology
Course code	40201
Scientific sector	AGR/05
Degree	Bachelor in Agricultural, Food and Mountain Environmental Sciences
Semester	II
Year	III
Academic year	2021/22
Credits	12
Modular	Yes

Total lecturing hours	36+36
Total lab hours	
Total exercise hours	24+24
Attendance	Recommended, particularly at the exercises
Prerequisites	Knowledge in botany and soil chemistry and fertility
Course page	See Resource Collection

Specific educational objectives	<p>Understanding the concepts of ecology is fundamental in the context of either conservation of natural resources or sustainable forest management, especially in the fate of climate change and anthropogenic pressures. Thus, the course will introduce the students to ecological theory and terminology, on factors affecting forest structure and composition, on the effects of environmental gradients on plant species distribution, on the dynamics of forest communities over time and key ecosystem-level processes such as nutrient and carbon cycling. Students will also learn how natural and human-induced perturbations affect forest dynamics and ecosystem services and how the appropriate forest management could increase the resilience to perturbations. In this context, they will be introduced to silvicultural techniques and their application to forest ecology in order to meet a wide range of desired conditions and resource objectives. In particular, the students will learn how to analyse and interpret the growth of individual trees and the dynamics of forest stands in order to develop decision tools and design silvicultural prescriptions for their management.</p>
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Module 1	Silviculture
Lecturer	Giorgio Alberti, K Building, Room 402, email: giorgio.alberti@unibz.it
Scientific sector of the lecturer	AGR/05

Teaching language	English
Office hours	Upon appointment
Teaching assistant (if any)	Alessandro Andriolo, K Building, Room 402, email: alessandro.andriolo@unibz.it
Office hours	Upon appointment
List of topics covered	<p>Silviculture: definition of wood, tree, forest and silviculture; concept of forest ecosystem services; definition of afforestation, reforestation and deforestation; forests in the world, in Italy and Sud Tyrol; forest dynamics and successional processes; principle of dendrochronology and dendroecology; site description; forest stand description (i.e. composition, density, vertical and horizontal structure, development stage); management of coppices; management of even-aged forests; thinning; management of uneven-aged forests; examples on the management of the most important forest categories in South Tyrol</p> <p>Forest mensuration: fundamentals of biometrics and statistics; measurement of standing trees (diameters, heights); measurements of felled trees; volume of single trees and forest stands; total forest biomass; principle of relascopy; measuring tree and stand growth.</p>
Teaching format	<p>Lectures will provide an overview over basic silvicultural and forest mensuration concepts and highlight the scientific basis for silvicultural practices.</p> <p>Field trips will provide real world experiences. They will help visualize basic ecological and silvicultural concepts.</p> <p>Laboratory and computer exercises will help the students to apply mensuration concepts to collected data.</p> <p>Power Point presentations will be available in the course reserve collection database of the faculty</p>

Module 2	
Lecturer	Leonardo Montagnani, K Building, Room 303, email: leonardo.montagnani@unibz.it ;
Scientific sector of the lecturer	AGR/05
Teaching language	English
Office hours	Upon appointment
Teaching assistant (if any)	
Office hours	
List of topics covered	<p>Sustainability of Forest Ecosystems. Concepts of Forestry and Forest Ecology. The concept of ecosystem. The transfer and storage of energy in ecosystems. The ecological role of solar radiation and temperature. The impact of the wind.</p> <p>Biogeochemical cycles: the cycle of carbon, water and nutrients in forest ecosystems. The role of the soil, of the</p>

	<p>water availability and of the water pressure deficit in the air. Forest productivity (gross and net primary productivity, net ecosystem productivity and net biome production) Ecology of disturbances (wind, fire, pest diseases). Biodiversity and ecosystem services. Interaction among species in forest ecosystems: symbiosis, competition, predation, parasitism, commensalism, mutualism, amensalism. Forests and climate change: mitigation and adaptation. Ecological successions. Models and their role in resource management.</p>
Teaching format	The course will include frontal lectures, laboratory work and field trips.

Learning outcomes	<p>Knowledge of the theoretical basis of ecology applied to the study of forests ecosystems; understanding of the functioning of forest ecosystems, their impact on the global environment and their role in the context of climate change.</p> <p>Application of the acquired knowledge and understanding to several contexts, such as forest management and natural resource conservation.</p> <p>Making judgments: the comprehension of ecological processes in forests and their role in the global environment will help the students to evaluate, from an ecological point of view, the potential effect of different forest management practices or policies on the forest processes, the environment and human population.</p> <p>Communication skills: through the participation to lessons, students will learn how to present the acquired knowledge in an appropriate way. Practical experiences will also develop the ability to summarize collected data and communicate results of their analysis.</p> <p>Learning skills: students will learn how to measure ecological parameters in forests in order to acquire information on forest ecological status. They will learn how to affect the forest structure and dynamics by forestry</p>
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Assessment	Oral exams with questions to test the acquired knowledge. Time will also be dedicated to the evaluation of knowledge and skills acquired from the laboratory experiences and field excursions.
Assessment language	English

<p>Evaluation criteria and criteria for awarding marks</p>	<p>Attribution of a final mark, on the base of the acquired knowledge and skills. Criteria of evaluation will also be the clarity of answers. mastery of language (relatively to teaching language), ability to summarize, evaluate, and establish relationships between topics.</p>
<p>Required readings Supplementary readings</p>	<p>Recommended texts for personal study of course topics:</p> <p>P. Piussi, G. Alberti (2015). "Selvicoltura generale. Boschi, società e tecniche culturali". Compagnia delle Foreste, Arezzo.</p> <p>Kimmins JP. (2005). Forest ecology: a foundation for sustainable forest management and environmental ethics in forestry. London: Macmillan Publishing Company Press. 3rd ed.</p>