

## Syllabus

### Course description

<b>Course title</b>	Silviculture and Forest Ecology
<b>Course code</b>	40168
<b>Scientific sector</b>	AGR/05
<b>Degree</b>	Bachelor in Agricultural and Agroenvironmental Sciences
<b>Semester</b>	II
<b>Year</b>	III
<b>Academic year</b>	2019/20
<b>Credits</b>	12
<b>Modular</b>	Yes

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

<b>Specific educational objectives</b>	<p>Understanding the concepts of ecology is fundamental in the context of sustainable forest management and conservation of natural resources. The aim of this course is to give a general overview of the actual knowledge about the ecology of forest ecosystems, and their management considering also the crucial role and importance of forests in the context of global climate change.</p> <p>By the end of the course, students will develop an understanding of theoretical basis of ecology applied to the study of forests functioning and forest management. By using appropriate instruments and methods, students will learn how to collect and analyze ecological data in order to study the structure and functioning of forest ecosystems with the final aim to define a properly management strategy.</p> <p>Students will 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.</p>
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<b>Module 1</b>	Silviculture
<b>Lecturer</b>	Giustino Tonon, K Building, Room 204, email: giustino.tonon@unibz.it, tel. 0471-017190
<b>Scientific sector of the lecturer</b>	AGR/05

<b>Teaching language</b>	English
<b>Office hours</b>	At any time for an appointment with the lecturer
<b>Teaching assistant (if any )</b>	Alessandro Andriolo, K Building, Room K4.01, email: alessandro.andriolo@unibz.it
<b>Office hours</b>	To be decided
<b>List of topics covered</b>	<p>Forest structure and successional processes</p> <p>Concept of ecosystem services</p> <p>Forest dynamics</p> <p>Dendrochronology and dendroecology</p> <p>Climate changes and forests</p> <p>Forestry and forest planning</p> <p>Silvicultural systems and ecology of regeneration</p> <p>Management of the most important forest types in South Tirol</p>
<b>Teaching format</b>	This is a lecture- and field-course in which topics are presented by professors. Practical parts and excursions are explained by the professor with the support of local forest managers. Power Point presentations will be available in the course reserve collection database of the faculty

<b>Module 2</b>	
<b>Lecturer</b>	Maurizio Ventura; K2.06a; Maurizio.ventura@unibz.it; +39 0471017806
<b>Scientific sector of the lecturer</b>	AGR/05
<b>Teaching language</b>	
<b>Office hours</b>	On appointment
<b>Teaching assistant (if any)</b>	Name, office, e-mail, tel., lecturer's page
<b>Office hours</b>	
<b>List of topics covered</b>	<p>Topics of this course will cover the basic concepts of ecology such as productivity, nutrient cycles, and population dynamics applied to forest ecosystems. Fluxes of energy and material in forests, the interaction of trees with the physical environment and the limiting factors affecting forest growth and productivity will be analyzed and discussed.</p> <p>The role of forests in the context of global change will be also considered, considering the threatens faced by forests in a changing environment and their potential role in climate change mitigation.</p> <p>An overview of the methods used in the study of the different aspects of forest ecology will be also presented, in order to give to the students an idea on how knowledge in ecology is achieved and how forest ecosystems functions and processes can be measured. The topics of the course include:</p> <ul style="list-style-type: none"> <li>• Remind of basic ecological concepts: definition of</li> </ul>

	<p>ecology and ecosystems; turnover rate and residence time; emergent properties and ecosystem stability; positive and negative feedbacks; resistance and resilience.</p> <ul style="list-style-type: none"> <li>• Autoecology: ecological factors affecting forest growth and development: abiotic factors (temperature, light radiation, water availability).</li> <li>• Structure of forest ecosystems: tropical rainforests, tropical seasonal forests, temperate rainforests, temperate seasonal forests, boreal forest (taiga), mediterranean forests.</li> <li>• Trophic interactions in forest ecosystems: grazing food chain and detritus food chain.</li> <li>• Interaction among species in forest ecosystems: symbiosis, competition, predation, parasitism, commensalism, mutualism, amensalism.</li> <li>• Energy fluxes and balance in forest ecosystems</li> <li>• Forest productivity: gross and net primary productivity, net ecosystem productivity and net ecosystem exchange.</li> <li>• Biogeochemistry: cycles of carbon, nitrogen and other main nutrients in forest ecosystems.</li> <li>• Effect of forests on C sequestration and role for climate change mitigation.</li> <li>• Forest soil: characteristics and formation. Litter decomposition and soil organic matter dynamics.</li> <li>• Water and forests, effect of forests on global and regional water cycle.</li> <li>• Fire ecology: role of fire in forest ecology and biogeochemical cycles.</li> </ul>
<p><b>Teaching format</b></p>	<p>The course will include frontal lectures, exercises as well as field excursions.</p>

<p><b>Learning outcomes</b></p>	<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>
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	<p>Students will acquire the ability to choose among different methods to evaluation of forest function ad processes and how to translate them in forest management</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>
<p><b>Assessment</b></p>	<p>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.</p>
<p><b>Assessment language</b> <b>Evaluation criteria and criteria for awarding marks</b></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><b>Required readings</b> <b>Supplementary readings</b></p>	