Syllabus

Kursbeschreibung

Titel der Lehrveranstaltung	Forstwesen und Waldökologie
Code der Lehrveranstaltung	40201
Zusätzlicher Titel der Lehrveranstaltung	
Wissenschaftlich-disziplinärer Bereich	AGRI-03/B
Sprache	Englisch
Studiengang	Bachelor in Agrar-, Lebensmittel- und Bergumweltwissenschaften
Andere Studiengänge (gem. Lehrveranstaltung)	
Dozenten/Dozentinnen	Prof. Roberto Tognetti, Roberto.Tognetti@unibz.it https://www.unibz.it/en/faculties/agricultural-environmental-food-sciences/academic-staff/person/47243
Wissensch. Mitarbeiter/Mitarbeiterin	
Semester	Zweites Semester
Studienjahr/e	3
KP	12
Vorlesungsstunden	72
Laboratoriumsstunden	48
Stunden für individuelles Studium	180
Vorgesehene Sprechzeiten	36
Inhaltsangabe	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, factors affecting forest structure and composition, on the effects of environmental gradients on plant species distribution,

	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 appropriate forest management could increase resilience to perturbations. In this context, they will be introduced to silvicultural techniques and their applications to meet a variety of landowner or stakeholder objectives in forested stands and multiple ecosystem services. Students will learn how to analyse and interpret the growth of individual trees and the dynamics of forest stands to develop decision tools and design silvicultural prescriptions for sustainable forest management.
Themen der Lehrveranstaltung	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. Forest mensuration: fundamentals of biometrics and statistics; fundamentals of measuring tree growth and volume; methods for assessing forest biomass; principles of relascopy; sampling techniques and data analyses; measuring timber products. Forest ecology: Understanding forest functioning in the context of the changing climate and human pressure. The concept of ecosystem. Resources and conditions. The ecological role of solar radiation and temperature. The transfer and storage of energy in ecosystems. Biogeochemical cycles - the carbon, water, and nutrients cycle in forest ecosystems. Forest productivity - gross and net primary productivity, net ecosystem productivity, and net ecosystem carbon balance. Interaction among species in forest ecosystems - symbiosis, competition, predation, parasitism, commensalism, mutualism, amensalism. Forest and disturbances - fire, pests, and wind effects. Forests and climate change - mitigation and adaptation. Ecological successions. Models and their role in resource management.

Stichwörter	Sustainable forest management, Mountain silviculture, Climate change, Biogeochemical cycles, Environmental disturbances.
Empfohlene Voraussetzungen	Botany, Soil chemistry
Propädeutische Lehrveranstaltungen	no
Unterrichtsform	Lectures shall provide an overview of fundamental forest ecology and management concepts, with particular emphasis on the scientific basis of ecological processes and silvicultural practices. Field excursions shall offer real-world experiences, enabling students to visualize key ecological and silvicultural principles. Group exercises shall support the application of these concepts through the analysis of collected data. Supporting materials, including PowerPoint presentations, shall be made available in the course reserve collection on Teams.
Anwesenheitspflicht	no
Spezifische Bildungsziele und erwartete Lernergebnisse	Knowledge of the theoretical basis of ecology applied to the study of forest ecosystems. The capacity of learning and synthesizing scientific literature. The capacity of conceiving field experiments and analysing experimental data. Communication skills: through active participation in lessons, students will learn how to present the acquired knowledge in an appropriate way. Practical experience with measured data and scientific literature will also develop the ability to summarize and communicate the results of their analysis.
Spezifisches Bildungsziel und erwartete Lernergebnisse (zusätzliche Informationen)	
Art der Prüfung	The final grade shall be determined on the basis of course activities, including field exercises and written essays, and shall be complemented by a final oral examination.
Bewertungskriterien	Evaluation shall focus on the student's capacity to undertake research activities both independently and in collaboration with peers. The final assessment shall place particular emphasis on the ability to synthesize, critically evaluate, and establish connections

	among the topics addressed in the course.
Pflichtliteratur	Recent scientific literature will be provided during the course.
Weiterführende Literatur	Ashton M., Kelty M. (2018). The Practice of Silviculture (10th ed.). Wiley. Palik B.J., D'Amato A.W., Franklin J.F., K. Johnson N. (2020). Ecological Silviculture: Foundations and Applications. Waveland Press, Inc. Kimmins J.P. (2005). Forest ecology: a foundation for sustainable forest management and environmental ethics in forestry. London: Macmillan Publishing. 3rd ed. Chapin III F.S., Matson P.A., Vitousek (2011). Principles of Terrestrial Ecosystem Ecology. Springer.
Weitere Informationen	
Ziele für nachhaltige Entwicklung (SDGs)	Nachhaltiger Konsum und Produktion, Leben an Land, Maßnahmen zum Klimaschutz

Kursmodul

Titel des Bestandteils der Lehrveranstaltung	Forstwesen
Code der Lehrveranstaltung	40201A
Wissenschaftlich-disziplinärer Bereich	AGRI-03/B
Sprache	Englisch
Dozenten/Dozentinnen	Prof. Roberto Tognetti, Roberto.Tognetti@unibz.it https://www.unibz.it/en/faculties/agricultural-environmental-food-sciences/academic-staff/person/47243
Wissensch. Mitarbeiter/Mitarbeiterin	
Semester	Zweites Semester
KP	6
Verantwortliche/r Dozent/in	
Vorlesungsstunden	36
Laboratoriumsstunden	24

Stunden für individuelles Studium	90
Vorgesehene Sprechzeiten	18
Inhaltsangabe	Silviculture: definition of wood, tree, forest and silviculture; concept of forest ecosystem services; definition of afforestation, reforestation, and deforestation; forest dynamics and successional processes; principle of dendrochronology and dendroecology; site description; forest stand description management of coppices; management of even-aged forests; thinning; management of uneven-aged forests; Forest mensuration: fundamentals of biometrics and statistics; fundamentals of measuring tree growth and volume; methods for assessing forest biomass; principles of relascopy; sampling techniques and data analyses; measuring timber products.
Themen der Lehrveranstaltung	
Unterrichtsform	Lectures shall provide an overview of fundamental forest management concepts, with particular emphasis on the scientific basis of silvicultural practices. Field excursions shall offer real-world experiences, enabling students to visualize key ecological and silvicultural principles. Group exercises shall support the application of these concepts through the analysis of collected data. Supporting materials, including PowerPoint presentations, shall be made available in the course reserve collection on Teams.
Pflichtliteratur	Recent scientific literature shall be provided throughout the course to support lectures, field activities, and group exercises.
Weiterführende Literatur	Ashton M., Kelty M. (2018). The Practice of Silviculture (10th ed.). Wiley. Palik B.J., D'Amato A.W., Franklin J.F., K. Johnson N. (2020). Ecological Silviculture: Foundations and Applications. Waveland Press, Inc.

Kursmodul

Titel des Bestandteils der Lehrveranstaltung	Waldökologie

Code der Lehrveranstaltung	40201B
Wissenschaftlich-disziplinärer Bereich	AGRI-03/B
Sprache	Englisch
Dozenten/Dozentinnen	Prof. Leonardo Montagnani, leonardo.montagnani@unibz.it https://www.unibz.it/en/faculties/agricultural-environmental-food-sciences/academic-staff/person/24975
Wissensch. Mitarbeiter/Mitarbeiterin	
Semester	Zweites Semester
KP	6
Verantwortliche/r Dozent/in	
Vorlesungsstunden	36
Laboratoriumsstunden	24
Stunden für individuelles Studium	90
Vorgesehene Sprechzeiten	18
Inhaltsangabe	Understanding forest functioning in the context of the changing climate and human pressure. The concept of ecosystem Biogeochemical cycles Forest productivity Interaction among species in forest ecosystems: Forest and disturbances Forests and climate change Ecological successions Models and their role in resource management.
Themen der Lehrveranstaltung	Kreisläufe von Kohlenstoff, Wasser und Stickstoff Der Energiefluss und das Nahrungsnetz Der menschliche Einfluss auf die Funktionsweise von Waldökosystemen Der Feuerkreislauf
Unterrichtsform	Die Vorlesungen vermitteln einen umfassenden Überblick über die Grundlagen der Waldekologie, mit besonderem Schwerpunkt auf den wissenschaftlichen Grundlagen ökologischer Prozesse.

	Didaktische Exkursionen ins Gelände ermöglichen praxisnahe Erfahrungen und fördern das Verständnis sowie die Einordnung zentraler ökologischer und forstwissenschaftlicher Prinzipien. Einzel- und Gruppenübungen unterstützen die Anwendung der erworbenen Konzepte durch die Analyse der erhobenen Daten. Begleitende Lehrmaterialien, einschließlich PowerPoint-Präsentationen, werden in der Kursablage auf Teams zur Verfügung gestellt.
Pflichtliteratur	Die aktuellste wissenschaftliche Literatur wird im Verlauf der Lehrveranstaltungen bereitgestellt, um die Präsenzlehre, die Geländeübungen und die Gruppenarbeiten zu unterstützen.
Weiterführende Literatur	Kimmins J.P. (2005). Forest ecology: a foundation for sustainable forest management and environmental ethics in forestry. London: Macmillan Publishing. 3rd ed. Chapin III F.S., Matson P.A., Vitousek (2011). Principles of Terrestrial Ecosystem Ecology. Springer.