Syllabus

Descrizione corso

Titolo insegnamento	Scienze ed ecologia forestale
Codice insegnamento	40201
Titolo aggiuntivo	
Settore Scientifico-Disciplinare	AGR/05
Lingua	Inglese
Corso di Studio	Corso di laurea in Scienze agrarie, degli alimenti e dell'ambiente montano
Altri Corsi di Studio (mutuati)	
Docenti	prof. Roberto Tognetti, Roberto.Tognetti@unibz.it https://www.unibz.it/en/faculties/agricultural-environmental-food-sciences/academic-staff/person/47243
Assistente	
Semestre	Secondo semestre
Anno/i di corso	3
CFU	12
Ore didattica frontale	72
Ore di laboratorio	48
Ore di studio individuale	180
Ore di ricevimento previste	36
Sintesi contenuti	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.
Argomenti dell'insegnamento	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.
Parole chiave	Sustainable forest management, Mountain silviculture, Climate change, Biogeochemical cycles, Environmental disturbances.

Prerequisiti	Botany, Soil chemistry
Insegnamenti propedeutici	no
Modalità di insegnamento	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.
Obbligo di frequenza	no
Obiettivi formativi specifici e risultati di apprendimento attesi	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.
Obiettivi formativi specifici e risultati di apprendimento attesi (ulteriori info.)	
Modalità di esame	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.
Criteri di valutazione	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.
Bibliografia obbligatoria	Recent scientific literature will be provided during the course.

Bibliografia facoltativa	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.
Altre informazioni	
Obiettivi di Sviluppo Sostenibile (SDGs)	Utilizzo responsabile delle risorse, Utilizzo sostenibile della terra, Lotta contro il cambiamento climatico

Modulo del corso

Titolo della parte costituente del corso	Scienze forestali
Codice insegnamento	40201A
Settore Scientifico-Disciplinare	AGR/05
Lingua	Inglese
Docenti	prof. Roberto Tognetti, Roberto.Tognetti@unibz.it https://www.unibz.it/en/faculties/agricultural-environmental-food-sciences/academic-staff/person/47243
Assistente	
Semestre	Secondo semestre
CFU	6
Docente responsabile	
Ore didattica frontale	36
Ore di laboratorio	24
Ore di studio individuale	90
Ore di ricevimento previste	18
Sintesi contenuti	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.
Argomenti dell'insegnamento	
Modalità di insegnamento	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.
Bibliografia obbligatoria	Recent scientific literature shall be provided throughout the course to support lectures, field activities, and group exercises.
Bibliografia facoltativa	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.

Modulo del corso

Titolo della parte costituente del corso	Ecologia forestale
Codice insegnamento	40201B
Settore Scientifico-Disciplinare	AGR/05
Lingua	Inglese
Docenti	prof. Leonardo Montagnani,

	leonardo.montagnani@unibz.it https://www.unibz.it/en/faculties/agricultural-environmental-food-sciences/academic-staff/person/24975
Assistente	
Semestre	Secondo semestre
CFU	6
Docente responsabile	
Ore didattica frontale	36
Ore di laboratorio	24
Ore di studio individuale	90
Ore di ricevimento previste	18
Sintesi contenuti	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.
Argomenti dell'insegnamento	Cicli del carbonio, dell'acqua e dell'azoto Il flusso di energia e la rete trofic L'impatto umano sul funzionamento degli ecosistemi forestali Il ciclo del fuoco
Modalità di insegnamento	Le lezioni forniranno una panoramica dell'ecologia forestale di base, con particolare enfasi sulle basi scientifiche dei processi ecologici. Le escursioni sul campo offriranno esperienze concrete, permettendo agli studenti di visualizzare i principi chiave dell'ecologia e della selvicoltura. Esercizi individuali e di gruppo sosterranno l'applicazione di questi concetti attraverso l'analisi dei dati raccolti. I materiali di supporto, comprese le presentazioni PowerPoint, saranno resi disponibili nella raccolta del corso su Teams.
Bibliografia obbligatoria	Letteratura scientifica più recente sarà resa disponibile nel corso

	delle lezioni per supportare le attività di didattica frontale, le esercitazioni in campo e i lavori di gruppo.
Bibliografia facoltativa	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.