Syllabus

Course Description

Course Title	Advanced ecological restoration and protection forestry
Course Code	47074
Course Title Additional	
Scientific-Disciplinary Sector	
Language	English
Degree Course	Master in Environmental Management of Mountain Areas
Other Degree Courses (Loaned)	
Lecturers	Prof. Roberto Tognetti, Roberto.Tognetti@unibz.it https://www.unibz.it/en/faculties/agricultural-environmental-food-sciences/academic-staff/person/47243
Teaching Assistant	
Semester	Second semester
Course Year/s	1
CP	6
Teaching Hours	36
Lab Hours	24
Individual Study Hours	90
Planned Office Hours	18
Contents Summary	The Protection forestry module aims to provide students with knowledge of the role of mountain forests in mitigating and preventing natural hazards, while ensuring the continued provision of other ecosystem services. The module focuses on forest management strategies specifically designed to enhance the protective functions of mountain forests. For each type of natural hazard and forest category in the Alpine region, the most suitable management approaches will be discussed, with reference to real-world case studies.
Course Topics	- Definition of protection forests and hazards

	- Recalls about tree characteristics and organs - Extreme events and return period - Target profile - Landslides, avalanches, rockfalls - Soil stability and bioengineering - Approaches, methodologies, tools, and practical measures in specific ecosystem restoration projects throughout the world - Current trends and new frontiers of restoration ecology - Specific ecosystem and land-use types - Socio-economic aspects of specific ecosystem restoration projects
Keywords	Extreme events, Disturbance, Land use change, Restoration ecology, Protection forestry
Recommended Prerequisites	
Propaedeutic Courses	No
Teaching Format	Lectures shall introduce fundamental concepts in protection forestry and ecological restoration with particular emphasis on the scientific foundations of environmental change restoration, adaptation, and mitigation. Field excursions shall provide direct experience in observing and understanding forest ecophysiological and ecosystem restoration processes. Laboratory exercises shall enable students to apply theoretical concepts through the analysis of empirical data. Supporting materials, including PowerPoint presentations, shall be made available on Teams.
Mandatory Attendance	No
Specific Educational Objectives and Learning Outcomes	Knowledge and understanding --> - incorporate socio-economic aspects into mountain rural development, including the promotion of tourism and local products - identifying and finding sources of funding, and managing rural development projects - apply knowledge of landscape ecology, spatial planning and environmental rehabilitation in the sustainable management of mountain environments - assess the natural hazards typical of mountain environments and their impact on society, identifying the most appropriate mitigation strategies

	- assess the natural hazards typical of mountain environments and their impact on society, identifying the most appropriate mitigation strategies - collaborate with other professionals in the fields of architecture, engineering and natural sciences Ability to apply knowledge and understanding --> Knowledge and learning abilities are achieved through course attendance, practical activities both in the field and in the laboratory and through personal study. The achievement of the learning objectives will be tested through oral and/or written examinations, as well as through the guided preparation of seminars on topics specific to the Master's degree. In addition to having acquired a solid scientific-technological basis, the graduate of the Master's degree in "Environmental Management of Mountain Areas" acquires the ability to tackle and solve new problems. Thanks to a technical-scientific education, integrated with technological-managerial subjects, he or she is able to analyse, design, plan and manage the mountain territory and its specificities, vulnerabilities and characteristics. The graduate must also be able to coordinate interdisciplinary teams in the fields of ecology, restoration and functional maintenance of mountain ecosystems, agro-forestry management and socio-economic development. The tests (written and oral examinations, reports) and exercises involve the performance of specific tasks in which the student demonstrates mastery of tools, methodologies and critical autonomy. The final thesis will play a central role in assessing the students' ability to design, plan, and manage forest ecosystems, with particular reference to the mountain environment. Autonomy of judgement --> The didactic approach envisages that theoretical training in courses is accompanied by individual and group work that encourages active participation, a proactive attitude and the capacity for autonomous elaboration. The writing of the thesis, which is experimental in nature, will follow the editorial style of a scientific publication, further consolidating the student's critical skills.

	Other key training moments for the development of independent judgement include educational visits and internships in companies and public or private institutions. Communication skills --> Graduates will be able to work professionally and scientifically in one or more foreign languages, since in addition to English (the official language of the course) in which all compulsory and part of the optional courses are offered, they will be able to follow optional courses offered in Italian or German. The Language Centre of the Free University of Bozen/Bolzano also offers students, in accordance with the policy for trilingualism that characterises the profile of the Free University of Bozen/Bolzano, the possibility of taking extracurricular courses at level (A1-C1) in Italian and German. Finally, the graduate will be able to effectively communicate what he or she has learnt to the different professional categories with which he or she works and has the ability, given the international nature of the degree course, to share projects with foreign interlocutors. Written and oral communication skills are developed in seminars, tutorials and training activities, which also include the preparation of written reports and documents and the oral presentation of these, compulsorily in English and possibly in Italian and German for optional courses. The acquisition and assessment/verification of the achievement of communication skills is also envisaged through the writing of the final dissertation and its discussion in English. The Master's degree course promotes the acquisition of additional language skills (Italian/German), which are also aimed at increasing the ability of graduates to effectively market themselves on the labour market in part of the Alpine region (Austria-Switzerland-Italy-Germany). Learning capacity --> The graduate will have the ability to learn by synthesising the notions learnt in the course of studies, in order to address complex design issues, by expanding and updating the knowledge and technical skills acquired by using analysis, design and management tools appropriate to the situations in which the graduate operates. The graduate will be able to manage the different information

	networks in order to be able to continue to learn and thus to update himself/herself for his/her own cultural improvement and professional advancement. In addition, the graduate will be able to identify the appropriate training tools and paths for the development of their own cultural and specialist knowledge. Learning skills are attained during all phases of the course of study. The Master's degree course enables students to consolidate their self-study skills, especially when they carry out group work on proposed topics; again, this ability is enhanced during a compulsory course, which involves group work, and subsequently in the preparation of the final thesis of an experimental nature. In particular, this practical course requires students to work in small groups (3-5) on a project (e.g., rural development plan for a mountainous area, rehabilitation project for a degraded terrestrial or river ecosystem) from its initial stages (identification of objectives, conceptual development of actions, collection of available data) through to interaction with the various stakeholders and communication activities towards society. The projects will take place under the supervision of two or more professors from the two universities involved, but also by having the students interact with professional firms and/or public technical offices that have already expressed interest and willingness to do so. Learning ability is assessed through continuous forms of verification during the training activities and during the conduct of the activity related to the final examination.
Specific Educational Objectives and Learning Outcomes (additional info.)	
Assessment	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.
Evaluation Criteria	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.
Required Readings	Recent scientific literature shall be provided throughout the course to support lectures, field activities, and group exercises.

Supplementary Readings	
Further Information	
Sustainable Development Goals (SDGs)	Life on land, Climate action

Course Module

Course Constituent Title	Advanced ecological restoration and protection forestry
Course Code	47074A
Scientific-Disciplinary Sector	BIO/03
Language	English
Lecturers	
Teaching Assistant	
Semester	Second semester
CP	3
Responsible Lecturer	
Teaching Hours	18
Lab Hours	12
Individual Study Hours	45
Planned Office Hours	9
Contents Summary	- Approaches, methodologies, tools, and practical measures in specific ecosystem restoration projects throughout the world - Current trends and new frontiers of restoration ecology - Specific ecosystem and land-use types - Socio-economic aspects of specific ecosystem restoration projects
Course Topics	
Teaching Format	Lectures shall introduce fundamental concepts in ecological restoration with particular emphasis on the scientific foundations of environmental change restoration. Field excursions shall provide direct experience in observing and understanding ecosystem restoration processes. Laboratory exercises shall enable students to apply theoretical concepts through the analysis of empirical data. Supporting materials, including PowerPoint presentations, shall be made available on Teams.

Required Readings	Recent scientific literature shall be provided throughout the course to support lectures, field activities, and group exercises.
Supplementary Readings	

Course Module

Course Constituent Title	Protection forestry and natural hazards
Course Code	47074B
Scientific-Disciplinary Sector	AGR/05
Language	English
Lecturers	Prof. Roberto Tognetti, Roberto.Tognetti@unibz.it https://www.unibz.it/en/faculties/agricultural-environmental-food-sciences/academic-staff/person/47243
Teaching Assistant	
Semester	Second semester
CP	3
Responsible Lecturer	
Teaching Hours	18
Lab Hours	12
Individual Study Hours	45
Planned Office Hours	9
Contents Summary	- Definition of protection forests and hazards - Recalls about tree characteristics and organs - Extreme events and return period - Target profile - Landslides, avalanches, rockfalls - Soil stability and bioengineering
Course Topics	The Protection Forestry module aims to provide students with knowledge of the role of mountain forests in mitigating and preventing natural hazards, while ensuring the continued provision of other ecosystem services. The module focuses on forest management strategies specifically designed to enhance the protective functions of mountain forests. For each type of natural hazard and forest category in the Alpine region, the most suitable management approaches will be discussed, with reference to real-

	world case studies.
Teaching Format	Lectures shall introduce fundamental concepts in protection forestry with particular emphasis on the scientific foundations of environmental change adaptation and mitigation. Field excursions shall provide direct experience in observing and understanding forest ecophysiological processes. Laboratory exercises shall enable students to apply theoretical concepts through the analysis of empirical data. Supporting materials, including PowerPoint presentations, shall be made available on Teams.
Required Readings	Recent scientific literature shall be provided throughout the course to support lectures, field activities, and group exercises.
Supplementary Readings	