

Syllabus

Course description

Course title	Ecosystem Restoration and Natural Hazards Mitigation
Course code	47007
Scientific sector	BIO/03 - AGR/08
Degree	Environmental Management of Mountain Areas
Semester	2
Year	I
Academic year	2016/2017
Credits	6
Modular	<i>yes</i>

Total lecturing hours	40
Total lab hours	-
Total exercise hours	20 (field trips)
Attendance	Optional
Prerequisites	-
Course page	Module 2 on UNIBZ Moodle website

Specific educational objectives	This course belongs to those characterizing the Master program, in the area of land conservation and restoration. The course aims at teaching basic and applied aspects of Restoration Ecology, in particular related to mountain areas, with regard to ecology, biology, and geography, as well as the necessary scientific knowledge to mitigate the adverse effects of natural hazards typical of mountain areas, i.e. snow avalanches, landslides, debris flows and sediment-rich floods. By the end of the course, the student is expected to have acquired: 1) the most updated scientific knowledge on the main characteristics of these natural hazards; 2) the capacity to predict the possible interactions between fluvial and colluvial processes at the basin scale; 3) the capability to identify the most adequate structural and non-structural measures to mitigate the associated risk, as well as their pros and cons; 4) knowledge on basic and applied aspects of ecosystem restoration; 5) the capacity to plan and manage ecosystem restoration; and 6) the knowledge on approaches, methodologies, tools, and limitations of ecosystem restoration, in particular under current and future trends of environmental and societal changes.
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Module 1	Ecosystem Restoration
Lecturer	Tommaso Sitzia Tommaso.Sitzia@unibz.it , tommaso.sitzia@unipd.it
Scientific sector of the	BIO/03

lecturer	
Teaching language	English
Office hours	See on timetable
Teaching assistant (if any)	Andrea Andreoli
Office hours	-
List of topics covered	PART I. Project Planning Framework for Ecological Restoration Restoration Project Management Defining the Project PART II. Project Design Site Analysis Design Approach Design Water and Soil Plant Material PART III. Project Implementation Restoration Project Documents Construction and Installation PART IV. Project Aftercare Maintenance and Stewardship Weed Management and Invasive Species Control Monitoring and Evaluation PART V. Synthesis of the Process
Teaching format	The teaching includes: indoor and outdoor lectures. The indoor lectures make use of digital presentations and videos. Moreover, projects dealing with ecological restoration will be discussed in class.

Module 2	Management of Natural Hazards in Mountain Basins
Lecturer	Francesco Comiti, building K, office K203, email francesco.comiti@unibz.it , tel: 0471017126, webpage: https://www.unibz.it/en/faculties/sciencetechnology/academic-staff/person/27445-francesco-comiti
Scientific sector of the lecturer	AGR/08
Teaching language	English
Office hours	From Tuesday to Friday, upon arrangement by email
Teaching assistant (if any)	Michael Engel
Office hours	upon arrangement by email
List of topics covered	The course will cover the following topics: 1. Basics of mountain geomorphology 2. Hillslope processes (snow avalanches, landslides) 3. Debris flows processes 4. Flood processes in mountain streams 5. Definition of hazard, vulnerability and risk 6. Structural and non-structural mitigation measures
Teaching format	In this course the theoretical concepts are presented in the class by the Professor whereas field excursions are led by the Professor with the teaching assistant. Power Point presentations of the lectures will be made

	available on the Moodle website of the University, along with links to external resources and exercises. Additional material will be provided on selected topics.
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Learning outcomes	Knowledge and understanding of i) basic and applied aspects and methodologies in Restoration Ecology; ii) ecosystem functioning and services as well as human impact on mountain ecosystems and their restoration after degradation; iii) main geomorphological processes typical of mountain areas and of their possible management strategies Applying knowledge and understanding to i) ecosystem management and restoration, solving environmental problems by restoration and sustainable management or within research projects; ii) in the geomorphological analysis of mountain landscapes and in the proposal of the most suitable mitigation measures against hazards. Making judgements on ecosystem changes, human impact and ecosystem degradation, natural hazards and management/restoration options through the personal interpretation of the study areas visited during the field trips Communication skills to present basic and applied aspects of restoration ecology, of geomorphological processes in mountain areas and of management strategies to stakeholders, scientists, and the public clearly and unambiguously with pertinent and adequate technical terminology Learning skills to autonomously deepen and update the knowledge acquired during the course seeking relevant information on scientific and technical literature, for their future professional and/or academic studies
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Assessment	The assessment of students' outcomes will be carried out through i) written exam; ii) oral exam; iii) individual written reports and presentations
Assessment language	English
Evaluation criteria and criteria for awarding marks	The final grade for the entire course will be calculated as the average of the final grades obtained in the two modules. The mark for Module 1 will be assigned based on a final oral exam. The mark for Module 2 will be assigned based on an oral

	exam (80 %) and on an individual report (20 %). Relevant for assessment of student reports: ability to use correct technical terminology, to present recent scientific results and to apply a critical thinking. Relevant for the oral exam assessment are correctness and clarity of answers, mastery of the technical language, capability to establish relationships between different topics.
Required readings	• J. Rieger, J. Stanley, R. Traynor (2014) Project Planning and Management for Ecological Restoration. Island Press, Washington, DC. • P. L. Bierman and D. R. Montgomery (2013) Key concepts in Geomorphology. Macmillan learning (selected chapter indicated in class) • Scientific papers provided in class
Supplementary readings	• Additional scientific papers provided in class