Freie Universität Bozen
Libera Università di Bolzano
Università Liedia de Bulsan

Syllabus
Course description

Course title	Natural risks in mountain areas: processes and mitigation strategies
Course code	47052
Scientific sector	AGR/08
Degree	Environmental Management of Mountain Areas
Semester	1
Year	*I*
Academic year	2024/2025
Credits	3
Modular	*no*

Total lecturing hours	20
Total lab hours	-
Total exercise hours	10
Attendance	Recommended
Prerequisites	-
Course page	2024/25 - Natural risks in mountain areas: processes and mitigation strategies - Michele Larcher - 47052 | General | Microsoft Teams

Specific educational objectives	This course belongs to those characterizing the Master program. By the end of the course, the student is expected to have acquired: 1) the most updated scientific knowledge on the main characteristics of natural hazards in mountain areas; 2) the basics of river hydraulics and sediment transport; 3) the capacity to predict the possible interactions between colluvial and fluvial processes at the basin scale; 4) the capacity to identify risks mitigation strategies associated to natural hazards.

Lecturer	Michele Larcher, building C, office C5.04, email michele.larcher@unibz.it , tel: 0471 017694
Scientific sector of the lecturer	AGR/08
Teaching language	English
Office hours	Any time, upon prior arrangement by email
Teaching assistant (if any)	Felix Pitscheider
Office hours	upon arrangement by email
List of topics covered	The course will cover the following topics: 1. Introduction to natural risks in mountain areas 2. Basics of river hydraulics 3. Initiation of sediment motion and basics of sediment transport 4. Hillslope processes

	5. Debris flows 6. Definition of hazard, vulnerability and risk 7. Overview of modelling tools for natural hazards prediction 8. Hints of structural and non-structural mitigation measures
Teaching format	Theoretical concepts are presented in the class by the professor and field excursions are led by the professor with the teaching assistant. Teaching material and the transcription of the blackboard will be made available in MS Teams. Additional material will be provided on selected topics.

Learning outcomes	**Knowledge and understanding** of: *i*) basics of mountain river hydraulics and sediment transport; *ii*) main geomorphological processes typical of mountain areas *iii*) identifying natural hazards and related risks in mountain areas; *iv*) pros and cons of possible management strategies. **Applying knowledge and understanding** to the analysis of hazard scenarios in mountain environments and the identification of possible risk mitigation measures. **Making judgements** on types and magnitude of natural hazards and management options through the personal interpretation of the study areas. **Communication skills** to present basic and applied aspects of fluvial and colluvial 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.

Assessment	The assessment of students' outcomes will be carried out through *i*) exam on the contents of the course and *ii*) individual written report.
Assessment language	English
Evaluation criteria and criteria for awarding marks	The mark will be assigned based on the exam (80 %) and on an individual report (20 %). Relevant for assessment of student reports: ability to use correct technical terminology, to perform the analysis of natural risks and possible mitigation strategies and to apply a critical thinking. Relevant for the written exam assessment are correctness and clarity of answers, mastery of the technical language,

	capability to establish relationships between different topics.

Required readings	• A. Armanini (2018) Principles of river hydraulics. Springer (selected chapters). • P. L. Bierman and D. R. Montgomery (2013) Key concepts in Geomorphology. Macmillan learning (selected chapters). • Teaching material and scientific papers provided in class.
Supplementary readings	• Additional scientific papers provided in class.