

Syllabus

Course description

Course title	Management of Mountain Rivers
Course code	47056
Scientific sector	AGR/08 ICAR/02
Degree	EMMA
Semester	2
Year	I
Academic year	2024/25
Credits	6
Modular	Yes

Total lecturing hours	40 (20 + 20)
Total lab hours	20 (10 + 10)
Total exercise hours	
Attendance	Not required
Prerequisites	-
Course page	https://www.unibz.it/en/faculties/agricultural-environmental-food-sciences/master-environmental-management-mountain-areas/course-offering/ 2024/25 - Hydromorphology of mountain rivers - Andrea Andreoli - 47056A General Microsoft Teams

Specific educational objectives	<p>This course belongs to those characterizing the Master program. The course aims at teaching theoretical and applied aspects of river management, in particular related to mountain channels, which must combine the conservation/enhancement of environmental quality with a certain level of flood risk mitigation.</p> <p>By the end of the course, the student is expected to have acquired: 1) the most updated scientific knowledge on river hydromorphology and on flood mitigation strategies; 2) the capacity to predict the possible interactions across the different spatial and temporal scales in river systems; 3) the capacity to assess the hydromorphological alterations induced by human activities in mountain rivers; 4) the capability to identify and design the most adequate measures to mitigate flood risk as well as to favor the natural morphological processes; 5) the capacity to establish river management plans.</p>
--	--

Module 1	Hydromorphology of mountain rivers
Lecturer	Dr Andrea Andreoli, office K3.04 (building K, piazza Università 5, 3rd floor), andrea.andreoli@unibz.it , tel: +39 0471 017171

Scientific sector of the lecturer	AGR/08
Teaching language	English
Office hours	Any time upon prior arrangement
Teaching assistant (if any)	Dr. Vittoria Scorpìo, vscorpìo@unimore.it
List of topics covered	<ul style="list-style-type: none"> • Basics of river hydraulics and sediment transport • Scales in river morphology • Classification of river types and geomorphic units • Assessment of rivers' morphological quality
Teaching format	<p>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.</p> <p>Power Point presentations of the lectures will be made available on TEAMS, along with links to external resources and exercises. Additional material will be provided on selected topics.</p>

Module 2	Flood risk mitigation measures in mountain basins
Lecturer	Prof. Ing. Maurizio Righetti, office C5.03(building C, piazza Università 5, 5th floor), maurizio.righetti@unibz.it , tel: +39 0471 017693
Scientific sector of the lecturer	ICAR/02
Teaching language	English
Office hours	
Teaching assistant (if any)	Dr. Pranav Dhawan, pranav.dhawan@unibz.it
List of topics covered	<ul style="list-style-type: none"> • Flood hydrology and statistics of extreme events: concepts and models • Prediction of large wood and bedload transport during floods • Prediction of geomorphic changes during floods • Design of river management structures in mountain torrents • Design of river management structures in lowland rivers • Integrated river management interventions
Teaching format	<p>In this course the theoretical concepts are presented in the class by the Professor, who also leads the field excursions (along with local river managers)</p> <p>Power Point presentations of the lectures will be made available on TEAMS, along with links to external resources and exercises. Additional material will be provided on selected topics.</p>

Learning outcomes	<p>Knowledge and understanding of i) basic and applied aspects and methodologies in river management science; ii) river functioning as well as human impacts on their processes; iii) main geomorphological processes typical of mountain channels and of their possible management strategies; iv) pros and cons of different river management strategies.</p>
--------------------------	--

	<p>Applying knowledge and understanding to i) the hydromorphological analysis of mountain channels and to ii) river management, including restoration actions and risk mitigation;</p> <p>Making judgements on river dynamics, on human impacts on fluvial processes, on flood hazard type and magnitude, as well as on management options through the personal interpretation of the study areas visited during the field trips</p> <p>Communication skills to present basic and applied aspects of river processes and management strategies to stakeholders and scientists clearly and unambiguously with pertinent and adequate technical terminology</p> <p>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</p>
<p>Assessment</p>	<p>For each module, an written examination (3 open questions) for the theoretical aspects and an individual report about the computer-based exercise activities; for the second module oral examination is required</p>
<p>Assessment language</p>	<p>English</p>
<p>Evaluation criteria and criteria for awarding marks</p>	<p>The final grade for the course will be calculated as the average of the final grades obtained in the two modules. The mark for both modules will be assigned based on the written and oral exam (80%) and the individual report (20%).</p> <p>Relevant for the assessment of student reports: ability to analyze correctly the context of the study cases, skills in critical thinking, ability to summarize.</p> <p>Relevant for the written exam assessment are correctness and clarity of answers, mastery of the technical language, capability to establish relationships between different topics.</p>
<p>Required readings</p>	<p>Course slides, scientific papers and selected book chapters posted on TEAMS platform</p>
<p>Supplementary readings</p>	<p>Fryirs, KA, Brierley, G.J (2012) Geomorphc Analysis of River Systems: An Approach to Reading the Landscape. Wiley, 360 pp, ISBN: 978-1-405-19274-3</p> <p>Wohl, EE (2013) Mountain Rivers Revisited. Water Resources Monograph AGU, ISBN 9780875903231</p> <p>Rinaldi M., Surian N., Comiti F., Bussetini M. (2012), Guidebook for the evaluation of stream morphological conditions by the Morphological Quality Index (MQI), ISPRA, Roma, 90 pp (available online)</p>

Conesa-Garcia M., Lenzi M.A. (2010) Check Dams, Morphological Adjustments and Erosion Control in Torrential Streams. Nova Publisher, ISBN: 978-1-60876-146-3.

Armanini, A. (2018) Principles of river hydraulics
ISBN 978-3-319-68099-6