PENS-225

Rhonescape

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Cursus	Sem.	Type
Projeter ensemble ENAC	BA4	Opt.

Language of teaching	English
Credits	4
Withdrawal	Unauthorized
Session	Summer
Semester	Spring
Exam	During the semester
Workload	120h
Weeks	
Hours	**48 weekly**
Lecture	4 weekly
Exercises	22 weekly
Project	22 weekly
Number of positions	

Il n'est pas autorisé de se retirer de cette matière après le délai d'inscription.

Summary

RHONEscape aims at realizing the necessary interdisciplinary educational background of the problematics affecting highly-corrected large rivers, by examining riverine ecological, hydrological and morphological spatial features with new methods of conceiving the space in and around rivers.

Content

Rivers have once served as the backbone of civilization as they represent vital freshwater resources that sustain greatest-on-earth lifeforms' biodiversity, and establish a direct link between the built and the natural environments. However, the push towards industrialization, increasing agricultural needs and growing urbanization across territories have resulted in the gradual degradation of streams. During this evolution, contemporary river systems have become more and more "hidden" and alienated from the population because of two main reasons. On the one hand, the gradual channelization of natural meandering or braided streams today "physically hides" the main water course behind dikes and levees, so as concrete or large riprap structures in urban areas reduce accessibility to the stream. On the other hand, dealing with river ecosystem problems exacerbated by climatic changes requires cross- and transdisciplinary approaches which are rarely adopted. This mirrors the "culturally hidden" public perception that flooding and drought events of rural-industrial and urban environments as well as environmental criticalities such the global loss of river ecosystem biodiversity are indeed part of the same problem, which has not been solved by the past river channelization (engineering) practice.
In this course we shall learn answering the following question: how can innovative river engineering projects better contribute to integrate the ecomorphological dynamics of large rivers (e.g., the Rhone-River), in the context of growing urbanization, land use constraints and global changing scenarios?
There is still a limited multi-disciplinary knowledge about natural or nature-like rivers - whether they are understood as natural ecosystems, cultural landscapes or artificial water infrastructure. However, the challenges within these areas are multiple and complex, hence requiring interdisciplinary approaches. An ecological engineering know-how is gradually emerging on the footprint of integrated urban, landscape, water and environmental management methods that are today used for river restoration or river revitalization projects. This allows for taking into combined consideration river's tributaries and their watershed space as well as their ecosystem ensemble, which together share public spaces and water management infrastructures.
ENAC week's RHONEscape attempts to expose students to the ecological, hydrological and morphological spatial issues affecting the problematics of large rivers. This will be done with the support of professional inputs, guided field observations, as well as analytical and operational methods. By crossing engineering, biology and architecturally related skills, this interdisciplinary approach shall engage in new design-based ideas regarding the future of the rivers' ecosystems, and ecohydraulics across spatial environments, and to use the experience acquired from the ongoing 3rd Rhone correction.

Keywords

Channelized river; river ecosystem; interdisciplinary project; water infrastructure; cultural landscape; ecosystem resilience; river hydrology; 3rd Rhone correction; river revitalization; ecological restoration; natural or nature-like river morphology

Learning Outcomes

By the end of the course, the student must be able to:

- Analyze and classify river systems, as well as their related geomorphological, ecological and hydraulic both characteristics and spatial requirement
- Elaborate interdisciplinary river analysis to identify the river ecosystem needs as a whole
- Design interdisciplinary river project performing some simple calculations and methods
- Contextualise river ecological, hydrological and territorial issues to elaborate integrative ecological engineering measures
- Create innovative ways of conceiving the space, forms, connectivity and morphological evolution of rivers in highly rural, industrial and urbanized landscapes

Transversal skills

- Use a work methodology appropriate to the task.
- Communicate effectively with professionals from other disciplines.
- Demonstrate a capacity for creativity.
- Access and evaluate appropriate sources of information.

Teaching methods

A theoretical and practical overview about contemporary rivers, in general, and the Rhone River in Central Valais, in particular, shall be introduced by professionals as far as the fields of fluvial ecohydrology and ecohydraulics, landscape architecture, ecosystem dynamics and resilience, environmental and civil engineering are concerned. A combination of lectures, on-site visits and workshops shall be undertaken between experts and students to build different analytical skills.
Each student teams shall be multi-disciplinary with the goal of encouraging exchanges and understanding between fields of expertise. Fieldwork and analysis shall be undertaken across designated reaches of the Rhone River in Central Valais territories to generate specific understanding and new ideas.

Assessment methods

Assessment will be made on the basis of the final presentation as well as project materials submitted during the last day of the course - including but not limited to, findings from fieldwork, site analysis, innovative approaches and proposals.