

| Cursus | Sem. | Type |
|--|-------------|-------------|
| Environmental Sciences and Engineering | MA2, MA4 | Opt. |
| Territories in transformation and climate minor | E | Opt. |
| Urban Planning and Territorial Development minor | E | Opt. |

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| Language of teaching | English |
| Credits | 3 |
| Session | Summer |
| Semester | Spring |
| Exam | During the semester |
| Workload | 90h |
| Weeks | 14 |
| Hours | 3 weekly |
| Lecture | 1 weekly |
| Exercises | 2 weekly |
| Number of positions | |

Summary

The course introduces the concept of green and blue infrastructure in the context of global warming. It presents practical methods for planning, developing, and maintaining an efficient network of green and blue infrastructure in urban areas.

Content

With over 60% of the world's population living in cities by 2030, global warming represents a significant challenge for urban development. By their positive impact on the urban environment, "green" (plant-based) and "blue" (water-based) infrastructures help cities to adapt and remain resilient in the face of climate change.

Green and blue infrastructure helps to improve city living conditions by reducing heat islands, controlling run-off water, filtering the air, depolluting water, protecting soil and enhancing biodiversity. They also provide services essential to the physical and mental well-being of the population and urban communities. Last but not least, their cost-benefit ratio is, in many cases, advantageous compared with conventional grey infrastructure.

The course introduces the development of green and blue infrastructure in urban areas. It enables students to familiarise themselves with the following themes:

- Urban challenges linked to climate change.
- Ecosystem services provided by green and blue infrastructures.
- Assessment and strategic planning of green and blue infrastructure in urban areas.
- Design, implementation and maintenance of green and blue infrastructure.
- Functional monitoring and cost-benefit assessment of green and blue infrastructure projects

The course places great emphasis on practical experience and case studies. It identifies key concepts and best practices for the urban development of green and blue infrastructures. It features contributions from recognised national and international experts.

Keywords

Green and blue infrastructure, nature-based solutions, ecosystem services, climate change, resilient cities, and biophilic architecture.

Learning Prerequisites

Required courses

The course does not require any prerequisites. It is aimed at people who want to understand and integrate the concept of green and blue infrastructure into urban development.

Learning Outcomes

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

- Define the concept of green and blue infrastructures and their contribution to the adaptation of cities to climate change.
- Analyze the type, density and distribution of green and blue infrastructure in an urban area.
- Design a strategic plan to develop an urban network of green and blue infrastructure that is ecologically, economically and socially efficient.
- Describe good practices for designing, building, maintaining and evaluating different urban green and blue infrastructure networks.
- Assess / Evaluate the state and availability of ecosystem services provided by green and blue infrastructure in a given area.

Teaching methods

An interactive course combining theoretical approaches, case studies, and practical exercises.

Expected student activities

Active participation in the course, reading of course documents, study of practical cases, individual and group exercises

Assessment methods

Continuous assessment during the semester:

- 2 exercises or individual projects = 50%
- 1 group project = 50%

Supervision

Others

- Availability of instructors during lessons
- Contact with the teacher by e-mail or telephone

Resources

Virtual desktop infrastructure (VDI)

No

Bibliography

- EBP, 2012: *Adaptation aux changements climatiques dans les villes suisses*. Rapport final du 16 août 2012 sur mandat de l'Office fédérale de l'environnement (OFEV). Ernst Basler + Partner (EBP), Berne, 79 p. Disponible en ligne : <https://www.are.admin.ch/are/fr/home/media-et-publications/publications/villes-et-agglomerations/anpassung-an-die-klim>
- House, E., C. O'Connor, K. Wolf, J. Israel, & T. Reynolds. (2016). *Outside our Doors: The benefits of cities where people and nature thrive*. Seattle, WA: The Nature Conservancy, Washington State Chapter, 28 p Retrieved from: https://www.nature.org/content/dam/tnc/nature/en/documents/Outside_Our_Doors_report.pdf.
- Metro Vancouver, (n.d): *Connecting the dots. Regional green infrastructure network resource guide*. Diamond Head Consulting Ltd, Ecoplan International and Calypso Design, for Metro Vancouver, British Columbia, Canada. Retrieved from: <https://metrovancover.org/services/regional-planning/Documents/connecting-the-dots.pdf>
- New York City, (2005). (October). *High Performance Infrastructure Guidelines: Best Practices for the Public Right-of-Way*. New York City Department of Design and Construction, Design Trust for Public Space. 229pp. Retrieved from: <https://www.nyc.gov/assets/ddc/downloads/Sustainable/high-performance-infra-guidelines.pdf>.

- OFEV (éd.), 2018 : *Quand la ville surchauffe. Bases pour un développement urbain adapté aux changements climatiques*. Office fédéral de l'environnement, Berne. Connaissance de l'environnement, No 1812 : 109 S. Disponible en ligne : www.bafu.admin.ch/dam/bafu/fr/dokumente/klima/uw-umwelt-wissen/hitze-in-staedten.pdf.download.pdf/uw-1812-f.pdf

Notes/Handbook

Course materials

Documents, articles, case studies, and exercises will be distributed throughout the semester.