CAS / MAS
REGENERATIVE
MATERIALS

earth . bio-based . reused

2020-2021
The Program

Construction industry consumes a tremendous amount of resources and is responsible for half of the greenhouse gas emissions and waste released from our societies. In the last decades, diverse solutions have been provided in order to align building technologies with current sustainability standards. However, despite these efforts, being less bad is simply not good enough and a shift towards a regenerative approach, which provides more positive benefits is then urgently needed. Alternative solutions out of earth, bio-based and reused materials are emerging all over the world and are triggering regenerative output, thanks to their capacity to contribute to the restoration and improvement of the surrounding natural and social environment. However, they are not widespread in the construction sector due to lack of information from decision makers and lack of competence from practitioners.

Objectives

The education program “Regenerative materials” aims to give practitioners tools and methods to use earth, bio-based and reused materials with efficiency and creativity in order to contribute to the necessary ecological and social transition in the construction sector. We propose a Certificate of advanced studies (CAS) for the management of projects with basic knowledge about earth, straw, and others bio-based materials or a Master of advanced studies (MAS) to strengthen construction knowledge with these “low-carbon” building materials. With this program we ambition to:

- Participate to the necessary ecological and social transition in the construction sector.
- Train specialists to conduct complex projects using earth, bio-based and reused materials with realistic and affordable solutions.
- Highlight exemplary architectural projects developing circular economy and the use of «low-carbon» materials.
- Offer a practical experience on real projects (new construction, thermal renovation of existing building stock).
- Create a network of professionals working for regenerative construction.

Target Audience

CAS «MANAGING A PROJECT WITH REGENERATIVE MATERIALS»
10-15 project managers, members of city technical services, building contractors, NGOs, architects, engineers, from Switzerland and abroad

MAS «BUILDING WITH REGENERATIVE MATERIALS»
10-15 architects and engineers from Switzerland and all over the world
Pedagogical Program

The program uses new teaching practices with participative methods, experimental lectures, hands-on exercises and project-based learning. Modules combining theoretical and practical aspects are open to the MAS and CAS students as well as sometimes to a wider public (input lectures).

Two teaching programs:
- The CAS-course «Managing a project with regenerative materials» explains how to achieve a project with non-conventional materials in the Western world as well as in emerging and developing countries. It covers ecological aspects (environmental footprint, carbon storage...), regulations (hygrothermal, fire resistance, seismic safety...), evaluation of the costs, social aspects (communication, empowerment of the population, training of craftsmen...). Taught skills enable to manage new construction projects but also energy retrofit and heritage conservation projects.
- The MAS-course «Building with regenerative materials» goes more into details with specific technical knowledge and skills. It explains how to use these ecological and local materials with appropriate structural design, technological design, material and building physics... The CAS-course gives an overview about these issues while the MAS-course goes further.

In both case, diverse modules dealing with practical issues are offered:
- The «Inspiration modules» propose all along the semester public input lectures from well-known specialists (e.g. Wang Shu, Anna Heringer, Simón Veléz...) to raise public awareness. Furthermore, the visit of inspiring buildings and construction sites (e.g. those realised by Martin Rauch...) will allow discussion with stakeholders involved in their realisation.
- The «Practical modules» gather real-life experiences that can prepare the students to apply their knowledge. They include hands-on workshops to understand the materials, technical experiments to test the different ways of building with earth, bio-based and reused materials as well as group projects to work on realistic calls for tenders.

<table>
<thead>
<tr>
<th>MAS</th>
<th>CAS</th>
<th>Ind. project</th>
<th>Spring semester</th>
<th>Individual research project/Design Build</th>
<th>Design Build work</th>
<th>MAS work</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
<td>Module 1</td>
<td>Module 2</td>
<td>Module 3</td>
<td>Module 4</td>
</tr>
</tbody>
</table>

The MAS-course is validated by a MAS-work that can deal with theoretical or practical issues. Students can work on an individual research project or participate with partner universities to a Design-Build project or to the renovation of a heritage site.
Duration
CAS – Starting in January 2020
12 credits, 5 weeks distributed over 1 semester (theoretical and practical modules + individual project)
MAS – Starting in January 2021
60 credits, 30 weeks
(1 semester with theoretical lectures and practical exercises + 1 semester dedicated to Master work)

Language of instruction
Courses are typically held in English. Visits and discussion with practitioners will be translated in English but given sometimes in French, German or Italian.
The MAS thesis is also written and defended in English. However, it is possible if requested, to write the thesis in German, French or Italian.

Tuition fees
CAS: 7’000 CHF / MAS: 12’000 CHF
It does not include living expenses.
Every year 3 scholarships are offered by Ricola Foundation for MAS applicants with low income possibilities

Infrastructure
Students are enrolled at ETH Zurich and are entitled to the use of all academic facilities, including student computer rooms, excellent libraries with electronic access to journals, discounted meals in student cafeterias, as well as access to sport and leisure facilities.

Living in Zurich
Zurich is a fantastic city, offering a high quality of life and diverse recreational and cultural activities. Its proximity to lakes and mountains makes Zurich an especially attractive place to live. The city has an international metropolitan flair.

Application
Applicants are asked to send a motivation letter, a CV and 2 references.