Syllabus: Circular Economy for a Sustainable Built Environment

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1. Course overview

Building construction is one of the most waste producing sectors. In the European Union, construction alone accounts approximately 30% of the Raw Material Input. In addition, the different life-cycle stages of buildings, from construction to end-of-life, cause a significant environmental impact related to energy consumption, waste generation and direct and indirect Greenhouse Gas emissions.

The Circular Economy model offers guidelines and principles for promoting more sustainable building construction and reducing the impact on our environment. If you are interested in taking your first steps in transitioning to more sustainable construction, then this is the course for you!

In this course you will become familiar with circularity as a systemic, multi-disciplinary approach, concerned with the different scales, from material to product, building, city, and region.

Some aspects of circularity that will be included in this course are maximizing reuse and recycle levels by closing material loops. You will also learn how the Circular Economy can help to realign business incentives in supply chains, and encourage consumer engagement through new business models enabling circular design, reuse, repair, remanufacturing and recycling of building components.

In addition, you will learn how architecture and urban design can be adapted according to the principles of the Circular Economy and ensure that construction is more sustainable. You will also explore in case studies how companies already profitably incorporate this new theory into the design, construction and operation of the built environment.

2. Learning objectives

By the end of this course, you will be able to:

Identify the scales of the built environment from materials and products to cities and regions and the life-cycle phases of buildings and building products and how they can be circular

Discuss the circular design and development approach for buildings and recognize the impact of a building on the environment during its life-cycle

Recognize the flows at different city scales and reflect on the variety of possible circular solutions in terms of energy, water and waste flows

Explore the potentials of intervening to steer the value web towards more circularity

3. What we expect from you

As an online student, we expect you to be an active participant in this course by contributing to a positive atmosphere. We want you to question, share and help others by engaging in meaningful discussions.

This course is meant to be a place where you learn with and from others. In this sense, we would like you to experience collaboration and peer feedback, so please make sure you follow along with other participants in order to enrich the overall learning experience.

You are expected to follow forum and collaboration guidelines. Respect the course policies, academic integrity and most importantly your fellow students.

4. What you can expect from us / the course team

The moderator will guide you throughout the course, launching the weekly content, promoting and engaging in discussions. Guidance and support will happen on a regular basis. We will try to respond to all your questions and posts within 48 hours. If this not possible for any reason, we will let you know.

5. Course structure

The course is organized in 6 modules. Each of them represents approximately between 3-4 hours of study time. A brief summary of each unit is presented below. Detailed instructions and resources will be provided during the course.

Week 1. Introduction

In this fist week you'll get to know the course structure, get familiarized with the virtual learning environment, complete your profile, meet your fellow students and the moderator. These introductory tasks should be completed in the beginning of the course, after your first login. In addition, we will discuss the principles of the Circular Economy and how the Circular Built Environment can apply to a number of systemic levels. You will be introduced to the main terms and the Circular Built Environment framework.

Week 2. Product

This week focuses on the products and materials, the base ingredient of buildings. What their life-cycle is and how they determine the overall life-cycle performance of buildings. You will explore the principles of design for disassembly and how this process can extend the useful life of the built product. Moreover, you will get familiar with the material recovery practices and the ways to bring the products back to the circle.

Week 3. Building

This week we will discuss the buildings' layers and their life-cycle and explore how the principles of Circular Economy influenced the design of the featured case study buildings. You will be familiarized with the role of business models within the design and development process of a building.

Week 4. City

This week we will discuss how circularity is connected to the neighborhood and city level. We will deduct the most important flows that enter, circulate and leave the urban environment every day: water, energy and waste. You will explore different circular solutions depending on the scale (household, neighborhood, city) and the various ways in which solutions can be organized (individually, collectively or centrally).

Week 5. Region

This week introduces to one comprehensive assignment that aims to explore different impacts of thinking through scales. Furthermore, the assignment focuses on the geographical value chain of building products and reflects on possible environmental impact of the different life-cycle stages and activities along the value web.

Week 6. Wrap up

This week discusses how the various aspects are impacting the implementation of the circularity in the built environment and where Europe in this context. Finally, we will sum up and come to an integrated view on the future of the Circular Built Environment.

6. Resources, Tools & Browsers

All educational resources will be available in the course. They consist of short videos, readings, quizzes, assignments and forum discussions to support you in the completion of the weekly learning activities.

We support the following browsers: Chrome, Firefox and Safari.

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