Course 1 - Innovative and transnational teaching methodologies applied to BUILD2050

20 March 2023 – 21 April 2023

Leader

Susana Lucas, IPS – Instituto Politécnico de Setúbal / Polytechnic Institute of Setúbal.

Contributors

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Total duration of the course

25 hours, 5 hours per week from 20 March 2023 to 21 April 2023.
The course is equal to 1 ECTS credit, 25 CFP for Italian Engineers (members of "Ordine degli Ingegneri") and 20 CFP for Italian Architects (members of "Ordine degli Architetti").

Course 1 "Innovative and transnational teaching methodologies applied to BUILD2050" focuses on buildings tecnologies that are used today in perspective of what will be used in 2050.

The Learning Objectives are:

1. Identify the legal and normative requirements about building;
2. Analyse the differences between buildings now and buildings in 2050.

Image credits: Susana Lucas, 2022

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Course 2 - Zero Energy and Positive Energy Buildings towards the full decarbonization

24 April 2023 – 26 May 2023

Leader

Maria Koukou, NKUA - Ethniko Kai Kapodistriako Panepistimio Athinon / National and Kapodistrian University of Athens.

Contributors

Michail Gr. Vrachopoulos (NKUA), Christos Manasis (NKUA), Maria Koukou (NKUA), John Konstantaras (NKUA), Leda Tzannetou (NKUA), Luis Coelho (IPS), Nuno Pereira (IPS), João Francisco (IPS), Paulo Fontes (IPS), João Garcia (IPS), Giovanni Semprini (UNIBO), Constantinos Sourkounis (RUB), Pavlos Tourou (RUB), Magdalena Dąbrowska (SGGW), Michał Awtoniuk (SGGW), Joanna Aleksiezuk (SGGW).

Total duration of the course

25 hours, 5 hours per week from 24 April 2023 to 26 May 2023.
The course is equal to 1 ECTS credit, 25 CFP for Italian Engineers (members of "Ordine degli Ingegneri") and 20 CFP for Italian Architects (members of "Ordine degli Architetti").

Course 2 "Zero Energy and Positive Energy Buildings towards the full decarbonization" consists of five modules that, together, provide a full presentation of the required steps to achieve Zero Energy and Positive Energy Buildings towards the full decarbonization. It is a full tutorial, meant to engage and challenge students to consider the many levels and options involved in advancing energy efficiency in buildings towards Zero Energy and Positive Energy Buildings. The course covers mainly the technical and design dimensions necessary to practically engage the participants on the topic.

Image credits: Source : https://theconversation.com/buildings-consume-lots-of-energy-heres-how-to-design-whole-communities-that-give-back-as-much-as-they-take-133871

Learning Objectives:

1. Introduction to technologies employed in a ZEB / PEB: generation, consumption, passive and active interventions;
2. Analyse energy use profiles. Analyse the energy use of a building. Case studies of designs and implementation of active and passive interventions. - Calculate electrical and thermal loads. Calculations and dimensioning of systems used in ZEBs/PEBs;
3. Select appropriate energy reducing measures, evaluate reduction in net energy usage and CO2 footprint. Various use cases and evaluate impact of interventions and other energy reducing measures.

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Course 3 - Circular water management in Buildings

29 May 2023 – 30 June 2023

Leader

Nelson Carriço, IPS – Instituto Politécnico de Setúbal / Polytechnic Institute of Setúbal.

Contributors

Susana Lucas (IPS), Nuno Pereira (IPS), Ricardo Salgado (IPS), Carla Gamelas (IPS), Marco Maglionico (UNIBO), Margherita Altobelli (UNIBO), and Margherita Evangelisti (UNIBO).

Total duration of the course
25 hours, 5 hours per week from 29 May 2023 to 30 June 2023.
The course is equal to 1 ECTS credit, 25 CFP for Italian Engineers (members of "Ordine degli Ingegneri") and 20 CFP for Italian Architects (members of "Ordine degli Architetti").

Course 3 "Circular water management in Buildings" focuses on the use of water in buildings in the past and now.

The Learning Objectives are:

1. Identify the basic and principles of circular water management;
2. Compare the differences in water management between historical and nowadays buildings;
3. Explain what is needed to implement circular water management in existing and brand-new buildings.

Image credits: Susana Lucas, 2021

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Course 4 - (Innovative Construction) Materials

11 September 2023 – 13 October 2023

Leader

Elisa Franzoni, UNIBO - Alma Mater Studiorum Università di Bologna / University of Bologna.

Contributors

Maria Chiara Bignozzi (UNIBO-DICAM), Clelia Marrone (UNIBO-DICAM), Giulia Masi (UNIBO-DICAM), Vincenzo Sapienza (UNICT - DICAr), Gianluca Rodonò (UNICT - DICAr), Claudio Lantieri (UNIBO-DICAM), Margherita Pazzini (UNIBO-DICAM), Rossano Scoccia (POLIMI), Mohammad Abdollah (POLIMI), Susana Lucas (IPS), Cristina Oliveira (IPS), Michail Gr. Vrachopoulos (NKUA), Maria K. Koukou (NKUA).

Total duration of the course

25 hours, 5 hours per week from 11 September 2023 to 13 October 2023.
The course is equal to 1 ECTS credit, 25 CFP for Italian Engineers (members of "Ordine degli Ingegneri") and 20 CFP for Italian Architects (members of "Ordine degli Architetti").

Course 4 "Innovative Construction Materials" focuses on innovative construction materials and their applications in different European countries.

The course is divided into two parts. The first one is centred on the delivering of a shared knowledge base about the following concepts:

- the relationship between materials and environmental sustainability, deepening recent innovation in ceramic materials, composite materials, and materials for paving and streets;
- the choice of envelope materials for buildings and the use of passive interventions (i.e., solar chimneys, reflective insulation and Phase Change Materials, PCMs) for energy saving;
- how materials and the health of inhabitants are interconnected in buildings;
- structural concerns in sustainable construction.

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The second part is application-oriented as it aims to develop a design project proposal based on local, sustainable circular materials, technics, and innovative solutions, using technical datasheets and other specific databases provided during the classes. In this step, the participants will work in a team from the same country and then present and discuss their proposals with all the trainees.

Course 4 Learning Objectives are the following:

1. Identify innovative construction and local materials and their experimental applications in different contexts/countries and EU projects;
2. Understand how innovative construction and local materials are used by companies, industries and other institutions that work with construction materials;
3. Implement a design proposal: focus on the choice and use of locally available innovative sustainable, and circular construction materials;
4. Analyze the design proposals.

Erasmus+

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Course 5 - Digitization of Buildings

16 October 2023 – 17 November 2023

Leader

Mohammad Abdollah Fadel Abdollah, POLIMI – Politecnico di Milano / Polytechnic Institute of Milan.

Contributors

Rossano Scoccia (POLIMI), Claudio Sapaterio (IPS), Susana Lucas (IPS), Fabrizio Ivan Apollonio (UNIBO), Cristiana Bartolomei (UNIBO), Caterina Morganti (UNIBO), Angelo Massafra (UNIBO), Michal Awtoniuk (SGGW) and Joanna Aleksiejuk (SGGW).

Total duration of the course

25 hours, 5 hours per week from 16 October 2023 to 17 November 2023.
The course is equal to 1 ECTS credit, 25 CFP for Italian Engineers (members of “Ordine degli Ingegneri”) and 20 CFP for Italian Architects (members of “Ordine degli Architetti”).

Course 5 “Digitization of Buildings” focuses mainly on collecting, handling, and drawing beneficial conclusions from building data. The course starts with the useful measurements in buildings and the technologies used to collect them. Then Building management systems are introduced and the methods of handling the data from them are explained. Lastly some applications of the data collected will be shown, namely Fault detection and diagnostics in HVAC systems and survey methodologies in urban contexts.

Erasmus+

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Course 6 - Sustainable, Healthy and Regenerative Construction

20 November 2023 – 22 December 2023

Leader

Cecilia Mazzoli, UNIBO - Alma Mater Studiorum Università di Bologna / University of Bologna.

Contributors

Annarita Ferrante (UNIBO), Giorgia Predari (UNIBO), Riccardo Gulli (UNIBO), Anna Chiara Benedetti (UNIBO), Carlo Costantino (UNIBO), Lorna Dragonetti (UNIBO), Joanna Aleksiejuk-Gawron (SGGW), Susana Lucas (IPS) and Cristina Oliveira (IPS).

Total duration of the course

25 hours, 5 hours per week from 20 November 2023 to 22 December 2023.
The course is equal to 1 ECTS credit, 25 CFP for Italian Engineers (members of "Ordine degli Ingegneri") and 20 CFP for Italian Architects (members of "Ordine degli Architetti").

Course 6 "Sustainable, Healthy and Regenerative Construction" focuses on innovative construction techniques through recent experience with some European projects and construction and energy companies.

The course is divided into two parts. The first one is centred on the delivering of a shared knowledge base about the following concepts:

- Circularity (EU H2020 "DRIVE 0" Research Project);
- Deep renovation through add-ons (EU H2020 "Pro-GET-onE" Research Project);
- Urban regeneration strategies based on reconstruction ("Integrho - Integrated Housing System & Facility"- UNIBO Doctoral Research);
- Evaluation of energy efficiency of the building depending on photovoltaic solutions;
- Life-cycle perspective on renovation measures in a sub-Artic climate;
- Healthy buildings and sustainable construction solutions from waste ("Biovilla" project);
- Prefabrication techniques for building renovation.

Image credits: © https://unsplash.com/it

The second part is application-oriented, and it consists of two workshops.

The first one aims to simulate seismic behaviour, assess occupant health and well-being improvements, and define end-of-life and regeneration proposals for selected Construction Material and Structural Material (Course 4). The second activity focuses on the development of a shared checklist with all the requirements that "sustainable healthy and regenerative buildings" should meet. In both workshops, the participants will work in teams from each country and elaborate a proposal that will be presented and discussed with all the trainees.

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Course 6 Learning Objectives are the following:

1. Identify the concepts of sustainability and health linked to the construction sector, and regeneration strategies, and also their experimental applications in different contexts/countries and EU projects;
2. Understand how companies, industries and other institutions designed/built relevant buildings in terms of health (wellness) and sustainability (environmental, social and economic, but focusing on construction techniques and solutions);
3. Apply the concepts of sustainability and health to buildings;
4. Analyze sustainable and healthy buildings' common requirements.

Course 7 - Circular Economy and LCA methodology applied to construction

8 January 2024 – 9 February 2024

Leader

Joanna Aleksiejuk-Gawron, SGGW - Szkoła Główna Gospodarstwa Wiejskiego w Warszawie/ Warsaw University of Life Sciences.

Contributors

Tomasz Bakoń (SGGW), Jakub Gawron (SGGW), Boguslawa Sardinha (IPS), Jacopo Famiglietti (POLIMI), Hashem Amini Toosi (POLIMI), Luca Guardigli (UNIBO), Marco Innantuono (UNIBO), Alessandra Bonoli (UNIBO) and Beatrice De Pascale (UNIBO).

Total duration of the course

25 hours, 5 hours per week from 8 January 2024 to 9 February 2024.
The course is equal to 1 ECTS credit, 25 CFP for Italian Engineers (members of "Ordine degli Ingegneri") and 20 CFP for Italian Architects (members of "Ordine degli Architetti").

Course 7 "Circular Economy and LCA methodology applied to construction" focuses on buildings and their construction elements. Firstly, the definition, description and approach for the circular methodology LCA method will be presented. Also,the course participant will be introduced to the EN 15 978 and EN 15 804, biogenic carbon in buildings: an overview of LCA methods applied for buildings and energy systems.

Next, some economic issues according to the LCA will be presented. In the end stage of the course there will be also a challenge for all participants.

Image credits: BUILD2050 logo, source: https://build2050.weebly.com/circular-economy.html

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Course 8 - Innovative Business Models based on Circular Economy in Construction

12 February 2024 – 15 March 2024

Leader

Antonis Livieratos, NKUA - Ethniko Kai Kapodistriako Panepistimio Athinon / National and Kapodistrian University of Athens.

Contributors

Vasilis Siemos (NKUA) and POLIMI for “Future challenges in circular economy and construction”.

Total duration of the course

25 hours, 5 hours per week from 12 February 2024 to 15 March 2024.
The course is equal to 1 ECTS credit, 25 CFP for Italian Engineers (members of “Ordine degli Ingegneri”) and 20 CFP for Italian Architects (members of “Ordine degli Architetti”).

Course 8 “Innovative Business Models based on Circular Economy in Construction”

As engines of modern society, firms need to become part of the solution of the effort to tackle global warming and its consequences. They need to fundamentally change their business model – their underlying way of doing business. Instead of focusing on traditional linear-oriented business models, companies need to design and implement circular business models. The biggest challenge for Circular Economy is to create products and services that are not only sustainable in environmental and social terms, but are also profitable ensuring thus their perennity. To that end, the main aim of Course 8 is to give participants the opportunity to recognize new business opportunities leveraging on their core skills both at personal as well as organizational level. The course will guide participants through the whole process, from ideation to the development of an integrated business proposal. Participants will be guided to form ideas into products and in turn products into sustainable business models.

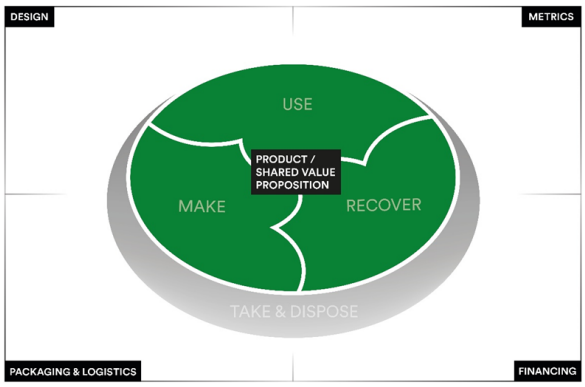

Image credits: The circular canvas. Source: Takacs, F., Stechow, R. & Frankenberger, K. (2020). Circular Ecosystems: Business Model Innovation for the Circular Economy. White Paper of the Institute of Management & Strategy, University of St. Gallen

This course consists of six modules:

1. Introduction (Ideation workshop, Future challenges in circular economy and construction, The Lean startup framework);
2. Business Model (Business model basics, Business model navigator, Business model canvas, Value proposition canvas, Case studies);
3. Intellectual Property Management (IP basics, Types of IP, Management of IP, IP implications on business models);
4. Business strategy and Innovation (Business strategy fundamentals, Innovation management fundamentals, Open strategy, Open innovation, Business model innovation);
5. The Develop+Protect+Commercialize model (The Develop+Protect+Commercialize model, Technology2Business Model Game);
6. Presentation skills (Elevator pitch workshop, Demo day).

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Course 8 Learning Objectives are the following:

- Develop and select new business ideas and new business models;
- Analyze and apply business models;
- Understand intellectuall property basics and evaluate their application business model generation;
- Understand open strategy and open innovation and in turn evaluate their application in business model generation;
- Understand how to turn a technology into a product and in turn a product into a business. Apply the framework in a given case;
- Create pitch decks for presenting new business ideas and new business models.

For more info, please take a look at BUILD2050 website:
https://build2050.weebly.com/
and/or contact the project team at the following mail address:
build2050@ips.pt; projectbuild2050@gmail.com

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