

SYLLABUS

1. Data about the program of study

1.1	Institution	The Technical University of Cluj-Napoca
1.2	Faculty	Faculty of Building Services Engineering
1.3	Department	Building Services Engineering
1.4	Field of study	Civil Engineering and Building Services
1.5	Cycle of study	Master
1.6	Program of study/Qualification	Building Services for Regenerative Cities / MS Engineer
1.7	Form of education	Full time

2. Data about the subject

2.1	Subject name	Building and City Assessment	Subject code	8.00
2.2	Course responsible/lecturer	Prof. PhD.Eng. Cristina Câmpian - <i>cristina.campian@dst.utcluj.ro</i>		
2.4	Teachers in charge of projectS	Prof.PhD.Eng. Dorin Beu - <i>dorin.beu@insta.utcluj.ro</i>		
2.5	Year of study	I	2.6 Semester	2
2.7 Assessment		Exam		
2.8 Subject category	Formative category	DS		
	Optionality	DOB		

3. Estimated total time

3.1	Number of hours per week	3	of which	3.2 Course	1	3.3 Seminar		3.3 Laboratory		3.3 Project	2
3.4	Total hours in the curriculum	42	of which	3.5 Course	14	3.6 Seminar		3.6 Laboratory		3.6 Project	28
3.7 Individual study:											
(a) Exams and tests											2
(b) Manual, lecture material and notes, bibliography											18
(c) Supplementary study in the library, online and in the field											18
(d) Preparation for seminars/laboratory works, homework, reports, portfolios, essays											18
(e) Tutoring											2
(f) Other activities											
3.8 Total hours of individual study (sum (3.7(a)...3.7(f)))						58					
3.9 Total hours per semester (3.4+3.8)						100					
3.10 Number of credit points						4					

4. Pre-requisites (where appropriate)

4.1	Curriculum	nZeB Buildings, Circular Economy
4.2	Competence	Use of computer (MS-Office)

5. Requirements (where appropriate)

5.1	For the course	Video-projector
5.2	For the project	N/A

6. Specific competences

Professional competences	CP2 – synthesizes information CP4 – promotes awareness of environmental issues CP6 – assess environmental impact CP12 – use measurement instruments CP18 – perform pipeline routing studies CP19 – oversee wetlands in project development CP21 – combine multiple fields of knowledge CP25 – manage air quality
Cross competences	CT2 – thinks holistically CT3 – dealing with problems

7. Expected Learning Outcomes

Knowledge	CP2 – Knows methods of critical analysis of information sources specific to the urban domain (environmental studies, infrastructure reports, European regulations), synthesis techniques, and how to structure complex data to support decision-making in urban planning. CP4 – Has in-depth knowledge of major urban environmental issues (air, water, soil pollution, noise, heat islands, biodiversity loss), anthropogenic impact on the environment (carbon footprint, resource consumption, waste generation), environmental regulations (European directives, national legislation), and principles of sustainable development and circular economy. CP6 – Has in-depth knowledge of environmental impact assessment methodologies for urban infrastructure projects, urban sustainability indicators (ecological footprint, air quality, urban biodiversity), and sustainable development principles in the context of regenerative cities. CP12 – Knows measurement instruments used in urban infrastructure monitoring (flow meters, pressure sensors, water quality probes), operating principles, and calibration procedures. CP18 – Knows route analysis methodologies for urban pipelines, decision factors (geotechnics, environment, costs, social impact, coordination with other utilities), and regulations regarding network placement in public spaces. CP19 – Knows wetland ecology, protection regulations, integration solutions in urban developments, and principles of sustainable real estate development. CP21 – Possesses integrated knowledge from diverse fields (building services engineering, architecture, urban planning, environmental sciences, circular economy, public policies, urban sociology), essential for the holistic approach to regenerative cities. CP25 – Knows major air pollutants, air quality standards (European and national norms), monitoring methods (fixed stations, mobile sensors, remote sensing), and pollution reduction measures.
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Skills	CP2 – Critically analyzes technical reports, impact studies, and geo-spatial data, selects relevant information for urban infrastructure projects, synthesizes and structures knowledge coherently, producing documented summaries for project teams and authorities. CP4 – Actively promotes awareness of environmental issues in urban infrastructure projects, develops information and training materials (guides, brochures, presentations), organizes awareness campaigns for communities and project teams, provides consulting on reducing environmental impact and promoting sustainable solutions. CP6 – Monitors and evaluates the environmental impact of urban infrastructure projects (water, sewage, transport networks), identifies environmental and social risks, develops impact assessment studies, proposes mitigation, compensation, and monitoring measures, integrates circular economy and climate resilience principles into proposed solutions. CP12 – Selects the appropriate instrument for required measurements (flow rates, pressures, water quality, spatial positioning), correctly uses it in field conditions, interprets measured values, and records data in urban monitoring systems. CP18 – Collects and analyzes geotechnical, environmental, and urban planning data for pipeline routes, evaluates alternative routes for urban pipelines, identifies constraints (properties, protected sites, existing infrastructure), develops comparative studies, and recommends the optimal route from a technical, economic, and environmental perspective. CP19 – Proactively monitors and responds to challenges posed by wetlands in real estate developments, identifies conservation and integration solutions, collaborates with environmental agencies and developers to develop management plans, ensures compliance with protection measures during execution and operation. CP21 – Integrates perspectives from multiple disciplines in analyzing and solving complex urban problems, collaborates effectively with specialists from different fields (architects, urban planners, ecologists, sociologists, economists), develops interdisciplinary solutions that simultaneously address technical, social, economic, and environmental requirements. CP25 – Monitors air quality using specific equipment, analyzes obtained data, identifies pollution sources and trends, evaluates compliance with standards, develops air quality reports, and proposes emission reduction measures.
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Responsibilities and autonomy	CP2 – Independently evaluates information sources, forms evidence-based opinions, supports conclusions before public authorities and stakeholders, assuming responsibility for the validity of analyses in the context of regenerative urban development. CP4 – Acts as a sustainability promoter in urban infrastructure projects, assuming responsibility for raising awareness of environmental issues among all stakeholders, for promoting best practices, and for integrating sustainable development principles into organizational and community culture. CP6 – Coordinates environmental impact assessment processes for complex urban infrastructure projects, assuming responsibility for the quality of analyses, for compliance with national and European regulations, and for integrating environmental protection measures into technical solutions that shape sustainable urban development. CP12 – Performs measurements responsibly in the urban environment, verifies instrument calibration and reports any deviations, assuming responsibility for data accuracy that underpins operation and maintenance decisions for infrastructure. CP18 – Leads route studies for complex urban pipeline projects, assuming responsibility for choosing the optimal solution in the context of sustainable development, minimizing community impact, and integrating into regenerative urban strategies. CP19 – Manages the relationship between real estate developments and wetlands, assuming responsibility for ecosystem conservation and sustainable integration into urban projects, in accordance with regulations and international best practices. CP21 – Approaches regenerative urban development challenges from a holistic and integrated perspective, assuming responsibility for solutions that harmonize the multiple dimensions of sustainability, in collaboration with all stakeholders and respecting cultural and social diversity. CP25 – Manages air quality monitoring processes in urban projects, assuming responsibility for data accuracy, regulatory compliance, and recommendations for improving air quality in the community.
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8. Discipline objectives (as results from the *key competences gained*)

8.1	General objective	Development of students' ability to evaluate the sustainable performance of buildings and cities using internationally recognized assessment and certification methodologies (LEED, BREEAM, GREEN HOMES, European Energy Award, Covenant of Mayors). Students will learn to collect, validate, and interpret relevant data for environmental impact assessment, air quality monitoring, and urban sustainability, integrating interdisciplinary knowledge to formulate recommendations for improving the performance of buildings and cities.
8.2	Specific objectives	• Development of the ability to critically analyze information about a building and a city, to synthesize complex data from multiple sources, and to support decision-making in urban planning (CP2, CP21). • Development of skills to promote awareness of environmental issues and to assess the environmental impact of decisions at building and city level (CP4, CP6). • Development of competences in using measurement instruments for various metrics used for buildings and cities, including air quality monitoring and proposing solutions for improvements (CP12, CP25).

		• Development of the ability to conduct pipeline routing studies for various urban networks and to oversee wetlands in real estate/municipal projects, understanding the importance of nature-based solutions (CP18, CP19). • Development of a holistic vision for buildings and cities, integrating technical, social, economic, and environmental aspects in sustainability assessment (CP21, CT2). • Understanding and applying the main green building and city certification systems, including the pre-certification and certification process, data collection and validation, interpretation of limitations, and preparation of specific reports (CP2, CP6, CT3). • Development of communication skills with designers, architects, owners, and local authorities to obtain the necessary information for the assessment process (CP4, CT1).
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9. Contents

9.1. Lecture (syllabus)	Number of hours	Teaching methods	Notes
1.Introduction to voluntary green building/city certification systems: History, definition, types, benefits, structure;	2	Video-Projector Teaching style based on the interactive teacher-student partnership; Presentation of case studies.	
2.Goal and intent of the criteria for BREEAM, LEED, GREEN HOMES and European Energy Award;	2		
3. Data collection and validation. Data interpretation, limitation of green building/city certification systems.	2		
4. Identification of significant issues, evaluation, reporting, critical review.	2		
5.Pre-certification and certification process for a variety of projects.	2		
6.Integrated design charrettes with a project team and role play in order to understand the process and the responsibilities of the green building/city consultant;	2		
7.Specialty reports and dynamic modelling specifications using approved software;	2		
Bibliography			
1. Reeder, L., Guide to Green Building Rating System, John Wiley & Sons, ISBN 978-0470401941, 2010			
2. LEED V5 Reference Manual; www.usgbc.org			
3. BREEAM New Construction V7 Manual; www.breeam.com			
4. BREEAM Refurbishment and Fit Out Scheme Manual; www.breeam.com			
5. GREEN HOMES v3 Manual; www.rogbc.org			
6. EEA manual: https://www.european-energy-award.org			

9.2. Seminar /Laboratory/Project	Number of hours	Teaching methods	Notes
Computing programs and databases dedicated to green buildings	4	Site visits, role play during the projects, modeling execution, computer exercises, group project	
Preparation of reports based on the visit to the construction site;	4		
Real experience in each project;	2		
Preparation of an interim or final report for BREEAM, LEED and GREEN HOMES.	2		
Critical view and limitations of the main green building certification systems;	2		
European Energy Award concept - EEA	4		
Evaluating a city with the EEA system using the EMT calculation program	4		
Covenant of Mayor - CoM reporting system	2		
Data transfer between EEA and CoM	2		
Presentation of case studies	2		
Bibliography			
1. National and international case studies;			
2. Most specialized magazines with articles about the certification of green buildings / cities;			
3. Journal of Industrial Ecology,			
4. Environmental Science and Technology,			
5. Journal of Cleaner Production,			
6. Journal of Environmental Management, Ecological Economics, Energy.			

10. Bridging course contents with the expectations of the representatives of the community, professional associations and employers in the field

The course is supervised by EEA – European Energy Award Association and Green Building Council International, with the help of Romania Green Building Council.

11. Evaluation

Activity type	11.1 Assessment criteria	11.2 Assessment methods (and evaluation form: continuous/summative)	11.3 Weight in the final grade
11.4 Course	Technical content, word count, structure and critical analysis;	mid-term exam final report grade	20% 40%
11.5 Seminars /Laboratory/Project	Technical content, presentation and communication skills;	class activity, assignments, presentation grade	40%
11.6 Minimum standard of performance			
5 points out of 10 total points (5 min/10 max)			

Date of filling in: 16.05.2026		Title Surname Name	Signature
	Lecturer	Prof.PhD.Eng. Cristina Câmpian	
	Teachers in charge of application	Prof.PhD.Eng. Dorin Beu	

Date of approval in the Department of Building Services Engineering 09.07.2026	Head of department Assoc.Prof.PhD.Eng. Ciprian BACOȚIU
Date of approval in the Council of the Faculty of Building Services Engineering 09.07.2026	Dean Assoc.Prof.PhD.Eng. Florin DOMNIȚA