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Report on existing curricula related to CSUD in EU Member States and third countries not or associated to the Programme

Project: 101081724 — SmartWB — ERASMUS-EDU-2022-CBHE

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PROJECT INFO

Project title	Curricula innovation in climate-smart urban development based on green and energy efficiency with the non-academic sector
Project acronym	SmartWB
Project reference number	101081724
Funding scheme	Lump sum grant - ERASMUS-EDU-2022-CBHE
Web address	www.smartwb.ucg.ac.me
Coordination institution	University of Montenegro
Project duration	36

DOCUMENT CONTROL SHEET

Work package	WP2 Analysis of current status in climate-smart urban development
Ref. no and title of activity	T2.3 Analysis of existing curricula related to CSUD in EU Member States and third countries not or associated to the Programme
Title of deliverable	Report on existing curricula related to CSUD in EU Member States and third countries not or associated to the Programme
Lead institution	Polytechnic University of Tirana (UPT)
Author(s)	Genti Qirjazi, Milan Gocić
Document status	Final
Document version and date	v.03, 12 May 2023
Dissemination level	Sensitive

VERSIONING AND CONTRIBUTION HISTORY

Version	Date	Revision description	Partner responsible
v.01	14. 04. 2023.	Document created	UPT
v.02	07. 05. 2023.	First revision	UPT
v.03	12. 05. 2023.	Final revision	UNI
v.04	16.05.2023.	QAC revision	THOWL, UNIZG

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Executive Summary

This document represents D2.3 “Report on existing curricula related to CSUD in EU Member States and third countries not or associated to the Programme” of the SmartWB project funded by the European Commission's Erasmus+ Programme ERASMUS-EDU-2022-CBHE under grant agreement No 101081724. In this activity, all project HEIs analyzed existing curricula in CSUD and provided comparative analysis which can lead at the same time to find the way to improve the existing courses or development new according to the presented curricula in EU Member States and third countries associated to the Programme universities.

List of abbreviations

BOKU	University of Natural Resources and Life Sciences
BSc/BEng	Bachelor of Science/Bachelor of Engineering
CSUD	Climate Smart Urban Development
ECTS	European Credit Transfer and Accumulation System
EU	European Union
G-1	Group of EU Member States and third countries associated to the Programme
G-2	Group of third countries not associated to the Programme
HE	Higher Education
HEI	Higher Education Institution
MSc/MEng	Master of Science/ Master of Engineering
NMBU	Norwegian University of Life Sciences
SC	Smart Cities
THOWL	Technische Hochschule Ostwestfalen-Lippe
U_POLIS	Polis University
UET	European University of Tirana
UNBI	University of Bihac
UNI	University of Nis
UNIZG	University of Zagreb
UNMO	Dzemal Bijedic University of Mostar
UNSA	University of Sarajevo
UoM	University of Montenegro
UPT	Polytechnic University of Tirana
URJC	Universidad Rey Juan Carlos
WB	Western Balkans
WP	Work package

1 Introduction

Climate change is a global challenge, and cities are at the forefront of the response (Perry & DaPra, 2021). Cities are making great efforts (investing a tremendous amount of money) to improve their planning, development, and management, what is today recognized under the term and concept of Climate Smart Urban Development (CSUD) or Smart Cities (SC). However, those two concepts differ slightly. While CSUD is more focused on climate change influence, the SC considers one of the essential factors which drive the development of SC. For the SmartWB project, we put the CSUD in the first place and follow its concept while keeping in mind the SC concept and its impact on the curricula of partner universities. Innovation in curricula related to CSUD is essential to address the challenges posed by climate change. Collaboration between the non-academic sector and academic institutions can facilitate the development of innovative curricula that promote green and energy-efficient solutions for urban development.

The European Union (EU) and other countries around the world are taking steps to promote climate-smart urban development. In this report, we will analyze existing curricula related to climate-smart urban development in EU member states and third countries not or associated to the Programme.

Countries in the Western Balkans (WB) are developing and claim that in the future their capacities regarding climate-smart urban development will be equal to those of other countries within the European market. Certainly, the professional and academic preparation of experts in this field begins at the appropriate universities. Thus, academic staff has a high scientific and research responsibility for actively providing knowledge, skills, and competences to aspiring experts in the field of climate-smart urban development.

The project "Curricula innovation in climate-smart urban development based on green and energy efficiency with the non-academic sector / SmartWB" is undertaken to carefully treat curricula and update them in the above-mentioned studies. This initiative is an endeavor for academic reform to raise the knowledge and capacity of young experts at national and international level. The wider objective of this project is to improve the quality of higher education (HE) all over Western Balkan countries. Based on previous discussions and analysis of curricula of EU Member States and third countries associated to the Programme it was identified that they are more stable and more advanced, while third countries not associated to the Programme curricula are shorter in experience and require further development. It is also preferable that higher education in the Western Balkans develops with harmonized program partner curricula. Based on literature review and research on developed projects related to curriculum comparison it has been ascertained that there are several methods of curriculum comparison and classification. For this study, we have split the curricula of partners from EU Member States and third countries associated to the Programme and partners from third countries not associated to the Programme into two groups to see their consistency and differences.

The produced report will summarize all project higher education institutions (HEIs) existing curricula in CSUD and provide comparative analysis which can lead at the same time to find the way to improve the existing courses or development new according to the presented EU curricula.

Contributing: All project partners

2 Analysis of master curricula in EU

2.1 The action plans

One of the important topics supported by the Erasmus + program is the analysis of existing curricula related to CSUD in EU Member States and third countries non or associated to the Programme. This aims at analyzing, comparing, and increasing the quality of curricula, the quality of courses with impact on the services, business, and economy.

The action plan is conceived in fulfilling the agenda for tasks according to the content of T2.3. on data collection/analysis (discussions, comments, meetings partners), as well as suggestions for the curriculum. In this case, implementation dates of this project are set out below:

- data collection, analyses, discussions, meetings, partners' proposals for curriculum typology and groups for BSc and MSc until 30/03/2023,
- draft report delivered on 17/04/2023,
- partner review and their comments until 15/05/2023,
- final report on 20/05/2023.

For conducting the comparison, curricula have been classified into two groups. All courses are grouped according to similarity. The first group contains the curricula of partners from EU Member States and third countries associated to the Programme (group 1) and the second group contains the curricula of institutions from third countries not associated to the Programme (group 2). Based on project preparation and discussions, the need for an action plan has been noted, which must be prepared with the following points:

- collecting curricula from partners,
- methodology of grouping curricula and courses,
- comparing courses of partner group 2 with the courses of program group 1,
- statistical data for analysis,
- final discussion and comments with/from each partner,
- final report and conclusions.

The action plan begins with the collection of data on the curricula that are being implemented in the partner universities in this project. As it is mentioned above, there are two groups of curricula (partners from EU Member States and third countries associated to the Programme and partners from third countries not associated to the Programme) which will be compared according to the similarity of names and content, systematized, and grouped according to the partner institutions in the project. In the action plan it is foreseen to continue comparing the curricula within the group and then comparing the curricula of the second group with the curricula of the first group. The group of partners from EU Member States and third countries associated to the Programme, as mentioned above, are considered to have the most modernized and advanced curricula in terms of providing knowledge to students. At the very end of the action plan, the presentation and interpretation of the database is developed through the statistical apparatus.

2.2 Overview of typology

The typology is briefly explained, to clarify the process on curriculum evaluation and comparison. The first step was the collection and systematization of curricula, or rather the collection of study programs by HEI partners in the SmartWB project.

Database: Universities → Study programs → Modules → Courses

Course characteristics:

- course name,
- category of course,
- number of hours,
- credits ECTS, etc.

The database of courses is then filtered based on the first two characteristics above, meaning by course name and category of course.

Through this process, we have classified the courses included in the database into 9 groups:

- Spatial and urban planning
- Architecture and building design
- Material science
- Energy efficiency
- Road design and mobility
- Urban water management
- Geodesy and analysis
- Planning and participation procedures
- Governance and planning policies.

2.3 Collecting curricula from all partners

Considering the difference in the level of curriculum development in HEIs from EU Member States and third countries associated to the Programme and the development of HEI curricula in third countries not associated to the Programme, two groups of curricula have been formed:

- The first group (G-1) includes the curricula of the HEI's from EU Member States and third countries associated to the Programme from the universities with advanced curricula.
- The second group (G-2) includes the curricula of HEI's from third countries not associated to the Programme, which are certainly on the way to raising their quality.

The data is presented at the tables 1 and 2, including information of institutions and their module-orientations on BSc and MSc study programs for all partners.

Table 1 - Number of modules where the courses will be modernized for each university

No	Code	G-1 Universities	Country	BSc No. of modules	MSc No. of modules
1	02/UNI	UNIVERZITET U NISU	RS	2	4
2	03/BOKU	UNIVERSITAET FUER BODENKULTUR WIEN	AT	2	3
3	04/NMBU	NORGES MILJO-OG BIOVITENSKAPLIGE UNIVERSITET	NO		1
4	05/UNIZG	SVEUCILISTE U ZAGREBU	HR	1	2
5	06/URJC*	UNIVERSIDAD REY JUAN CARLOS	ES	3	11
6	07/TH OWL	TECHNISCHE HOCHSCHULE OSTWESTFALEN-LIPPE	DE	4	2
G-2 Universities					
7	01/UoM	JAVNA USTANOVA UNIVERZITET CRNE GORE PODGORICA	ME	1	3
8	08/UNSA	UNIVERZITET U SARAJEVU	BA		2
9	09/UNMO	UNIVERZITET DZEMAL BIJEDIC U MOSTARU	BA		1
10	10/UNBI	UNIVERZITET U BIHACU	BA	2	1
11	11/JET	UNIVERSITETI EUROPIAN I TIRANES	AL	1	2
12	12/UPT	UNIVERSITETI POLITEKNIK I TIRANES	AL	1	1
13	13/POLIS	UNIVERSITETI POLIS SHPK	AL		1
		Total		12	24

*Note that due to the fact that URJC doesn't have a Civil Engineering School, the information about the courses is from the Barcelona School of Civil Engineering, Universidad Polit cnica de Catalu a

Table 2 - The information about the module for each university and the level of study

No/University	Module	Level of Study
02/UNI	Civil engineering	Bachelor
02/UNI	Project management in civil engineering	Bachelor
02/UNI	Civil engineering	Master
02/UNI	Project management in civil engineering	Master
02/UNI	Engineering of natural disasters risk management	Master
02/UNI	Architecture	Integrated
03/BOKU	Landscape Planning and Landscape Architecture [Landschaftsplanung und Landschaftsarchitektur]	Bachelor
03/BOKU	Environmental Sciences and Civil Engineering [Umweltingenieurwissenschaften]	Bachelor
03/BOKU	Landscape Planning and Landscape Architecture [Landschaftsplanung und Landschaftsarchitektur]	Master
03/BOKU	Civil Engineering and Water Management [Masterstudium Kulturtechnik und Wasserwirtschaft]	Master
03/BOKU	Water Management and Environmental Engineering	Master
04/NMBU	Water and Env Technology	Master
05/UNIZG	Geodesy and Geoinformatics	Bachelor
05/UNIZG	Geodesy and Geoinformatics	Master (Geodesy)

05/UNIZG	Geodesy and Geoinformatics	Master (Geoinformatics)
05/UNIZG	Geodesy and Geoinformatics	Postgraduate - PhD (Geodesy and Geoinformatics)
06/URJC*	Civil Engineering	Bachelor
06/URJC*	Environmental Engineering	Bachelor
06/URJC*	Marine Sciences & Technologies	Bachelor
06/URJC*	Civil Engineering (Sp. in structural & construction engineering)	Master
06/URJC*	Structural & Construction Engineering - Structure Track	Master
06/URJC*	Structural & Construction Engineering - Construction Track	Master
06/URJC*	Numerical Methods in Engineering	Master
06/URJC*	Environmental Engineering	Master
06/URJC*	Geotechnical Engineering (Sp. Geotechnical Engineering)	Master
06/URJC*	Geotechnical Engineering (Sp. Groundwater Hydrology)	Master
06/URJC*	Geotechnical Engineering (Sp. Earthquake Engineering)	Master
06/URJC*	Structural Analysis of Monuments & Historical Constructions	Master
06/URJC*	Urban Mobility - Sustainable Urban Mobility Transition Track	Master
06/URJC*	Urban Mobility - Smart Mobility Data Science & Analytics Track	Master
7 / TH OWL	Environmental Engineering	Bachelor
7 / TH OWL	Landscape Architecture	Bachelor
7 / TH OWL	Civil Engineering	Bachelor
7 / TH OWL	Environmental Sciences	Bachelor
7 / TH OWL	Environmental Engineering and Modelling	Master
7 / TH OWL	Infrastructure Management and Traffic	Master
1/UoM	Civil Engineering	Bachelor
1/UoM	Civil Engineering-Construction (module CONCRETE AND MASONRY STRUCTURES)	Master
1/UoM	Civil Engineering-Construction (module STEEL, COMPOSITE AND TIMBER STRUCTURES)	Master
1/UoM	Civil Engineering-Infrastructure (module HYDROTECHNICS)	Master
08/UNSA	Water Resources and Environmental Engineering	Master
08/UNSA	Roads and Transportation	Master
9/UNMO	Environmental Infrastructure Management	Master
UNBI	Spatial planning (5)	Bachelor
UNBI	Building materials (5)	Bachelor
UNBI	Energy efficiency of buildings (5)	Master
11/UET	Civil Engineering	Bachelor
11/UET	Architecture	Master

11/UET	Civil Engineering	Master
12/UPT	Geodesy	Bachelor
12/UPT	Geodesy	Master
13/POLIS	Urban Planning & Management	Integrated Master

**Note that due to the fact that URJC doesn't have a Civil Engineering School, the information about the courses is from the Barcelona School of Civil Engineering, Universidad Polit cnica de Catalu a*

Each study program is named by the University where the program takes place. Further, the list with the number of modules is shown according to the name of the study program at the Universities:

- Civil Engineering 14 Modules
- Environmental Engineering 8 Modules
- Marine Sciences & Technologies 1 Module
- Structural & Construction Engineering 2 Modules
- Numerical Methods in Engineering 1 Module
- Geotechnical Engineering 3 Modules
- Structural Analysis of Monuments & Historical Constructions 1 Module
- Urban Mobility 2 Modules
- Infrastructure Management and Traffic 1 Module
- Water Resources and Environmental Engineering 3 Module
- Roads and Transportation 1 Module
- Environmental Infrastructure Management 1 Module
- Spatial planning 1 Module
- Building materials 1 Module
- Energy efficiency of buildings 1 Module
- Architecture 5 Modules
- Geodesy 6 Modules
- Urban Planning & Management 1 Module

Regardless of how the study program will be named, theoretical problem-solving skills can only be achieved through modern and flexible academic education. While professional, technical, and practical achievements are gradually gained through career development and experience.

2.4 National reports on undergraduate and graduate study programmes

Climate change is one of the most significant challenges facing urban development today. Cities are major contributors to greenhouse gas emissions and are also highly vulnerable to the impacts of climate change (OECD, 2010). In response, many initiatives and policies have been developed to promote climate-smart urban development. This report will analyze existing curricula related to climate-smart urban development based on initiatives and policies of the New Urban Agenda, URBACT, and the Urban Development Network.

The New Urban Agenda emphasizes the need for sustainable urban development that addresses climate change. It calls for cities to adopt integrated and participatory approaches to urban planning and management that consider the impacts of climate change. In terms of curricula, the New Urban Agenda provides a broad framework for incorporating climate-smart urban development into urban planning and management courses. This could include modules on sustainable urban design, climate mitigation and adaptation strategies, and stakeholder engagement.

URBACT is a European Union program that aims to promote sustainable urban development through knowledge exchange and collaboration among cities (European Union, n.d.). URBACT's approach to curricula is to foster peer-to-peer learning and sharing of best practices among cities. URBACT's training program, URBACT III Capacity Building, offers courses on topics such as sustainable urban mobility, energy efficiency, and climate adaptation. The program also provides opportunities for cities to collaborate and share experiences through working groups, networks, and study visits.

The Urban Development Network is an initiative of the European Commission aimed at supporting the implementation of the EU's urban agenda (European Commission, n.d.). The network's approach to curricula is to promote the exchange of knowledge and best practices among cities, member states, and other stakeholders. The network offers a range of training opportunities for urban professionals, including webinars, workshops, and conferences. Topics covered by the network include sustainable urban development, urban resilience, and climate change mitigation and adaptation.

The initiatives and policies of the New Urban Agenda, URBACT, and the Urban Development Network provide a range of opportunities for incorporating climate-smart urban development into curricula. These initiatives emphasize the need for integrated and participatory approaches to urban planning and management that consider the impacts of climate change. Training programs offered by URBACT and the Urban Development Network provide opportunities for peer-to-peer learning and sharing of best practices among cities. Overall, these initiatives and policies offer valuable resources for promoting climate-smart urban development through education and training.

3 Comparative analysis

3.1 Methodology of grouping curricula and courses

The wider objective of this project is to improve the quality of higher education all over Western Balkan countries. Therefore, development of academic reforms on CSUD are necessary to raise the knowledge and capacity of young experts at national and international level. In SmartWB project, WP2 T2.3, we consider curricula from EU Member States and third countries associated to the Programme which are more stable and more advanced, due to their tradition and experience. While universities from third countries not associated to the Programme have good curricula, in some cases due to economic and political situations or lack of experience, lack of capacity, curricula have been developed more slowly. It is also preferable that higher education in CSUD in the countries of Western Balkans develops with approximately harmonized curricula of HEIs in EU Member States and third countries associated to the Programme. The aim of this task is to specify and analyze the gap between what education is currently offered in third countries not associated to the Programme and what is being offered, especially regarding the technologically advanced courses. The required data for the analysis were processed in three steps:

- list of courses per year for each semester, on the BSc. and MSc. study program from each HEI
- list of typologies that includes each course,
- establish typology into 9 groups.

The curricula specify the following main parameters for each course: course name, course contents, course outcome with expected results, the number of hours for lectures and exercise sessions, ECTS credits, and year and semester of studies. For the comparison of curricula one can use different methodologies by which one classifies the courses into different groups.

3.2 Categorizing courses using typology

Categorizing and grouping to facilitate a comparison of curricula is a process started by collecting data. Typology helps to systematize and categorize data according to predetermined criteria and features based on their content. Using typology creates the easiest possible way for interpreting and comparing data in their relevant fields. To facilitate this comparison of faculty curricula at partner universities involved in the project, we have categorized the courses according to their typology. The typology, in this case, is the grouping of courses according to CSUD categories.

Based on similarities of course names and contents of courses, a list with typology has been established for BSc and MSc study programs. In the study programs some courses are compulsory courses and some elective courses. All these courses together, in addition to the educational, training and research purpose, must complete the total of credits for the completion of their respective studies.

The curricula collected by HEIs are systematized and classified into two groups:

- The first group belongs to HEIs with advanced curricula,
- The second group has curricula for which they are required to be updated, with the aim of increasing their quality to the same level as the curricula of the first group.

Many times, it is not easy to determine the typology only by the name of the course, without looking at its content, the number of hours of lectures and exercises or the number of ECTS credits.

3.2.1 List of groups with respective typology courses

The list of course groups presented below is based on analysis of the names and content of module courses by the HEI partner in the SmartWB project. Following the similarity of the names and the similarity in content, we have categorized all the courses into 9 groups which fall in accordance with climate-smart urban development:

- Spatial and urban planning,
- Architecture and building design,
- Material science,
- Energy efficiency,
- Road design and mobility,
- Urban water management,
- Geodesy and analysis,
- Planning and participation procedures,
- Governance and planning policies.

The first group includes Spatial and urban planning courses, the second group includes Architecture and building design, in the third group are courses related to Material science. Then, Energy efficiency courses are listed in the fourth group. The fifth group includes Road design and mobility, the sixth group includes courses in Urban water management. The seventh group includes courses in Geodesy and analysis. The eighth group includes Planning and participation procedures courses and finally in the ninth group are courses that are part of Governance and planning policies.

3.3 Courses from WB Partner Universities that will be modernized

The courses that will be modernized based on climate-smart urban development include urban planning and design, environmental science, sustainable energy, transportation planning, and building science, geodesy, water engineering, architecture and building design, governance, and planning policies. These courses need to be revised to include the latest innovations and technologies that promote sustainable urban development and reduce the carbon footprint. It is essential to modernize these courses to prepare future urban professionals to address the challenges posed by climate change.

On Table 3, the list of courses that will be modernized for each WB partner university is shown.

Table 3 - The list of courses that will be modernized for each WB partner university

No/Partner	Subject name (ECTS)	Level of study	% of the modernized subjects compared to total subjects included in the course	Number of students to be accepted in the first year	Category
1/UoM	Communal Infrastructure (3)	Bachelor (240 ECTS)	< 10%	50	Urban water management
	Introduction to Civil Engineering (3)	Bachelor (240 ECTS)	< 10%	100	Architecture and building design
	Building materials (7)	Bachelor (240 ECTS)	< 10%	100	Architecture and building design
	Elements of buildings (6)	Bachelor (240 ECTS)	< 10%	100	Architecture and building design

	Urban planning basics (5)	Master (120 ECTS)	< 10%	5	Spatial and urban planning
	Maintaining, Sanation and Reconstruction of Buildings (5)	Master (120 ECTS)	< 10%	15	Architecture and building design
	Hydrotechnical Meliorations	Master (120 ECTS)	< 10%	8	Urban water management
8/UNSA	Environmental Protection (6)	Master (120 ECTS)	< 10%	10	Spatial and urban planning
	Water Protection I (6)	Master (120 ECTS)	< 10%	10	Urban water management
	Urban Roads (5)	Master (120 ECTS)	< 10%	20	Road design and mobility
9/UNMO	Materials for energy efficient and sustainable buildings (5)	Master (120 ECTS)	< 20%	10	Material science
	Durability, resilience and maintenance of structures (6)	Master (120 ECTS)	< 20%	10	Material science
	Sustainable Buildings from natural materials (5)	Master (120 ECTS)	< 20%	10	Material science
	Special types of concrete (5)	Master (120 ECTS)	< 20%	10	Material science
10/UNBI	Spatial planning (5)	Bachelor (240 ECTS)	< 20%	20	Spatial and urban planning
	Building materials (5)	Bachelor (240 ECTS)	< 20%	20	Material science
	Energy efficiency (5)	Master (120 ECTS)	< 20%	10	Energy efficiency
11/UET	Construction Sciences (6)	Bachelor (180 ECTS)/ Master - Integrated Diploma - (300 ECTS)	< 10%	25	Architecture and building design
	Urban Design (5)	Master (120 ECTS) / Master - Integrated Diploma - (300 ECTS)	< 10%	25	Spatial and urban planning
	Architecture Technology (6)	Master - Integrated Diploma - (300 ECTS)	< 10%	25	Architecture and building design
12/UPT	General Geodesy 1 (6)	Bachelor (180 ECTS)	< 20%	45	Geodesy and analysis
	General Geodesy 2 (7.5)	Bachelor (180 ECTS)	< 20%	45	Geodesy and analysis

	Topographic surveys and State networks 1 (6)	Bachelor (180 ECTS)	< 20%	45	Geodesy and analysis
	Topographic surveys and State networks 2 (7.5)	Bachelor (180 ECTS)	< 20%	45	Geodesy and analysis
	Knowledge of urban planning and projects (4)	Master	< 20%	15	Spatial and urban planning
13/U_POLIS	Urban Economics (3)	Master	< 20%	30	
	Local Governance (6)	Master	< 20%	30	Governance and planning policies
	Urban planning (6)	Master	< 20%	30	Spatial and urban planning
	Geographic Informational systems (6)	Master	< 20%	30	Geodesy and analysis

3.4 Comparing curricula between groups

The objective of this report is to specify and analyze the gap between what education is currently offered in third countries not associated to the Programme and what is needed, especially regarding the technologically advanced courses. This gap is then to be used as guidance document when specifying new curricula and courses at the universities in third countries not associated to the Programme. Consequently, two major questions are to be answered, namely:

1. What are the major structural differences at a curriculum level between the universities in EU Member States and third countries associated to the Programme and the universities in third countries not associated to the Programme? Which academic disciplines are over- and under-represented in the various countries?
2. What are the major structural differences at a course level between the universities in EU Member States and third countries associated to the Programme and the universities in third countries not associated to the Programme? It is here believed that there is a difference in technologically advanced courses and that this difference is important for the future employers of the students.

Explanations and graphic presentation related to these questions are shown on Table 5, and Table 6, then chart 1, and chart 2.

Comparing curricula between partners from EU Member States and third countries associated to the Programme and partners from third countries not associated to the Programme continues to be interesting, because there are many similarities between them, yet there are also differences. The process is elaborated on three levels:

- comparison of curricula within EU Member States and third countries associated to the Programme (group 1),
- comparison of the curricula of the Universities within the third countries not associated to the Programme (group 2),
- comparison of curricula group 2 with curricula from group 1.

Table 4 shows a summary of database about HEI in bachelor and master study programs.

Table 4 - Summary of database about HEI in bachelor and master study programs

Study program	No of Universities	No of Modules	No of Courses
BSc and BEng	9	17	749
MSc and MEng	13	35	1092
Total		52	1841

Comparison of data from curricula courses from 13 Universities in the SmartWB project is presented in Table 5 and Table 6.

Table 5 shows a summary of the bachelor curricula in 9 Universities. Table 6 shows the corresponding data for the master curricula in 13 universities.

These tables are organized as follows:

- The first column contains the names of the universities along with their corresponding modules.
- The second column, titled 'No. of courses' shows the number of courses within the corresponding module.
- The remaining columns (columns 3 - 12) show the types/groups of the typology, along with the number of courses of that type belonging to each module.

At the bottom of each column indicating a group, the total number of courses in that group is shown. Also, the total amount of the course from nine categories of courses was calculated.

Based on these two figures, the percentage of participation of each group of courses in the total bachelor and master study programs is calculated. The calculation of the percentage of group participation is done according to formula 1.

$$p\% = \frac{\sum g_i}{\sum_{1}^{13} \text{courses}} \cdot 100\% \quad (1)$$

g_i - group of courses.

$\sum_{1}^{13} \text{courses}$ - total number from nine group of courses.

Table 5 shows that, at bachelor level, based on categorization according to the CSUD, we see that in WB universities there is no representation of courses related to "Energy Efficiency" and "Governance and planning policies". Also, there are some differences in other categories as well between WB universities and universities from EU Member States and third countries associated to the Programme.

It is evident from the data on the tables that the curricula of group 1 and group 2 have both similarities and differences. These nuances are discussed in Chart 1.

Table 6 shows that, at master level, based on categorization according to the CSUD, we see that in WB universities there is an over representation of courses related to "Material Science" which we don't see it in the courses of the universities from EU Member States and third countries associated to the

Programme. In G-2 universities, we see a representation of courses in the category “Governance and planning policies”. Also, there are some differences in other categories as well between G-2 universities and universities from EU Member States and third countries associated to the Programme mostly in the categories: “Architecture and building design”, “Urban water management”, “Material Science” etc.

It is evident from the data on the tables that the curricula of G-1 and G-2 universities have both similarities and differences. These nuances are discussed in Chart 2.

Table 5 - Courses per group on bachelor curriculum

University/Module	No. of courses	No. of courses for each type									
		Spatial and urban planning	Architecture and building design	Material science	Energy efficiency	Road design and mobility	Urban water management	Geodesy and analysis	Planning and participation procedures	Governance and planning policies	Other
Group 1											
2-UNI / Civil engineering	47	3	8	2	2	2	15	3	2	2	8
2-UNI / Project management in civil engineering	50	2	7	2	6	1	1	1	13	7	10
3-BOKU / Landscape Planning and Landscape Architecture [Landschaftsplanung und Landschaftsarchitektur]	70	9	0	0	0	1	2	4	0	1	53
3-BOKU / Environmental Sciences and Civil Engineering [Umweltingenieurwissenschaften]	50	1	4	2	0	3	8	3	0	0	29
05-UNIZG / Geodesy and Geoinformatics	45	2	0	0	0	0	1	28	2	1	11
06-URJC* / Civil Engineering	46	5	9	5	3	2	2	5	0	1	14
06-URJC* / Environmental Engineering	40	1	4	1	6	2	6	1	0	1	14
06-URJC* / Marine Sciences & Technologies	44	2	0	0	4	1	0	3	0	1	33
07 - TH OWL / Environmental Engineering	32		1	0	7	0	8	1		1	14
07 - TH OWL / Landscape Architecture	36	3	0	0	0	0	0	0	1	0	32
07 - TH OWL / Civil Engineering	40	0	0	0	0	2	4	2	0	0	32
07 - TH OWL / Environmental Sciences	28	0	0	0	2	0	3	2	2	1	18
TOTAL	528	28	33	12	30	14	50	53	20	16	268
$p\% = \frac{\sum g_i}{\sum_1^9 \text{courses}} \cdot 100\%$		5%	6%	2%	6%	3%	9%	10%	4%	3%	51%
Group 2											

01-UoM / Civil Engineering	38	0	1	1	0	1	1	1	0	0	33
10-UNBI / Spatial planning	61	1	5	6	0	8	3	1	2	0	35
10-UNBI / Building materials	61	1	5	6	0	8	3	1	2	0	35
11-UET / Civil Engineering	29	0	1	7	0	0	1	1	0	0	19
12-UPT / Geodesy	32	0	0	0	0	1	0	18	0	0	13
TOTAL	221	2	12	20	0	18	8	22	4	0	135
$p\% = \frac{\sum g_i}{\sum_{i=1}^9 \text{courses}} \cdot 100\%$		1%	5%	9%	0%	8%	4%	10%	2%	0%	61%

*Note that due to the fact that URJC doesn't have a Civil Engineering School, the information about the courses is from the Barcelona School of Civil Engineering, Universidad Politécnica de Cataluña

Table 6 - Courses per group on master curriculum

University/Module	No. of courses	No. of courses for each type									
		Spatial and urban planning	Architecture and building design	Material science	Energy efficiency	Road design and mobility	Urban water management	Geodesy and analysis	Planning and participation procedures	Governance and planning policies	Other
Group 1											
2-UNI / Civil engineering	9	1	2	0	1	0	1	0	0	1	3
2-UNI / Project management in civil engineering	11	1	1	0	2	0	0	0	2	2	3
2-UNI / Engineering of natural disasters risk management	9	2	0	0	0	0	0	0	2	2	3
2-UNI / Architecture	75	14	40	3	5	0	0	1	1	2	9
3-BOKU / Landscape Planning and Landscape Architecture [Landschaftsplanung und Landschaftsarchitektur]	145	15	0	1	0	3	14	5	4	4	99
3-BOKU / Civil Engineering and Water Management [Masterstudium Kulturtechnik und Wasserwirtschaft]	170	4	13	1	4	16	39	12	1	3	77
3-BOKU / Water Management and Environmental Engineering	89	0	0	0	1	0	26	3	1	2	56
04-NMBU / Water and Env Technology	25	0	0	0	0	0	20	0	0	1	4
05-UNIZG / Geodesy and Geoinformatics	16	1	2	0	0	0	3	8	0	0	2
05-UNIZG / Geodesy and Geoinformatics	16	2	0	0	0	0	0	12	1	0	1
05-UNIZG / Geodesy and Geoinformatics	2	0	0	0	0	0	0	1	0	0	1
06-URJC* / Civil Engineering (Sp. in structural & construction engineering)	17	0	6	2	0	1	2	2	0	0	4
06-URJC* / Structural & Construction Engineering - Structure Track	32	0	15	6	0	0	0	1	0	0	10

06-URJC* / Structural & Construction Engineering - Construction Track	13	0	6	1	0	0	0	0	0	0	0	6
06-URJC* / Numerical Methods in Engineering	21	0	0	0	0	0	0	0	0	0	0	21
06-URJC* / Environmental Engineering	31	0	0	2	3	0	6	1	0	0	1	18
06-URJC* / Geotechnical Engineering (Sp. Geotechnical Engineering)	23	0	2	0	0	0	0	5	0	0	0	16
06-URJC* / Geotechnical Engineering (Sp. Groundwater Hydrology)	21	0	0	0	0	0	6	2	0	0	0	13
06-URJC* / Geotechnical Engineering (Sp. Earthquake Engineering)	22	0	3	1	0	0	0	8	0	0	0	10
06-URJC* / Structural Analysis of Monuments & Historical Constructions	8	0	2	0	0	0	0	1	0	0	0	5
06-URJC* / Urban Mobility - Sustainable Urban Mobility Transition Track	19	0	0	0	0	16	0	0	0	0	0	3
06-URJC* / Urban Mobility - Smart Mobility Data Science & Analytics Track	12	0	0	0	0	5	0	0	0	0	0	7
07 - TH OWL / Environmental Engineering and Modelling	26				7		7		1		1	10
07 - TH OWL / Infrastructure Management and Traffic	11					1	2				1	7
TOTAL	823	40	92	17	23	42	126	62	13	20	388	
$p\% = \frac{\sum g_i}{\sum_1^9 courses} \cdot 100\%$		5%	11%	2%	3%	5%	15%	8%	2%	2%	47%	
Group 2												
01-UoM / Civil Engineering-Construction (module Concrete and masonry structures)	18	0	2	1	0	0	0	0	0	0	0	15
01-UoM / Civil Engineering-Construction (module Steel, composite and timber structures)	18	0	2	1	0	0	0	0	0	0	0	15

01-UoM / Civil Engineering-Infrastructure (module Hydrotechnics)	18	0	0	0	0	0	1	1	2	0	14
08-UNSA / Water Resources and Environmental Engineering	21	1	0	0	0	0	17	0	1	0	2
08-UNSA / Roads and Transportation	16	0	0	0	0	12	0	0	1	0	3
09-UNMO / Environmental Infrastructure Management	32	4	3	3	5	1	3	0	1	4	8
10-UNBI / Energy efficiency of buildings	13	0	0	1	1	1	1	0	0	1	8
11-UET / Architecture	48	5	9	5	1	0	0	3	0	1	24
11-UET / Civil Engineering	14	1	0	6	0	0	0	2	0	2	3
12-UPT / Geodesy	18	1	0	0	0	1	0	14	0	0	2
13-POLIS / Urban Planning & Management	53	4	0	0	0	4	2	2	4	3	34
TOTAL	269	16	16	17	7	19	24	22	9	11	128
$p\% = \frac{\sum g_i}{\sum_1^9 \text{courses}} \cdot 100\%$		6%	6%	6%	3%	7%	9%	8%	3%	4%	48%

*Note that due to the fact that URJC doesn't have a Civil Engineering School, the information about the courses is from the Barcelona School of Civil Engineering, Universidad Politécnic de Cataluña

3.5 Graphical presentation of the comparison between curricula

From the data in Table 5 and Table 6, the results of the comparison between curricula in universities of G-1 and G-2 are graphically presented on Tables 7 and 8.

Table 7 – Comparison of curricula from G-2 with curricula from G-1 universities (bachelor study program)

Bachelor (data from table 4)	Spatial and urban planning	Architecture and building design	Material science	Energy efficiency	Road design and mobility	Urban water management	Geodesy and analysis	Planning and participation procedures	Governance and planning policies
Group 1	5%	6%	2%	6%	3%	9%	10%	4%	3%
Group 2	1%	5%	9%	0%	8%	4%	10%	2%	0%

A key finding is that the bachelor programs in G-1 have higher concentration of “Spatial and Urban planning”, “Energy Efficiency” and “Governance and planning policies” related subjects. Meanwhile, in the bachelor programs of G-2 there is less or no concentration of such subjects. Given the importance of these topics, and the fact they are in accordance with the development of the field today and in the future regarding Climate Smart Urban Development, we conclude that the programs of G-2 indeed need to be modernized.

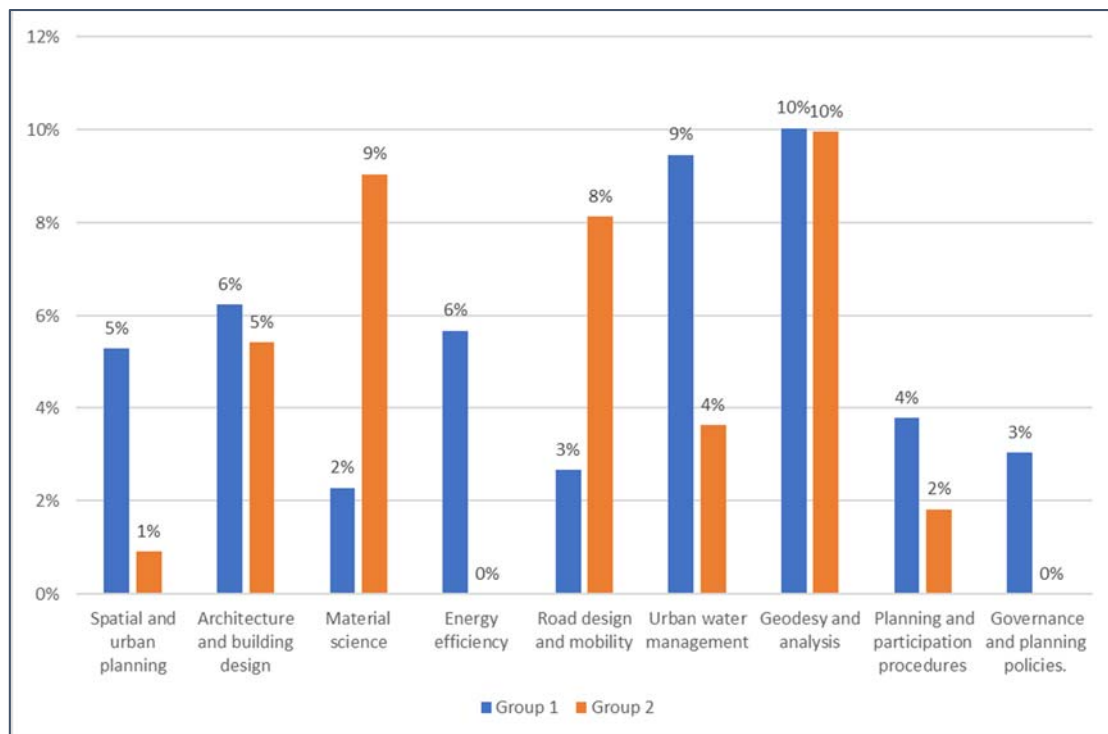


Figure 1 - Bachelor study program: Comparison of curricula from G-2 with curricula from G-1 universities

Table 8 - Comparison of curricula from G-2 with curricula from G-1 universities (master study program)

BSc (data from table 4)	Spatial and urban planning	Architecture and building design	Material science	Energy efficiency	Road design and mobility	Urban water management	Geodesy and analysis	Planning and participation procedures	Governance and planning policies.
Group 1	5%	11%	2%	3%	5%	15%	8%	2%	2%
Group 2	6%	6%	6%	3%	7%	9%	8%	3%	4%

From Figure 2, we can see that the master programs of group 1 and group 2 have some similarities and differences. A key finding is that the concentration of “Spatial and Urban planning”, “Material Science”, “Planning and participation procedures” and “Governance and planning policies” subjects is lower in the universities from EU Member States and third countries associated to the Programme than in WB universities. Also, in WB universities there is a low representation of subjects in the categories of “Architecture and building design” and “Urban water management”. Thus, we conclude that, while the groups 1 and 2 have higher similarities for the master program, there is still space for improvement and harmonization and modernization of curricula according to CSUD.

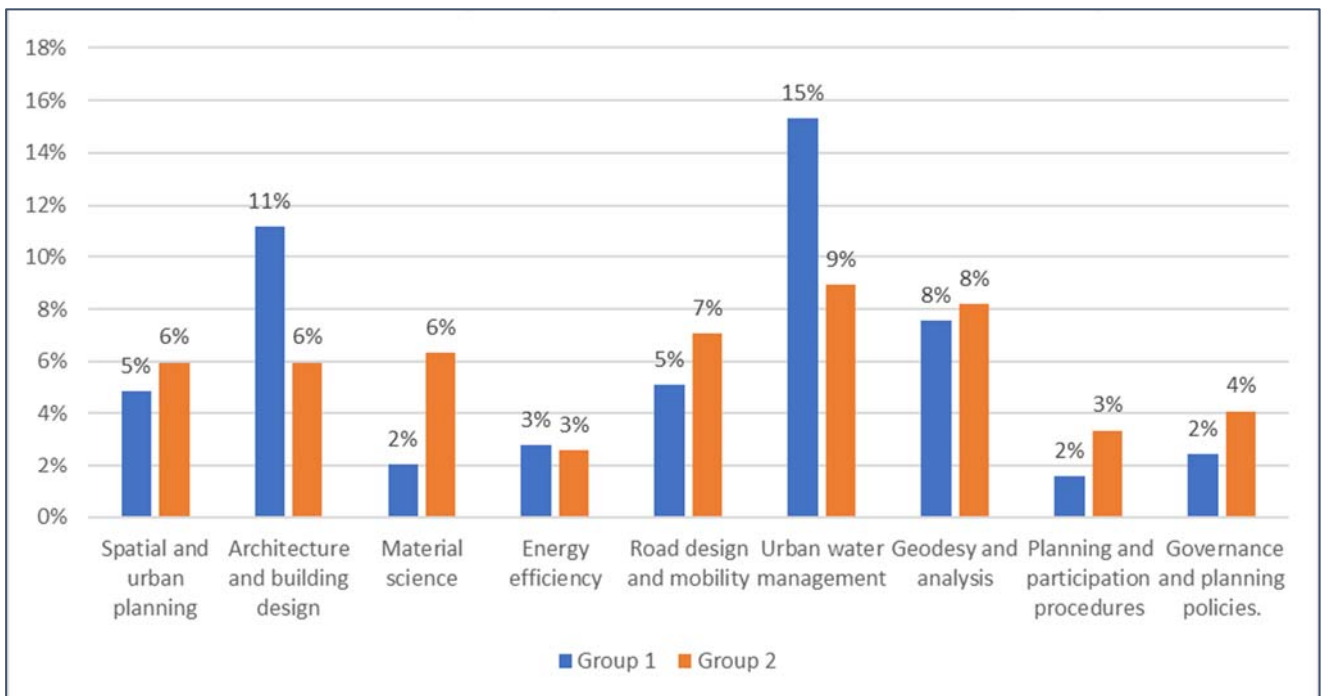


Figure 2 - Master study program: Comparison of curricula from G-2 with curricula from G-1 universities

Table 9 shows the following details for the bachelor programs at universities of groups 1 and 2:

- number of courses, number of modules, duration of study, and ECTS points

Table 9 - Number of courses, modules, years of study, semesters, and credits on bachelor

University/Module	No. of courses	No. of modules	Years of study/ semesters	ECTS
Group 1				
2-UNI / Civil engineering	47	1	4/8	240
2-UNI / Project management in civil engineering	50	1	4/8	240
3-BOKU / Landscape Planning and Landscape Architecture [Landschaftsplanung und Landschaftsarchitektur]	70	1	3/6	180
3-BOKU / Environmental Sciences and Civil Engineering [Umweltingenieurwissenschaften]	50	1	3/6	180
05-UNIZG / Geodesy and Geoinformatics	45	1	3/6	180
06-URJC* / Civil Engineering	46	1	4/8	240
06-URJC* / Environmental Engineering	40	1	4/8	240
06-URJC* / Marine Sciences & Technologies	44	1	4/8	240
07 - TH OWL / Environmental Engineering	32	1	3.5 / 7	210
07 - TH OWL / Landscape Architecture	36	1	4 / 8	240
07 - TH OWL / Civil Engineering	40	1	3.5 / 7	210
07 - TH OWL / Environmental Sciences	28	1	3.5 / 7	210
TOTAL	528	12		
Group 2				
01-UoM / Civil Engineering	38	1	3/6	180
10-UNBI / Spatial planning (5)	61	1	1/1	240
10-UNBI / Building materials (5)	61	1	1/2	240
11-UET / Civil Engineering	29	1	3/6	180
12-UPT / Geodesy	32	1	3/6	180
TOTAL	221	5		
TOTAL from 2 groups	BSc Courses 749	Modules 17		

*Note that due to the fact that URJC doesn't have a Civil Engineering School, the information about the courses is from the Barcelona School of Civil Engineering, Universidad Polit cnica de Catalu a

The first group of universities has 528 courses within twelve (12) modules, six of these modules have a 4-year duration with 8 semesters study program with 240 ECTS (06-URJC*/Civil Engineering, 06-URJC*/Environmental Engineering, 06-URJC*/Marine Sciences & Technologies, 07 - THOWL/Landscape Architecture, 2-UNI/Civil engineering, 2-UNI/Project management in civil engineering). Three other modules have a duration of 3.5 years with a study program of 7 semesters with 210 ECTS (07 - THOWL/Environmental Engineering, 07 - THOWL/Civil Engineering, 07 - THOWL/Environmental Sciences). Also, three modules have a duration of 3 years with a study program of 6 semesters with 180 ECTS (3-BOKU/Landscape Planning and Landscape Architecture, 3-BOKU/Environmental Sciences and Civil Engineering, 05-UNIZG/Geodesy and Geoinformatics).

The second group of universities has 221 courses within five (5) modules. These modules have a 3-year duration with 6 semesters study program with 180 ECTS (01-UoM/Civil Engineering, 11-UET/Civil Engineering, 12-UPT/Geodesy).

Table 10 shows the following details for the master programs at universities of groups 1 and 2:

- number of courses, number of modules, duration of study, and ECTS points

Table 10 - Number of courses, modules, years of study, semesters, and credits on master

University/Module	No. of courses	No. of modules	Years of study/ Semesters	ECTS
Group 1				
2-UNI / Civil engineering	9	1	1/2	60
2-UNI / Project management in civil engineering	11	1	1/2	60
2-UNI / Engineering of natural disasters risk management	9	1	1/2	60
2-UNI / Architecture	75	1	5/10	300
3-BOKU / Landscape Planning and Landscape Architecture [Landschaftsplanung und Landschaftsarchitektur]	145	1	2/4	120
3-BOKU / Civil Engineering and Water Management [Masterstudium Kulturtechnik und Wasserwirtschaft]	170	1	2/4	120
3-BOKU / Water Management and Environmental Engineering	89	1	2/4	120
04-NMBU / Water and Env Technology	25	1	5/10	300
05-UNIZG / Geodesy and Geoinformatics	16	1	2/4	120
05-UNIZG / Geodesy and Geoinformatics	16	1	2/4	120
05-UNIZG / Geodesy and Geoinformatics	2	1	3/6	180
06-URJC* / Civil Engineering (Sp in structural & construction engineering)	17	1	2/4	120
06-URJC* / Structural & Construction Engineering - Structure Track	32	1	1,5/3	120
06-URJC* / Structural & Construction Engineering - Construction Track	13	1	1,5/3	120
06-URJC* / Numerical Methods in Engineering	21	1	2/4	120
06-URJC* / Environmental Engineering	31	1	2/4	120
06-URJC* / Geotechnical Engineering (Sp. Geotechnical Engineering)	23	1	2/4	120
06-URJC* / Geotechnical Engineering (Sp. Groundwater Hydrology)	21	1	2/4	120
06-URJC* / Geotechnical Engineering (Sp. Earthquake Engineering)	22	1	2/4	120
06-URJC* / Structural Analysis of Monuments & Historical Constructions	8	1	1/2	60

06-URJC* / Urban Mobility - Sustainable Urban Mobility Transition Track	19	1	2/4	120
06-URJC* / Urban Mobility - Smart Mobility Data Science & Analytics Track	12	1	2/4	120
07 - TH OWL / Environmental Engineering and Modelling	26	1	1.5 / 3	90
07 - TH OWL / Infrastructure Management and Traffic	11	1	1.5 / 3	90
TOTAL	823	24		
Group 2				
01-UoM / Civil Engineering-Construction (module Concrete and Masonry Structures)	18	1	2/4	120
01-UoM / Civil Engineering-Construction (module Steel, Composite and Timber Structures)	18	1	2/4	120
01-UoM / Civil Engineering-Infrastructure (module Hydrotechnics)	18	1	2/4	120
08-UNSA / Water Resources and Environmental Engineering	21	1	2/4	120
08-UNSA / Roads and Transportation	16	1	2/4	120
09-UNMO / Environmental Infrastructure Management	32	1	2/4	120
10-UNBI / Energy efficiency of buildings	13	1	1/1	120
11-UET / Architecture	48	1	5/10	300
11-UET / Civil Engineering	14	1	2/4	120
12-UPT / Geodesy	18	1	2/4	120
13-POLIS / Urban Planning & Management	53	1	5/10	394
TOTAL	269	11		
TOTAL from 2 groups	1092	35		

*Note that due to the fact that URJC doesn't have a Civil Engineering School, the information about the courses is from the Barcelona School of Civil Engineering, Universidad Polit cnica de Catalu a

In the study program master in Table 10, the total number of courses and the number of modules developed by HEI in each curriculum are presented.

The first group has 823 courses within twenty-four (24) modules, fifteen of these modules have a 2-year duration with 4 semesters study program with 120 ECTS. While two other modules have a duration of 1.5 years with a study program of 3 semesters with 90. Four modules have a duration of 1 year with study program of 2 semesters with 60 ECTS.

The second group has 269 courses within eleven (11) modules. Nine of these modules have a 2-year duration with 4 semesters study program with 120 ECTS. While one other module has a duration of 5 years with a study program of 10 semesters with 300 ECTS. And another one of modules has a duration of 5 years with a study of 10 semesters with 394 ECTS.

4 Summary and conclusions on improvement of the existing courses and the development of new courses.

Climate change is a global challenge, and cities are at the forefront of the response. The European Union and other countries around the world are taking steps to promote climate-smart urban development. In this report, we analyzed existing curricula related to climate-smart urban development in EU member states and third countries not or associated to the Programme.

Countries in the Western Balkans are developing and claim that in the future their capacities regarding climate-smart urban development will be equal to those of other countries within the European market. Certainly, the professional and academic preparation of experts in this field begins at the appropriate universities. Thus, academic staff has a high scientific and research responsibility for actively providing knowledge, skills, and competencies to aspiring experts in the field of climate-smart urban development.

The curricula determine the following parameters for each course: course name, course contents, course outcome with expected results, the number of hours for lectures and exercise sessions, ECTS credits, and year and semester of studies. For the comparison of curricula one can use different methodologies by which one classifies the courses into different groups. Here we have classified the courses into nine groups:

- Spatial and urban planning,
- Architecture and building design,
- Material science,
- Energy efficiency,
- Road design and mobility,
- Urban water management,
- Geodesy and analysis,
- Planning and participation procedures,
- Governance and planning policies,

which contain courses based on CSUD.

From these comparisons, the following conclusions are drawn.

There are some structural differences at a curriculum level between the universities from EU Member States and third countries associated to the Programme and universities from third countries not associated to the Programme. The bachelor programs in EU Member States and third countries associated to the Programme universities have higher concentration of “Spatial and Urban planning”, “Energy Efficiency” and “Governance and planning policies” related subjects. Meanwhile, in the bachelor programs of third countries not associated to the Programme curricula there is less to no concentration of such subjects. Given the importance of these topics, and the fact they are in accordance with the development of the field today and in the future regarding the Climate Smart Urban Development, we conclude that a modernization of the bachelor curricula in WB countries is recommended.

The master programs of EU Member States and third countries associated to the Programme universities and universities from third countries not associated to the Programme have some similarities and differences. A key finding is that the concentration of “Spatial and Urban planning”,

“Material Science”, “Planning and participation procedures” and “Governance and planning policies” subjects is lower in EU Member States and third countries associated to the Programme universities than in WB universities. Also, in third countries not associated to the Programme universities there is a low representation of subjects in the categories of “Architecture and building design” and “Urban water management”. Thus, we conclude that, while two groups of universities have higher similarities for the master program, there is still space for improvement and modernization of curricula due to harmonization according to CSUD.

Reforms on the programs of third countries not associated to the Programme universities need to be in accordance with the regional and European developments. The objectives of study programs in CSUD need to be related to the following key factors: development and awareness of students for continued professional education, and protection of the environment based on the EU model.

The content of the curricula of HEIs in these countries is still under developing. But in some cases, due to economical restrictions and political situations or lack of experience, lack of capacity, curricula have been developed more slowly. It is necessary to harmonize the contents of courses from all WB partners according to more advanced curricula of partners from EU Member States and third countries associated to the Programme and EU model.

The courses that will be modernized based on climate-smart urban development include urban planning and design, environmental science, sustainable energy, transportation planning, and building science. These courses need to be revised to include the latest innovations and technologies that promote sustainable urban development and reduce the carbon footprint. It is essential to modernize these courses to prepare future urban professionals to address the challenges posed by climate change.

Collaboration between the non-academic sector and academic institutions is essential to develop innovative curricula that promote green and energy-efficient solutions for urban development. These curricula provide valuable resources for urban professionals to develop the skills and knowledge needed to promote green and energy-efficient solutions for urban development and address the challenges posed by climate change.

Universities of EU Member States and third countries associated to the Programme offer a range of courses and programs related to climate-smart urban development, including sustainable urban planning, renewable energy, and climate change adaptation. These curricula provide valuable resources for urban professionals to develop the skills and knowledge needed to promote sustainable urban development and address the challenges posed by climate change.

5 General information about task T2.3 contributors

The group of contributors for task T2.3. has played an important role with discussions, comments and organized meetings related to the curricula analyses, the group was composed by the members of thirteen universities (Table 11).

Table 11 - The group of contributors for task T2.3

T.2.3 Analysis of existing curricula related to CSUD in EU Member States and third countries not or associated to the Programme		
Partner institutions	Member	e-mail
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04/NMBU	Agnieszka Katarzyna Cuprys	agnieszka.cuprys@nmbu.no
05/UNIZG	Željko Bačić Vesna Posloncec-Petric	zeljko.bacic@geof.unizg.hr vesna.posloncec-petric@geof.unizg.hr
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6 References

Perry, G. and DaPra, M. 2021: Cities are at the Forefront of Climate Change, Retrieved from: <https://www.newsecuritybeat.org/2021/10/cities-forefront-climate-change/>

European Commission. (2019). Climate-smart urban development.

Frančula, N. and Tutić, D.2014: Comparison of Study of Geodesy and Geoinformatics at the Faculty of Geodesy, University of Zagreb with similar Studies in the WorldGeod. list 2014, 1, 1–16.

Mattsson, H. Vaskovich M.2010.: Capacity Building in Land Management. FIG Congress 2010. TS 4G - Surveying Education Curricula II. Facing the Challenges – Building the Capacity. Sydney, Australia, 11-16 April 2010.

OECD (2010), Cities and Climate Change, OECD Publishing, Paris

European Union, U. (n.d.). *URBACT*. Retrieved from: <https://urbact.eu/>

European Comission, U. (n.d.). Retrieved from an official website of the European Union: https://ec.europa.eu/regional_policy/whats-new/conferences/urban-development-network_en

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