

COURSE DESCRIPTION CARD

Faculty of Civil Engineering and Environmental Sciences									
Field of study								Degree level and programme type	
Specialization/ diploma path	-							Study profile	Academic profile
Course name	M-4. Systems related to sustainable development							Course code	IS-FCEE-00273W
								Course type	Erasmus
Forms and number of hours of tuition	L	C	LC	P	SW	FW	V	Semester	winter
					15			No. of ECTS credits	1
Entry requirements	No requirements								
Course objectives	<p>The aim of the activities included in this unit is to make students aware of the need of cooperation to develop the ability to use systems related to sustainable development, f.e.: heating and cooling systems, principles of designing small wind farms and photovoltaic panels, the basic characteristics of renewable sources of energy, plumbing installations, blue-green infrastructure f.e.: green roofs and walls, rain water retention solutions to improve all these systems in small urban elements, and to be able to integrate them in the design of a bus stop shelter.</p>								
Course content	<p>Activities included to reach this aim are very different. They include: – FACE TO FACE (materials available on www.glocal.pb.edu.pl prepared by 3 European Universities) Including: The aim of the classes (lectures, project) is to give a basic approach to understand the general knowledge needed for the course and the team design for the project of a small architecture object in different European cities locations. The goal is achieved through: SW (L- Lecture):</p> <ul style="list-style-type: none"> - Retrofitting a city with nature. The role of green-blue infrastructure in addressing challenges of the 21st century - Application of solar collectors in small architecture/ Use of the roof of bus / train stops to generate electricity using PV panels - Greenery in public space <p>Presentation and discussion of basic knowledge of the contents related to it. . SW – specialization workshop and P – project classes: Discussion and exchange of thoughts on examples presented on the lectures. Including also elaboratories:</p> <ul style="list-style-type: none"> - Hydraulic calculation of the swale infiltration ATV-A 138 new - Use of the roof of bus / train stops to generate electricity using PV panels - Selection of PV modules and inverter 								

	<ul style="list-style-type: none"> - - visit to the firm/ producers of green roofs and small architecture objects related to blue-green infrastructure <p>SW – specialization workshop and P – project classes (at informatics classrooms). The aim of the classes lectures, lab practice and specialization workshop (with an integrated methodology) is to make students develop the ability to use systems related to sustainable development, f.e.: heating and cooling systems, principles of designing small wind farms and photovoltaic panels, the basic characteristics of renewable sources of energy, plumbing installations, blue-green infrastructure f.e.: green roofs and walls, rain water retention solutions to improve all these systems in small urban elements, in their design for a green bus stop shelter designed by a team of 3 students from different universities. The goal will be achieved through:</p> <ul style="list-style-type: none"> -presentation and discussion of basic knowledge of the contents related to it. -discussion and exchange of thoughts on appropriately uses of methods for assessing the possibility of using different techniques related to it. - using their knowledge for basic project development of some selected systems, according to their location and environment, (for a small architecture object) - solving basic problems with the help of the teachers. - analyzing the best way to improve their design, with the help of the teachers. -discussion of the results and solutions proposed by student teams. Possible correction of proposed solutions. <p>Assessment (A): The developed team solution will be used for Final Oral Presentation of the 3 students team project. Assessment: test .</p>	
Teaching methods	Lectures, individual study (e-learning materials), laboratory classes (LC), specialization workshop (SW) and project classes (P), carrying out a design work for small architecture object in a team of 3 students from different universities	
Assessment method	Final test (E-learning part) and Final Oral Presentation of the team for design work defence and evaluation of design work (Face-to Face part)	
Symbol of learning outcome	Learning outcomes	Reference to the learning outcomes for the field of study
L01	The graduates show understanding of the basic systems for Heating and Cooling Systems, Plumbing Installations, blue-green infrastructure, using of renewable sources energy (PV, wind turbine) and as a result of it, select the best of them for specific purposes.	GLOCAL_M4_K18 (K_AK1_W12)
L02	The graduates know principles of greenery in public spaces	GLOCAL_M4_K19 (K_AK1_W11)
L03	The graduates show understanding of the English basic terminology related with Heating and Cooling Systems, Plumbing Installations, and the scientific texts related with them.	GLOCAL_M4_K20 (K_GP1_W15, K_AK1_W12)
L04	The graduates can apply their knowledge on basic systems for Heating and Cooling Systems, Plumbing Installations, blue-green infrastructure, using of renewable sources energy (PV, wind turbine), to elaborate basic project designs and drawings to transmit their ideas for the integration of these systems in their design of a bus stop shelter.	GLOCAL_M4_S13 (K_AK1_U14)
L05	The graduates can analyze basic problems related to engineering problems of Heating and Cooling Systems, Plumbing Installations, blue-green infrastructure, using of renewable sources energy (PV, wind turbine) by cooperating in their teams to solve them.	GLOCAL_M4_S14 (K_GP1_U03, K_AK1_U08)

L06	The graduates can analyze basic conditions related to greenery in public space and apply plants proper for green bus stop (using Glocal catalogue of greenery)	GLOCAL_M4_S15 (K_GP1_U08, K_AK1_U07)	
L07	The graduates can communicate effectively in a variety of intercultural contexts, reflect critically on stereotypical cultural perceptions of reality, Sustainable development in revitalization (renovation, revaluation) of public urban areas, and thus, are able to accept cultural diversity and differing points of view	GLOCAL_SC03 (K_AK1_U16, K_AK1_U17)	
L08	The graduates can formulate and communicate to the public, in a commonly understood way, information and opinions concerning urban design, the integration of new elements in the historic urban context of European cities, presenting different points of view	GLOCAL_SC04 (K_AK1_U16, K_AK1_U17)	
L09	The graduates accept cultural diversity and differing points of view and reflect critically on stereotypical cultural perceptions of reality, to be able to communicate effectively ideas for team work in the intercultural context of the 3 different European countries of its members.	GLOCAL_SC05 (K_GP1_K03, K_Ak1_U17)	
Symbol of learning outcome	Methods of assessing the learning outcomes	Type of tuition during which the outcome is assessed	
L01	Defence of the completed project (final oral presentation)	SW	
L02	Defence of the completed project (final oral presentation)	SW	
L03	Defence of the completed project (final oral presentation), test	SW	
L04	Defence of the completed project (final oral presentation)	SW	
L05	Defence of the completed project (final oral presentation)	SW	
L06	Defence of the completed project (final oral presentation)	SW	
L07	Defence of the completed project (final oral presentation), test	SW	
L08	Defence of the completed project (final oral presentation)	SW	
L09	Defence of the completed project (final oral presentation)	SW	
Student workload (in hours)		No. of hours	
Calculation	Participation in the SW (lecture).	3	
	Participation in specialization workshop.	4	
	Participation in SW (laboratory classes)	6	
	Participation in SW (field work)	2	
	Student individual work + test	10	
	TOTAL:	25	
Quantitative indicators		HOURS	No. of ECTS credits
Student workload – activities that require direct teacher participation		15	0,75
Student workload – practical activities		10	0,25
Basic references	Aguilera Benito, P., Bach Buendia, I., Piña Ramírez, C., Varela Lujan, S., & Vidales Barriguete, A. (2018). Transformación en la metodología del docente: “Método DIVE” = Changing the teaching methodology: “DIVE method”. Advances in Building Education, 2(1), 83-96. doi: https://doi.org/10.20868/abe.2018.1.3695		

	<p>Aguilera Benito, Patricia (2020). Optimización del comportamiento energético y lumínico en edificios singulares de vidrio a través de modelos a escala. Tesis (Doctoral), E.T.S. de Edificación (UPM) https://doi.org/10.20868/UPM.thesis.65436</p> <p>Aguilera Benito, P., Bach Buendía, I. Instalaciones Eléctricas. Parte I. 1ª ed. Madrid: Fundación General UPM, 2021. ISBN: 978-84-18255-28-1</p> <p>.Aguilera Benito, P., Bach Buendía, I. Instalaciones de suministro de agua. 1ª ed. Madrid: Fundación General UPM, 2021. ISBN: 978-84-18255-20-5.</p> <p>Gawryluk, D., & Kucinskiene, J. (2020). Small Glossary of Technical Terms for English–Polish–Spanish–Lithuanian Languages. Sausdino UAB „Vitae Litera” . https://short.upm.es/a4ab2</p> <p>General Council of Technical Architecture of Spain. Agenda 2030. https://short.upm.es/yhgxb</p> <p>Código Técnico de la Edificación [en línea]. http://www.codigotecnico.org</p> <p>Normativa Básica sobre Instalaciones Eléctricas [en línea]. https://short.upm.es/jnbtr</p> <p>Urban public spaces: Madrid, Bialystok, Klaipeda. A guide to their functions and meaning (2022) María Aurora Flórez de la Colina</p> <p>Pilar Cristina Izquierdo Gracia, Dorota Gawryluk Editors, Wydawnictwo Ekonomia i Środowisko (available on: https://glocal.pb.edu.pl/en/results/)</p> <p>Future of the City (2021, 2022) Dorota Gawryluk, Dorota Anna Krawczyk Editors, Oficyna Wydawnicza Politechniki Białostockiej (available on: https://glocal.pb.edu.pl/en/results/)</p> <p>Small Glossary of Technical Terms for English–Polish–Spanish–Lithuanian Languages (2020) Dorota Gawryluk, Jurga Kucinskiene, Sausdino UAB „Vitae Litera” (available on: https://glocal.pb.edu.pl/en/results/)</p> <p>materials available on www.glocal.pb.edu.pl prepared by 3 European Universities</p>	
Supplementary references		
Organisational unit conducting the course	BUT, FCEES, Department of Sustainable Construction and Building Systems	Date of issuing the programme
Author of the programme	Assoc. Prof. Dorota Krawczyk, DSc, PhD, Eng., Anna Werner-Juszczuk, PhD, Eng., Marta Baum, MSc, Eng. arch.	12.11.2022

L – lecture, C – classes, LC – laboratory classes, P – project, SW – specialization workshop, FW - field work,

V-virtual part , S – seminar