

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	Professional practice 2	Subject code	14.00
2.2	Course responsible/lecturer	-		
2.3	Teachers in charge with professional practice	Scientific advisor		
2.4	Year of study	I	2.5 Semester	II
			2.6 Assessment	Verification
2.7	Subject category	Formative category		
		Optionality		
		DS		
		DOB		

3. Estimated total time

3.1	Number of hours per week	14	of which	3.2 Course		3.3 Seminar		3.3 Laboratory		3.3 Project	13
3.4	Total hours in the curriculum	196	of which	3.5 Course		3.6 Seminar		3.6 Laboratory		3.6 Project	182
3.7	Individual study:										
	(a) Exams and tests										2
	(b) Manual, lecture material and notes, bibliography										15
	(c) Supplementary study in the library, online and in the field										15
	(d) Preparation for seminars/laboratory works, homework, reports, portfolios, essays										11
	(e) Tutoring										-
	(f) Other activities										-
3.8	Total hours of individual study (sum (3.7(a)...3.7(f)))					43					
3.9	Total hours per semester (3.4+3.8)					225					
3.10	Number of credit points					9					

4. Pre-requisites (where appropriate)

4.1	Curriculum	Bachelor's degree in one of the following fields: - building services engineering; - civil engineering; - architecture; - other related specializations.
4.2	Competence	

5. Requirements (where appropriate)

5.1	For the course	
5.2	For the development of professional practice	

6. Specific competences

Professional competences	CP1 - perform project management CP2 - synthesizes information CP7 - lead a team in water management CP8 - compares contractors' offers CP9 - apply health and safety standards CP12 - use measurement instruments CP16 - measure parts of manufactured products CP18 - perform pipeline routing studies CP22 - detect flaws in pipeline infrastructure CP24 - use CAD software CP26 - manage contracts CP27 - ensure compliance with purchasing and contracting regulations
Cross competences	CT1 - collaborating in teams and networks CT2 - thinks holistically CT3 - dealing with problems CT4 - respects the diversity of values and cultural norms

7. Expected Learning Outcomes

Knowledge	CP1 – by collaborating with experienced engineers in the field, the student will gain knowledge regarding leadership and project organization while performing the professional practice activities. CP2 – knowledge regarding application of information synthesis necessary to carry out project development tasks. CP7 - by collaborating with experienced engineers in the field of water management, the student will gain knowledge regarding leadership and project organization while performing the professional practice activities. CP8 – in collaboration with specialized companies, the student will see firsthand on how offers and development economy works to ensure optimal price-quality-benefits outcomes. CP9 – knowledge regarding the practical application of health and safety standards concerning both functional building services and labor protection during project execution. CP12 – knowledge concerning the use and operation of specific equipment (e.g. thermographic cameras, pressure gauges, pipe inspection/detection equipment, IAQ measuring tools etc.) CP16 – knowledge regarding the use of equipment used to assess the manufacturing quality control of pipelines, installation components etc. CP18 – knowledge regarding the selection optimal pipe routing prioritizing safety management during execution and use and other factors such as, geotechnics, economic feasibility, environmental impact etc. CP22 – knowledge regarding the detection of flaws of piping networks such as corrosion, leaks, faulty welding procedures, degradation etc. CP24 – knowledge regarding the use of CAD software to learn and correlate blueprints with field realities and execution possibilities. CP26 – knowledge regarding private and public contracting procedures that ensure fair and efficient collaboration with clients and partners. CP27 – knowledge regarding the complex national and European legal framework regarding that enforce fair trade regulations, environmental strategies etc.
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Skills	CP1 – skills regarding specific work site organization, task scheduling, drawing up a Gantt charts, dividing workers into teams, development scheduling etc. CP2 – skills regarding complex project synthesis needed for team briefing, meetings, managerial tasks etc. CP7 – skills regarding the logical chronological organization for water management works and development. CP8 – skills needed to view the building services development process from an economical point of view, such as work price assessment taking into account wages, equipment depreciation, consumables, investment costs etc., to insure sustainable costs both in the public and private sector. CP9 – skills at employing adequate and updated safety standards for building services execution such as appropriate safety equipment (e.g. protective helmet, eye wear, ear plugs, safety gloves), also scheduling work tasks during appropriate weather conditions, ensuring hydration possibilities etc. CP12 – skills concerning the operation and software use of numerous measuring equipment: thermographic cameras, pressure gauges, pipe inspection/detection equipment, IAQ measuring tools etc., also data interpretation in results assessment. CP16 – skills that are incorporated into product quality assessment such as pipeline manufacturing quality control, installation components etc. CP18 – skills concerning adequate pipeline routing selection taking into account execution safety management, optimal material list, optimal pipe lengths in concordance with the corresponding legal directives. CP22 – skills regarding flaw detection methodologies in pipeline networks, combining non-destructive testing, fracture mechanics, and data science, mastering advanced sensor technologies, diagnostic evaluation frameworks, and failure prediction modeling to ensure the integrity and safe operation of pipeline networks CP24 – skills in the use of CAD software: AutoCAD, Revit, CADvent, Dialux etc. CP26 – skills in adequately drafting and drawing up contract within the current legal framework, establishing clear rights, responsibilities and delivery terms for all parties involved. CP27 – skills in navigating and correctly identifying the relevant legal aspects within the national and European legal framework for fair trade, environmental strategies etc.
Responsibilities and autonomy	CP1 – ensuring compliance with, quality requirements, the delivery deadline, warranty etc. CP2 – correct and clear briefing, instructions communication, technical reports etc. CP7 – application of efficient water management methodologies. CP8 - correct competitive price estimation. CP9 – ensuring work progress under all updated safety requirements. CP12 – drafting accurate data and correct use of equipment. CP16 – correct quality assessments of all products and building services components. CP18 – drawing up and executing well justified pipeline routes. CP22 – accurate flaw detections along building services components. CP24 – correct interpretation and drawing using latest CAD software. CP26 – correct drafting of contracts. CP27 – compliance with purchasing and contracting laws and regulations.

8. Discipline objectives (as results from the *key competences gained*)

8.1	General objective	✓ To evaluate the functional and energy efficiency of the installation systems and to design solutions for their rehabilitation and technological modernization; ✓ To synthesize, explain and transmit information on the composition and operation of installation systems
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8.2	Specific objectives	• To compile programs for investigating the operating conditions and evaluating the efficiency of different categories of installations • To analyze and evaluate the functional parameters and performance indicators of equipment and installation systems in the given operating conditions • To identify the technical non-conformities and the needs of functional and energetic rehabilitation / modernization • To select and propose intervention measures for the energy efficiency of the different categories of installations • To draw up the technical-economic documentation specific to the functional and energetic evaluation • Analyze and synthesize existing information on installation systems; • To elaborate documentary and formative materials regarding the composition and calculation of the installation systems; • To know the recent technical-scientific achievements and the national and international tendencies for the development of the field.
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9. Contents

9.1. Theme area	Number of hours	Teaching methods	Notes
Building and City Assessment			
Indoor Environment Quality and Well-being			
Building Services Retrofit Solutions			
Energy Analysis of a Building / City			
Lifecycle Analysis			
Obs: Students will be divided into groups and will address a topic of their choice from those proposed by teachers or companies with which there are internship agreements. The themes will be focused on the realization of projects and on the analysis of the chosen solutions.			
9.2. Applications	Number of hours	Teaching methods	Notes
Presentation of the design / practice theme for each student	38	Exposure, applications	
Calculation method used at national level	38		
Implementation of the calculation methodology	38		
Case study based on calculation methods used at national level	66		
Deliver and present the elaborated project	2		
Bibliography			
1. Course notes related to the disciplines studied in the second semesters of the master's cycle.			
2. Bibliographic sources specific to the project / practice topic.			
3. Legislation specific to each topic.			

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

The gained knowledge will be necessary for employees that will work in building services engineering design and execution.

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	-		
11.5 Applications	Verification (grade C); Knowledge in the calculation methodology when carrying out the project (grade A).	The verification consists in evaluating the knowledge resulting from the design (2 hours).	80% project 20% verification
11.6 Minimum standard of performance			
Grade components: Verification (C); Knowledge in the calculation methodology (A). $G = 0.2 C + 0.8 A$ Condition for obtaining the credits: $G \geq 5$; $C \geq 5$; $A \geq 5$			
Date of filling in: 12.05.2026		Title Surname Name	Signature
	Lecturer		
	Teachers in charge of application	Assoc.Prof.PhD.Eng. Octavian Pop	
Date of approval in the Department of Building Services Engineering 09.07.2026 Date of approval in the Council of the Faculty of Building Services Engineering 09.07.2026		Head of department Assoc.Prof.PhD.Eng. Ciprian BACOTIU Dean Assoc.Prof.PhD.Eng. Florin DOMNIȚA	