Ministry of Education and Science of Ukraine
Sumy National Agrarian University
Faculty of Construction and Transport
Department of Architecture and Engineering Surveys

Working Program (Syllabus) of the Educational Component EC 2: Repair and technical operation of the building's internal communication

Implemented within the framework of the educational program

Architecture and Urban Planning

(title)

in the field of study 191 "Architecture and Urban Planning.".

(code, title)

at the second level of higher education.

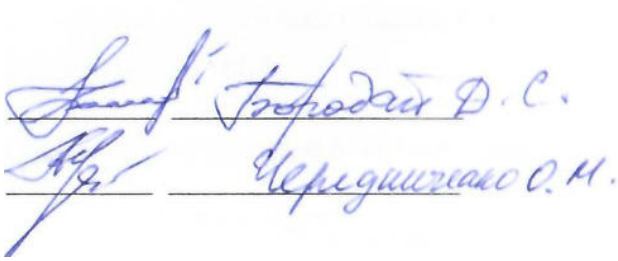
Sumy – 2024

Developer:  **Andriy Redko, Professor, Doctor habilitated**

Reviewed and approved at the meeting of the Department of Architec-ture and Engineering Surveys	protocol dated 07.06.24 № 14
	Head of the Department  **Dmytro Borodai**

Approved by:
Program Coordinator ___  ___ Artem BORODAI

Dean of the Faculty where the e
ducational program is implemented  Olexandr SOLARYOV

The review of the working program has been provided by 

Methodologist of the Department of
Education Quality, Licensing, and Accreditation
ліцензування та акредитації 

Registered in the electronic database: Date: 19.07 2024

Information on the review of the working program (syllabus):

Academic year in which changes are made	Appendix number to the working program with a description of changes	Changes reviewed and approved		
		Date and protocol number of the department meeting	Head of the Department	Program Coordinator

1. GENERAL INFORMATION ABOUT THE EDUCATIONAL COMPONENT

1.	Title of the educational component	EC 2: Repair and technical operation of the building's internal communication			
2.	Faculty/Department	Faculty of Construction and Transport / Department of Architecture and Engineering Surveys			
3.	Status of the educational component	Mandatory			
4.	Program/Specialty (programs) to which the educational component is part of (to be filled in for mandatory educational components)	Educational and Professional Program "Architecture and Urban Planning" of the second (master's) level of higher education in the specialty 191 "Architecture and Urban Planning," qualification: Master of Architecture.			
5.	The educational component may be offered for (to be filled in for elective components)				
6.	Level	7 Level			
7.	Semester and duration of study	Full-time – 2 Semester, 1-15 week			
8.	Number of credits	5 (150 hours)			
9.	Total number of hours and their distribution	Contact hours (classes)			Independent work
		Lectures	Practical / Seminar classes	Laboratory classes	
		16	30	-	104
10.	Language	English			
11.	Instructor/Coordinator of the educational component	Andriy Redko, Professor, Doctor habilitated			
11.1	Contact information	office 431e; tel +38 (050) 424-04-04; andrey.ua.1000@gmail.com			
12.	General description of the educational component	**Educational Component EC 2: Repair and technical operation of the building's internal communication** is aimed at the formation of students of higher education theoretical knowledge regarding the classification, features of construction, the composition of operation and repair of internal communication of buildings and the acquisition of practical skills in the use of modern methods of repair and operation of internal communication			
13.	Purpose of the educational component	Acquisition of knowledge in the field of operation and indoor systems by students of higher education, their acquisition of skills and decision-making regarding the choice of methods of their repair..			
14.	Prerequisites for studying the educational component, connection with other educational components of the program				
15.	Academic Integrity Policy	Observance of academic integrity for students of higher education involves: independent performance of educational tasks, tasks of current and final control of learning results; reference to sources of information in the case of using ideas, statements, information stay; compliance with copyright legislation; providing reliable information about the results of			

		one's own educational or scientific activities. Violations of academic integrity when studying the OC " Repair and technical operation of the building's internal communication " are considered to be: academic plagiarism, academic fraud (passing someone else's work as one's own), use of electronic devices during the final control of knowledge. Education seekers may be subject to the following academic responsibility: re-examination evaluation process (control (calculation and graphic) work, exam, credit, etc.); deprivation of an academic scholarship.
16.	Course link in the system Moodle	https://cdn.snau.edu.ua/moodle/course/view.php?id=5218

2. LEARNING OUTCOMES FOR THE EDUCATIONAL COMPONENT AND THEIR CONNECTION TO PROGRAM LEARNING OUTCOMES"

Learning Outcomes for the Educational Component: "Upon completing the educational component, the student is expected to be able to...	How the Learning Outcomes are Assessed
LO 1. Know the basic concepts of system elements, types and parameters of heat carriers, arrangement of heating devices, their selection, pipes, fittings, natural channel ventilation, principle schemes of mechanical ventilation of a building, its equipment, purpose, arrangement and classification of air conditioning systems and their equipment.	Questions, doing homework
LO 2. Know about the arrangement of internal water supply, schemes of internal water supply systems, their equipment, local and central hot water supply systems, schemes and elements of the hot water supply system of a residential building, classification, arrangement and elements of internal sewage systems, their equipment, materials and equipment of internal sewage systems, internal gutters.	Questions, doing homework
LO 3. Know about heat and gas supply systems of residential and public buildings, their purpose and arrangement, schemes of heat and gas supply of residential buildings, gas devices, pipes and fittings.	Questions, tests, homework
LO 4. Using regulatory documentation and technical literature, know the requirements for the effective operation of engineering systems of buildings.	Questions, doing homework
LO 5. Be able to make fundamental decisions regarding the qualified rational operation of heating systems. Know the structure, principle of operation, technical characteristics of engineering equipment of ventilation and air conditioning systems and be able to evaluate the main factors affecting the effectiveness of their functioning.	Questions, doing homework
LO 6. Using regulatory documentation and technical literature, know the requirements for the arrangement of internal gas supply systems, the basic rules of their operation.	Questions, doing homework
LO 7. Develop measures to carry out work on the operation of heat supply systems to ensure their reliable and uninterrupted operation	Questions, doing homework
LO 8. Develop organizational and technical measures to conserve energy resources (heat and electricity). Conduct an analysis of the causes of defects and damage to internal engineering networks. Develop recommendations for proper maintenance and maintenance of elements and engineering equipment of internal networks of buildings	Questions, tests, doing homework, passing the exam

3. CONTENT OF THE EDUCATIONAL COMPONENT (COURSE SYLLABUS)

Topic List of questions to be covered within the topic	Distribution within the Overall Time Budget				Recommended Reading
	Classroom Work			Independent Work	
	Lectures	Practical	Lab		
Content module 1 - Classification of internal engineering systems of buildings					
Topic 1: Heating, ventilation and air conditioning systems - purpose, types, requirements for systems Structural Components of Science; - heating devices of heating systems Key Features of Scientific Research; - equipment of forced ventilation systems; - type of air conditioners; - network equipment of SAC.	2	2		8	[1-6
Topic 2: Hot and cold water supply systems, sewage network - purpose, types, requirements for systems; - basic schemes and structural elements of internal hot and cold water supply; - basic schemes and structural elements of the internal sewage network.	2	4		12	[1-6,11]
Topic 3 Heat and gas supply systems: - classification of heat supply systems depending on the heat source, structure, type of heat carrier, number of pipelines; - general information about gas supply; - arrangement and equipment of the building's gas supply system.	2	4		12	[1-6]
Together according to content module 1	**6**	**10**		**32**	
Content module 2 – Repair of internal engineering networks of buildings					
Topic 4: General information about operational processes - basic concepts and definitions. - documentation on the technical operation of internal networks of buildings.	2	4		12	[7-13]
Topic 5: Operation of heating, ventilation and air conditioning systems of residential buildings - elimination of thermal insulation damage on central heating pipes; - repair of insulation of expansion tanks in the attic; - hydraulic testing and regulation of heating systems; - repair and replacement of regulating taps, valves and valves, flushing of pipelines and devices;	2	8		24	[7-13]

- replacement of sections of pipelines of heating systems; - regulation and adjustment of ventilation systems, repair of ventilation systems, ventilation grilles and shutters, elimination of air suction in ventilation systems.					
Topic 6: Repair of heat and gas supply systems - elimination of leaks in pipelines, devices and fittings; - repair of regulating taps, valves, valves, renewal of oil seals in heat supply systems; -repair, replacement of control and measuring devices - elimination of leaks in gas pipe joints; - grinding and lubrication of cork valves on pipelines, equipment, installation of gas valve handles.; - cleaning of steel cuffs on pipes in places where pipes pass through ceilings, walls; - cleaning of burners in gas water heaters and stoves; - stuffing seals in semi-automatic and automatic gas taps.	2	6		18	[7-13]
Topic 7: Repair of hot and cold water supply systems, sewerage. adjustment and hydraulic testing of hot and cold water supply systems - replacement of gaskets in water taps; - sealing of drains, renewal of packing seals, polishing of cork taps and mixers; - strengthening the insulation of pipelines; - elimination of clogging of indoor water supply networks; - adjustment of flushing tanks, replacement of gaskets.	2	4		10	[7-11,12-13]
Topic 8: Repair of individual heating points - commissioning of individual heating points, preparation for the heating season; - start-up and debugging works.	2	2		8	[17-20]
Together according to the meaningful module 2	**10**	**24**		**72**	
Total by meaningful modules	**16**	**30**		**104**	

4. TEACHING AND LEARNING METHODS

Learning Outcomes	**Teaching Methods** (Activities Conducted by the Instructor During Classroom Sessions and Consultations)	**Number of Hours**	**Learning Methods** (Types of Learning Activities to be Performed Independently by the Student)	**Number of Hours**
LO 1.	Explanation, Lecture, Book Work, Material Demonstration Using Multimedia Technologies, Practical Work	4	Use of Technical Teaching Aids, Self-Assessment of Knowledge, Use of Lecture Notes, Core and Supplementary Literature. Completion of Individual Assignments, Writing a Scientific Paper, Development of Analytical Diagrams and Tables	10
LO 2.	Explanation, Lecture, Book Work, Material Demonstration Using Multimedia Technologies, Practical Work	4	Use of Technical Teaching Aids, Self-Assessment of Knowledge, Use of Lecture Notes, Core and Supplementary Literature. Completion of Individual Assignments, Writing a Scientific Paper, Development of Analytical Diagrams and Tables	10
LO 3.	Explanation, Lecture, Book Work, Material Demonstration Using Multimedia Technologies, Practical Work	4	Use of Technical Teaching Aids, Self-Assessment of Knowledge, Use of Lecture Notes, Core and Supplementary Literature. Completion of Individual Assignments, Writing a Scientific Paper, Development of Analytical Diagrams and Tables	10
LO 4.	Explanation, Lecture, Book Work, Material Demonstration Using Multimedia Technologies, Practical Work	6	Use of Technical Teaching Aids, Self-Assessment of Knowledge, Use of Lecture Notes, Core and Supplementary Literature. Completion of Individual Assignments, Writing a Scientific Paper, Development of Analytical Diagrams and Tables	5
LO 5.	Explanation, Lecture, Book Work, Material Demonstration Using Multimedia Technologies, Practical Work	14	Use of Technical Teaching Aids, Self-Assessment of Knowledge, Use of Lecture Notes, Core and Supplementary Literature. Completion of Individual Assignments, Writing a Scientific Paper, Development of Analytical Diagrams and Tables	18
LO 6.	Explanation, Lecture, Book Work, Material Demonstration Using Multimedia Technologies, Practical Work	14	Use of Technical Teaching Aids, Self-Assessment of Knowledge, Use of Lecture Notes, Core and Supplementary Literature. Completion of Individual Assignments, Writing a Scientific Paper, Development of Analytical Diagrams and Tables	8
LO 7.	Explanation, Lecture, Book Work, Material Demonstration Using Multimedia Technologies, Practi-	10	Use of Technical Teaching Aids, Self-Assessment of Knowledge, Use of Lecture Notes, Core and	15

	cal Work		Supplementary Literature. Completion of Individual Assignments, Writing a Scientific Paper, Development of Analytical Diagrams and Tables	
LO 8.	Explanation, Lecture, Book Work, Material Demonstration Using Multimedia Technologies, Practical Work	8	Use of Technical Teaching Aids, Self-Assessment of Knowledge, Use of Lecture Notes, Core and Supplementary Literature. Completion of Individual Assignments, Writing a Scientific Paper, Development of Analytical Diagrams and Tables	10

5. EVALUATION OF THE EDUCATIONAL COMPONENT

5.1. Diagnostic Assessment (specified as needed)

5.2. Summative Assessment

5.2.1. To assess the expected learning outcomes, the following are provided:

№	Methods of Summative Assessment	Weight in the Overall Grade	Date
1	Preparation and Publication of Abstract Materials for a Scientific Conference	20/20%	After studying the topics 1-3
2	Practical Work (Development of Analytical Diagrams and Tables for Each Topic – 7 Topics)	25/25%	After studying the topics 4-5
3	Preparation of a Scientific Paper	25/25%	After studying the topics 6-8
4	Exam	30/30%	

5.2.2. Evaluation criteria

Component	Unsatisfactory	Satisfactory	Good	Excellent
Individual work №1	<6	6-7	8-9	10
	Most of the task requirements have not been met	The requirements for the task have not been fully met, but mostly done	The requirements for the task have been fulfilled, but there are comments on the work	The requirements for the task have been fulfilled, there are no comments
Individual work №2	<9	9-11	12-14	15
	Most of the task requirements have not been met	The requirements for the task have not been fully met, but mostly done	The requirements for the task have been fulfilled, but there are comments on the work	The requirements for the task have been fulfilled, there are no comments
Individual work №3	<12	12-15	16-19	20
	Most of the task requirements have not been met	The requirements for the task have not been fully met, but mostly done	The requirements for the task have been fulfilled, but there are comments on the work	The requirements for the task have been fulfilled, there are no comments
EXAM	<18	18-22	23-27	28-30

	Most of the task requirements have not been met	The requirements for the task have not been fully met, but mostly done	The requirements for the task have been fulfilled, but there are comments on the work	The requirements for the task have been fulfilled, there are no comments

5.3. Formative assessment:

For assessing current progress in learning and understanding areas for further improvement, the following are provided:

№	Elements of formative assessment	Date
	Verbal feedback with the teacher during practical classes	During practical classes

Self-assessment can be used as an element of summative assessment and formative assessment.

6. EDUCATIONAL RESOURCES (LITERATURE)

6.1. Primary Sources

1. Kravchenko V. S. Engineering equipment of buildings / V. S. Kravchenko, L. A. Sabliy, V. I. Davydchuk, N. V. Kravchenko. – Kyiv: Professional Publishing House, 2008. – 480 p.

2. O. Wozniak. Heating and gas supply and ventilation: teaching manual. / Voznyak O.T., Savchenko O.O., Myronyuk H.V., Shapoval S.P., Spodynyuk N.A., Gulay B.I. - Lviv: Publishing House of the National University "Lviv Polytechnic", 2013.-275p.

3. Stepanov M.P., Roskovshenko Yu.K. Heat and gas supply and ventilation: Study guide / M. Stepanov, Yu.K. Roskovshenko. - K.: KNUBA, 2008. - 256 p.

4. Shulga M.O., Shushlyakov D.O., Usyk G.A. Engineering equipment of buildings. Study guide. Kharkiv: KhNAMG, 2011. 344 p.

5. Kravchenko V.S., Sabliy L.A., Zinich P.L. Sanitary and technical equipment of buildings. Kyiv: Condor, 2007. 457 p.

6. Biletskyi B.F. Sanitary and technical equipment of buildings. Kyiv: Derzhbud, 2002. 512 p.

7. Yakymchuk B.N. Operation of heat and gas supply and ventilation systems: training. manual / B. N. Yakymchuk, A. M. Girol, R. M. Rossinskyi. - Rivne: NUVHP, 2012. - 235 p.

8. Barashikov A. Ya., Gomilko V. O., Malyshev O. M. Technical exploitation of buildings and urban areas: Textbook. Kyiv: Higher School, 2000. - 112 p.

9. Havrylyak A.I. etc. Technical operation, reconstruction and modernization of buildings: Training manual / A.I. Havrylyak, I.B. Bazarnyk, R.I. Kinash, M.V. Kotiv, M.R. Bilskyi, J.P. Yusyk, I.V. Melnyk, B.L. Nazarevich, I.A. Yusyk, S.G. Shevchuk, O.M. Hoyda, B.V. Morklyanyk, O.V. Petrenko, A.Ya. Pentsak, B.Z. Parnet Under the editorship A.G. Havrylak - Lviv: Publishing House of the National University "Lviv Polytechnic", 2006. - 540 p.

10. Tugai A.M. Rules of technical operation of heat supply systems of communal energy of Ukraine / Tugai A.M., Yenin P.M., Shishko G.G. - K.: KDNK, 1999. - 200 p.

11. Kravchenko V.S. Water supply and sewerage. Kyiv: Condor, 2013. 153 p.

12. Technical operation of residential buildings, hotels and tourist complexes: training. manual / V.I. Abeleshov; Hark. national Acad. urban farm - Kh.: KhNAMG, 2012. - 261 p.

13. B.H. Draganov, V.V. Ishchenko, O.V. Shelimanova Operation of thermal power plants and systems: textbook/ed. by Professor B.H. Draganov:-Kyiv: CP "Comprint", 2017-338p.

14. Savyovsky V.V. C13 Thermal modernization of buildings: training. manual Kyiv: Lira-K Publishing House, 2021. – 278 p.

15. Zhukovsky S.S., Labai V.Y. Energy supply systems and provision of the microclimate of buildings and structures. Education manual. - Lviv: Astronomical Geodesic Society, 2000. - 259 p.

16. Ratushnyak H.S., Popova H.S. Energy conservation and operation of heat supply systems/study manual - Vinnytsia: VDTU, 2002. - 120 p.

6.2. Supplementary Sources

17. Order of the State Committee of Ukraine on Housing and Communal Affairs dated May 17, 2005 No. 76 "On Approval of the Rules for the Maintenance of Residential Buildings and Outbuildings".

18. Order of the State Committee of Ukraine on Housing and Communal Affairs No. 150 of August 10, 2004 "On Approval of the Exemplary List of Services for the Maintenance of Buildings and Structures and Outbuildings and Services for the Repair of Premises, Buildings, and Structures".

19. "Rules for determining the physical wear and tear of residential buildings" SOU Housing and Housing 75.11 - 35077234. 0015:2009).

20. "Regulations on the maintenance of internal gas supply systems of residential buildings, public buildings, domestic and communal enterprises", approved by the order of the Ukrgaz DAKH on July 30, 1997, No. 35.