



Institute of Architecture and construction named after T.K. Basenova

Department of Engineering systems and networks

**ADDITIONAL EDUCATIONAL PROGRAM (Minor)
«Design, installation and operation of internal engineering
systems of buildings and structures»**

Almaty 2022

Additional educational program (Minor) «**Design, installation and operation of internal engineering systems of buildings and structures**» was approved at the meeting of K.I. Satbayev KazNRTU Academic Council

Minutes # 13 dated «28» 04 2022.

was reviewed and recommended for approval at the meeting of K.I. Satbayev KazNRTU Educational and Methodological Council.

Minutes # 7 dated «26» 04 2022.

Additional educational program (Minor) «**Design, installation and operation of internal engineering systems of buildings and structures**» developed by Academic committee:







Full name	Academic degree/ academic title	Position	Workplace	Signature
Chairperson of Academic Committee:				
Alimova Kulyash	cand. tech. sciences	Head department, associate professor	Department of "Engineering systems and networks" IAC named after T. K. Basenov	
Teaching staff:				
Halkhabay Bostandyk	cand. tech. sciences, docent	Associate Professor	department "Engineering systems and networks"	
Khoyshev Amirkhan	cand. tech. sciences	Associate Professor	department "Engineering systems and networks"	
Employers:				
Zhumartova Aliya		headmaster	LLP "Research Center Eco Zhubalau"	
Students:				
Shalkar Saken		Master student	1st course	
Bayarystanov Madiyar		Student	4th course	

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1. Description of additional educational program (Minor)

The program is devoted to the study of the current state of the theory and practice of applied aerodynamics, thermophysics, heating, ventilation and air conditioning; sanitary and technical devices of buildings; design and calculation, commissioning and operation of internal engineering systems in residential, public and industrial buildings; improvement and development of heating and ventilation systems using renewable sources, methods and ways of technological design and installation in the construction of residential and civil buildings and structures.

2. The purpose and objectives of additional educational program (Minor)

The purpose of additional educational program (Minor): to train specialists to work in the field of designing heat and gas supply and ventilation systems, water supply and sewerage of residential and public buildings of cities and settlements; having the knowledge necessary for the successful execution of construction and installation works, rational and industrial production methods.

Tasks of additional educational program (Minor): to study the theoretical and practical foundations of design, installation and operation of modern engineering systems of buildings and structures.

3. Learning outcomes

- know the basic schemes of heating, ventilation, gas supply, cold and hot water supply, sewerage;
- choose and use modern sanitary appliances and equipment using innovative technologies;
- apply modern principles of designing effective internal engineering systems;
- for selection of diameters of pipelines of engineering systems;
- to carry out reconstruction and operation of internal engineering systems using modern energy-saving technologies.
- apply the most rational methods, rules of production and acceptance of construction and installation works and their interrelation;
- to develop technological maps for the production of installation works using complex mechanization and advanced labor methods;
- development of design documentation for internal engineering systems of buildings and structures.

4. Catalog of disciplines

Code and name of the discipline: HYD478 Design of internal water supply and sewerage systems for buildings and structures

Number of credits:5 (1/0/2/2)

Component: Basic (component of choice)

The purpose and objectives of the course: The purpose of mastering the discipline is to form students' competencies in the field of theoretical knowledge on the design of internal water supply and sewerage systems for buildings and structures. The task is to teach students how to calculate and design internal water supply and sewerage systems.

Brief description of the course: To study methods and ways of solving practical engineering problems and scientific and technical problems in the field of creating modern water supply and sewerage systems, independently solve technical problems, freely and correctly understand projects of engineering equipment for buildings and structures.

Knowledge, skills, competences at the course end:

- Know the theoretical foundations of hydraulics, thermodynamics and the importance of water supply and sewerage systems of buildings and structures in urban construction;

- Own the basics of designing internal water supply and sewerage systems;
- Calculate the required water flow for individual buildings and structures;
- Use modern technologies in the design of internal water supply and sewerage systems for buildings and structures.

- Be able to calculate the internal water supply and sewerage systems of buildings and structures, have the skills to read the drawings of working projects, draw up sketches for the design of internal water supply and sewerage systems of buildings and structures.

Code and name of the discipline: HYD479 Design of internal heating, ventilation, air conditioning systems for buildings and structures

Number of credits:5 (1/0/2/2)

Component: Basic (component of choice)

The purpose and objectives of the course: The purpose of the discipline is the formation of students' competencies in the field of theoretical knowledge on the design of internal heating, ventilation, air conditioning systems of buildings and structures. The task is to teach students how to calculate and design internal heating, ventilation and air conditioning systems.

Brief description of the course: To study methods and ways of solving practical engineering problems and scientific and technical problems in creating a microclimate in a room, to solve technical problems, to properly understand projects of engineering equipment of buildings and structures.

Knowledge, skills, competences at the course end:

- Know the theoretical foundations of hydraulics, thermodynamics, heating, ventilation, air conditioning of buildings and structures in urban construction;
- Own the basics of designing internal heating, ventilation and air conditioning systems;
- Know the required heat consumption for individual buildings and structures;
- Use modern technologies in the design of internal heating, ventilation, air conditioning systems of buildings and structures.
- Be able to perform calculations of internal heating, ventilation, air conditioning systems of buildings and structures, have the skills to read drawings of working projects, draw up sketches for the design of internal heating, ventilation, air conditioning systems of buildings and structures.

Code and name of the discipline: HYD480 Installation of internal engineering systems of buildings and structures

Number of credits: 5 (1/0/2/2)

Component: Profile (component of choice)

The purpose and objectives of the course: The purpose of the discipline is the formation of students' competencies in the field of theoretical knowledge about the installation of internal engineering systems of buildings and structures. To teach the theoretical foundations of the installation of internal engineering systems of buildings and structures.

Brief description of the course: To study the methods of installation of internal engineering systems of buildings and structures.

Knowledge, skills, competences at the course end:

- Own the theoretical foundations of the installation of internal engineering systems of buildings and structures: water supply, sewerage, heating, ventilation and air conditioning;
- Use modern technologies in the installation of internal engineering systems of buildings and structures;
- To be able to carry out in practice the installation of various internal engineering systems of buildings and structures.

Code and name of the discipline: HYD481 Operation of internal engineering systems of buildings and structures

Number of credits:5 (1/0/2/2)

Component: Profile (component of choice)

The purpose and objectives of the course: The purpose of mastering the discipline is to develop students' competencies in the field of theoretical knowledge on the operation of internal systems of water supply, sewerage, heating, ventilation, air conditioning of buildings and structures. To teach the operation of various buildings and structures of internal systems.

Brief description of the course: To study the methods of operation of internal systems of water supply, sewerage, heating, ventilation, air conditioning of buildings and structures; to freely and correctly understand the operation of engineering equipment of buildings and structures.

Knowledge, skills, competences at the course end:

- Know the theoretical foundations of hydraulics, thermodynamics, water supply, sewerage, heating, ventilation, air conditioning of buildings and structures in urban construction;
- Own the basics of operation of water supply, sewerage, heating, ventilation systems;
- Know the basics of technology for the operation of internal systems of water supply, sewerage, heating, ventilation, air conditioning of buildings and structures;
- Be able to perform operational calculations of internal systems of water supply, sewerage, heating, ventilation, air conditioning of buildings and structures.