



**NJSC Kazakh National Research Technical University named after K.I. Satbayev
Institute of Architecture, Construction and Energy named after T.K. Bassenov
Department of "Construction and building materials"**

EDUCATIONAL PROGRAM

**"CONSTRUCTION AND PRODUCTION OF BUILDING MATERIALS AND
CONSTRUCTIONS"
(profile direction (1 year))**

**Master of Engineering and Technology in the educational program "7M07302 - Construction
and production of building materials and structures"**

1st edition
in accordance with the State Educational Standard of Higher Education 2018

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Программа составлена и подписана сторонами:

От КазНТУ им К.Сатпаева:

1. Заведующий кафедрой СиСМ
2. Директор Института АнС им. Т.К. Басенова
3. Председатель УМГ кафедры,

 Н.К. Кызылбаев
 Б.У. Куспангалиев
 Ж.Т. Наширалиев

От работодателей:

1. Заведующий лабораторией «Сейсмостойкого строительства» АО КазНИИСА
2. Директор ТОО «Сұлутөр»

 А.А. Беспаев
 Е. Жаутиков

 Рахимова Г.М.

От вуза-партнера:

1. Заведующая кафедрой «Строительные материалы и технологии» Каргандинского государственного технического университета

Approved at a meeting of the Educational and Methodological Council of the Kazakh National Research Technical University named after K.I. Satpayev. Minutes No. 4 dated 14.01.2020

Qualification:

Qualifications and positions are determined in accordance with the "Qualification handbook of positions of managers, specialists and other employees", approved by order of the Minister of Labor and Social Protection of the Population of the Republic of Kazakhstan dated May 21, 2012 No. 201-p-m (as amended on 17.04.2013) ... Graduates of the specialty 7M07302 "Construction and production of building materials and structures" can work in the following positions:

- Master of Engineering and Technology: Design Institutions; the Bureau; companies, firms and organizations (enterprises) of construction, transport and communication, construction and road, mining, oil and gas and military complexes; companies, firms and organizations (enterprises) of other infrastructures of the economy.

Professional competence: - training of specialists according to the profile for work, regardless of the form of ownership and subordination: in design institutions; in the office; in companies, firms and organizations (enterprises) of construction, in companies, firms and organizations (enterprises) of other infrastructures of the economy. Instilling management skills and providing training for professional managers (general managers in all aspects of management).

Brief description of the program:

The objects of professional activity of the master are: design bureaus, design institutes; construction organizations and firms, akimats, ministries.

Masters of specialty 7M07302 "Construction and production of building materials and structures" can perform the following **types of professional activities:**

- Calculation and design and technical and economic;
- organizational and managerial;
- production, technological and operational;
- legal, expert and consulting;

Settlement and design and technical and economic activities:

- production of appropriate calculations of structural elements of buildings and structures of transport, communication and oil and gas complexes;
- drafting projects and feasibility studies for the construction of new ones, repairs, current maintenance and reconstruction of existing objects of transport, communication and oil and gas complexes.

Organizational and managerial activities:

- organization of the work of the labor collective of performers with the creation of the necessary conditions, equipping (providing) production with labor and material resources, making optimal management decisions in various production conditions;
- finding optimal solutions in the event of labor disputes on the staffing table, wages, cost and quality of performance of various types of work, ensuring life safety, labor protection and environmental safety in production areas;
- assessment of production and non-production costs to ensure the quality of products of construction and repair production;

Production, technological and operational activities:

- planning and solving technological problems encountered in the production process;
- effective use of materials and raw materials, equipment, technology, modern computer programs for calculations and design of technological process parameters;
- organization and effective implementation of incoming quality control of raw materials, production control of semi-finished products and parameters of technological processes, quality of finished products;
- engineering and technical maintenance of buildings and structures.

Legal, expert and consulting activities:

- possession of basic knowledge in the field of civil, financial, commercial and other branches of law;
- the ability to navigate the current legislation and the ability to apply certain legal norms in practice;
- carrying out expertise and providing consulting assistance in various production situations.

PASSPORT OF THE EDUCATIONAL PROGRAM

1. Scope and content of the program

The term of study in the master's program is determined by the amount of acquired academic credits. Upon mastering the established amount of academic credits and achieving the expected learning outcomes for obtaining a master's degree, the master's educational program is considered fully mastered. In the profile master's program there are 62 academic credits with a term of study of 1 year.

The planning of the content of education, the way of organizing and conducting the educational process is carried out by the university and the scientific organization independently on the basis of the credit technology of education.

The master's degree in the profile direction implements educational programs of postgraduate education for the training of management personnel with in-depth professional training.

The content of the Master's degree program consists of:

- 1) theoretical training, including the study of cycles of basic and major disciplines;
- 2) practical training of undergraduates: various types of practices, scientific or professional internships;
- 3) experimental research work, including the implementation of a master's project;
- 4) final certification.

Objectives of the educational program:

The main objectives of the Master's degree programs in the specialty 7M07302 "Construction and production of building materials and structures" are the preparation of highly qualified competent specialists in the field of construction, calculation and design, reconstruction of buildings and structures, as well as the production of building materials, products and structures capable of making the right decisions in the production process of works.

2 Requirements for applicants

The previous level of education of applicants is higher professional education (bachelor's degree). The applicant must have a diploma of the established sample and confirm the level of knowledge of the English language with a certificate or diplomas of the established sample.

The procedure for admitting citizens to a magistracy is established in accordance with the "Standard rules for admission to training in educational organizations that implement educational programs of postgraduate education."

The formation of a contingent of undergraduates is carried out by placing a state educational order for the training of scientific and pedagogical personnel, as well as paying for training at the expense of citizens' own funds and other sources. The state provides citizens of the Republic of Kazakhstan with the right to receive, on a competitive basis, in accordance with the state educational order, free postgraduate education, if they receive education of this level for the first time.

At the "entrance", a master's student must have all the prerequisites necessary for mastering the corresponding educational master's program. The list of required prerequisites is determined by the higher education institution independently.

In the absence of the necessary prerequisites, the master student is allowed to master them on a paid basis.

3 Requirements for completing studies and obtaining a diploma

Designed by:	Reviewed: meeting of the Academic Council of the Institute	Approved by: Scientific and Methodological Council of KazNRTU	Page 4 of 25
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Awarded degree / qualifications: The graduate of this educational program is awarded the academic degree of Master of Engineering and Technology in the direction.

A graduate who has mastered master's programs must have the following general professional competencies:

- the ability to independently acquire, comprehend, structure and use new knowledge and skills in professional activities, develop their innovative abilities;
- the ability to independently formulate research goals, establish a sequence for solving professional problems;
- the ability to apply in practice the knowledge of fundamental and applied disciplines that determine the focus (profile) of the master's program;
- the ability to professionally choose and creatively use modern scientific and technical equipment for solving scientific and practical problems;
- the ability to critically analyze, represent, defend, discuss and disseminate the results of their professional activities;
- possession of the skills of compiling and preparing scientific and technical documentation, scientific reports, reviews, reports and articles;
- willingness to lead a team in the field of their professional activities, tolerantly perceiving social, ethnic, confessional and cultural differences;
- readiness to communicate in oral and written forms in a foreign language to solve problems of professional activity.

A graduate who has mastered the master's program must have professional competencies corresponding to the types of professional activity that the master's program is focused on:

- *production activities:*
 - the ability to independently carry out production, field and laboratory and interpretation work in solving practical problems;
 - the ability to professionally operate modern field and laboratory equipment and instruments in the field of the mastered master's program;
 - the ability to use modern methods of processing and interpreting complex information to solve production problems;
- *project activities:*
 - the ability to independently compose and submit projects of research and development work;
 - readiness to design complex research and development work in solving professional problems;
- *organizational and management activities:*
 - the willingness to use the practical skills of organizing and managing research and development work in solving professional problems;
 - readiness for the practical use of regulatory documents in the planning and organization of scientific and industrial work;

When developing a master's program, all general cultural and general professional competencies, as well as professional competencies related to those types of professional activities that the master's program is focused on, are included in the set of required results of mastering the master's program.

4 Working curriculum of the educational program

4.1. Term of study: 1 year

year of study	Code	Name of course	Component	Academic credits	lec/ lab/ prac/MSIW	Prerequisites	Code	Name of course	Component	Academic credits	lec/ lab/ prac/MSIW	Prerequisites	
1	1 semester						2 semester						
	LNG202	Foreign language (professional)	BD IC	4	0/0/3/3		AAP207	Master's student experimental research work, including internship and master's project implementation	MSERW	13			
	MNG274	Management	BD IC	6	2/0/1/3		AAP248	Work placement	PS	7			
	HUM204	Management Psychology	BD OC	4	1/0/1/2		ECA206	Registration and defense of the master's project (RaDMP)	FA	12			
	1101	Elective	BD OC	6									
	1201	Elective	PS OC	6									
	1202	Elective	PS OC	6									
	1203	Elective	PS OC	6									
		In total			38			In total		32			
								In all		70			

Number of credits for the whole period of study	
Cycles of disciplines	Credits
The cycle of general education	0
A cycle of basic disciplines (BD IC, BD OC)	20
A cycle of principal subjects (PS IC, PS OC)	25
All on the theoretical classes:	45
MSERW	13
Registration and defense of the master's project (RaDMP)	12
In total	70

THE CURRICULUM FOR MODULAR EDUCATIONAL SYSTEM

Form of study: *full*

Duration of training: 1 years

Academic degree: Master of Engineering and Technology

The cycle	code	Name of disciplines	Semester	Academ. credit	lec.	lab.	prac.	MSIW	Control type	Department
Profile training module										
Basic disciplines (BD) (20 credits)										
Institute component (IC)										
BD 1.1.1	LNG202	Foreign language (professional)	1	6	0	0	3	3	Exam	FL
BD 1.2.1	MNG274	Management	1	6	2	0	1	3	Exam	RECUP
BD 1.3.1	HUM204	Management Psychology	1	4	1	0	1	2	Exam	RECUP
Optional component (OC)										
BD 1.4.1.	CIV220	Mathematical modeling in the technology of construction materials	1	6	2	0	1	3	Exam	CEaBM
BD 1.4.1.1	CIV243	Spatial coverage								
Profiling subjects (PS) (25 credits)										
Optional component (OC)										
		Mathematical modeling module								
PS 2.2.1	CIV208	Dynamic of structures	1	6	2	0	1	3	Exam	CEaBM
PS 2.2.1.1	CIV222	Modification in building materials technology								
PS 2.3.1	CIV246	Seismic resistance of buildings and structures	2	6	2	0	1	3	Exam	CEaBM
PS 2.3.1.1	CIV247	Modern concrete								
PS 2.4.1	CIV248	Physico-chemical basis of ceramic materials and glass	2	6	2	0	1	3	Exam	CEaBM
PS 2.4.1.1	CIV470	Project management								
Practice-oriented module										
PS	AAP246	Work placement	3	7					Report	CEaBM
Experimental research module (13 credits)										
MSER W	AAP221	Master's student experimental research work, including internship and master's project implementation	2	13					Report	CEaBM
Final certification module (12 credits)										
FA	ECA205	Registration and defense of the master's project (RaDMP)	4	12					Defense of dissertations	
Total credits				70						

5 Descriptors of the level and amount of knowledge, abilities, skills and competencies

The requirements for the level of preparation of a master's student are determined on the basis of the Dublin descriptors of the second level of higher education (master's) and reflect the acquired competencies, expressed in the achieved learning outcomes.

Learning outcomes are formulated both at the level of the entire educational program of the master's program, and at the level of individual modules or academic discipline.

Descriptors reflect learning outcomes that characterize the student's abilities:

1) demonstrate developing knowledge and understanding in the studied field of science and technology related to the design, construction, operation of buildings and structures, civil and industrial purposes, as well as the production of building materials, products and structures, based on the advanced knowledge of the construction industry, when developing and / or application of ideas in the context of research;

2) apply at a professional level their knowledge, understanding and ability to solve problems in a new environment, in a broader interdisciplinary context;

3) collect and interpret information to form judgments, taking into account social, ethical and scientific considerations;

4) clearly and unambiguously communicate information, ideas, conclusions, problems and solutions, both to specialists and non-specialists;

5) learning skills necessary for independent continuation of further education in the studied area of design, construction, operation of buildings and structures, civil and industrial use, as well as the production of building materials, products and structures.

6 Competencies on completion of training

6.1 Requirements for key competencies of graduates of a specialized master's program must:

1) *have an idea:*

- about current trends in the development of scientific knowledge;
- on topical methodological and philosophical problems of natural (social, humanitarian, economic) sciences;

- about the contradictions and socio-economic consequences of globalization processes;

- about the current state of the economic, political, legal, cultural and technological environment of the world business partnership;

- on the organization of strategic enterprise management, innovation management, leadership theories;

- on the main financial and economic problems of the functioning of enterprises.

2) *know:*

- methodology of scientific knowledge;

- the main driving forces behind changes in the structure of the economy;

- features and rules of investment cooperation;

- at least one foreign language at a professional level, allowing for scientific research and practical activities.

3) *be able to:*

- apply scientific methods of cognition in professional activities;

- critically analyze existing concepts, theories and approaches to the study of processes and phenomena;

- integrate the knowledge gained in different disciplines, use it to solve analytical and managerial problems in new unfamiliar conditions;

- conduct a microeconomic analysis of the economic activity of the enterprise and use its results in the management of the enterprise;
- to apply in practice new approaches to the organization of marketing and management;
- to make decisions in difficult and non-standard situations in the field of organization and management of economic activities of an enterprise (firm);
- to apply in practice the norms of the legislation of the Republic of Kazakhstan in the field of regulation of economic relations;
- think creatively and be creative in solving new problems and situations;
- to carry out information-analytical and information-bibliographic work with the involvement of modern information technologies;
- to summarize the results of experimental research and analytical work in the form of a master's thesis, article, report, analytical note, etc.

4) *have skills:*

- solutions to standard scientific and professional problems;
- scientific analysis and solution of practical problems in the organization and management of economic activities of organizations and enterprises;
- research of problems in the field of management and marketing and use the results obtained to improve the methods of enterprise management;
- professional communication and intercultural communication;
- oratory, correct and logical formulation of their thoughts in oral and written form;
- expanding and deepening the knowledge required for daily professional activities and continuing education in doctoral studies;
- the use of information and computer technologies in the field of professional activity.

5) *be competent:*

- in the field of research methodology in the specialty;
- in the field of contemporary problems of the world economy and the participation of national economies in world economic processes;
- in the organization and management of the enterprise;
- in the implementation of industrial relations with various organizations, including public service bodies;
- in ways to ensure constant updating of knowledge, expansion of professional skills and abilities.

B - Basic knowledge, skills and abilities:

B1 Be able to integrate knowledge gained in different disciplines to solve research problems in new unfamiliar conditions.

B2 Possess the skills of using the knowledge gained for the original development and application of ideas in the context of scientific research.

B3 Be able to make judgments and make decisions based on incomplete or limited information through the integration of knowledge, be able to think creatively and be creative in solving new problems and situations

P - Professional competencies:

P1 Ability to conduct surveys to assess the state of natural and natural-man-made objects, determine the initial data for the design and calculation justification and monitoring of facilities, patent research, prepare design assignments.

P2 Ability to conduct surveys to assess the state of natural and natural-man-made objects, to determine the initial data for the design and calculation justification and monitoring of facilities, patent research, to prepare design assignments.

P3 Ability to organize, improve and master new technological processes of the production process at an enterprise or site, control over the observance of technological discipline, maintenance of technological equipment and machines.

P4 Know modern technologies in construction production, new methods and techniques in the technology of building processes of buildings and structures, as well as in the production of building materials, products and structures. Use new materials and structures of buildings and structures in transport construction; modern methods and techniques for the construction of buildings and structures in transport.

P5 Ability to organize adjustment, testing and commissioning of facilities, samples of new and modernized products manufactured by the enterprise.

P6 To know the basic principles of construction design, progressive methods of calculating and designing parts and assemblies, the basics of achieving maximum production efficiency and high quality of the final product.

P7 To know and use the latest achievements in the field of construction, to determine the prospects for their use, to simulate systems in the technology and organization of construction production.

P8 To be able to competently make independent decisions based on the knowledge gained for subsequent practical justifications aimed at improving the functioning of the construction industries, to introduce progressive forms of organizing production at their enterprises.

O - Human, social and ethical competences:

O1 To have an idea of the role of science and education in public life, of current trends in the development of scientific knowledge, of topical methodological and philosophical problems of natural (social, humanitarian, economic) sciences.

O2 Readiness to work in a team, social interaction based on accepted moral and legal norms, showing respect for people, willingness to take responsibility for maintaining trusting partnerships

O3 Possesses the culture of thinking, is capable of analyzing, summarizing information, setting goals and choosing ways to achieve them, owns the culture of oral and written speech

S - Special and managerial competencies:

S1 To be able to economically substantiate and solve issues related to the organization of the production process, determine the volume and quality indicators of the work of construction enterprises, process and analyze the results of theoretical and experimental studies on the technical level and operational state of building structures.

S2 Be able to competently forecast the work of construction using statistical and other data; technically and economically evaluate foreign and domestic projects, development programs, strategic plans and promptly draw conclusions and proposals for practical application; as well as methods of rational organization of production processes in the construction industry.

S3 Be able to make informed decisions on the choice of options for management structures for the effective operation of construction enterprises; to carry out the formation of management structures at all levels; use modern technology for strategic purposes.

6.2 Requirements for the experimental research work of a master student in a specialized master's program:

1) corresponds to the profile of the master's educational program, according to which the master's project is carried out and defended;

2) is based on modern achievements of science, technology and production and contains specific practical recommendations, independent solutions to management problems;

3) it is performed using advanced information technologies;

4) contains experimental - research (methodological, practical) sections on the main protected provisions.

6.3 Requirements for organizing practices:

The educational program of the profile magistracy includes industrial practice in the PD cycle.

Industrial practice in the PD cycle is carried out with the aim of consolidating the theoretical knowledge gained in the learning process, acquiring practical skills, competencies and experience of professional activity on the taught educational program of the Master's program, as well as mastering advanced experience.

7 ECTS Diploma Supplement

The application was developed according to the standards of the European Commission, Council of Europe and UNESCO / CEPES. This document is for academic recognition only and is not an official proof of education. Not valid without a university degree. The purpose of completing the European Annex is to provide sufficient information about the holder of the diploma, the qualification obtained, the level of this qualification, the content of the study program, the results, the functional purpose of the qualification, as well as information about the national education system. The application model that will be used to translate grades uses the European Credit Transfer or Transfer System (ECTS).

The European Diploma Supplement provides an opportunity to continue education at foreign universities, as well as to confirm national higher education for foreign employers. When going abroad for professional recognition, additional legalization of the educational diploma is required. The European Diploma Supplement is completed in English upon individual request and is issued free of charge.

Foreign language (professional)

CODE - LNG202

CREDIT - 6

PURPOSE AND OBJECTIVES OF THE COURSE

Thanks to this course, you will master specific terminology, be able to read specialized literature, gain the knowledge necessary to implement effective oral and written communications in a foreign language in your professional activities.

SHORT DESCRIPTION OF THE COURSE

In the process of training, students acquire knowledge of a foreign language, including mastery of specialized vocabulary, necessary for the implementation of effective oral and written communications in a foreign language in their professional activities. Practical tasks and methods for developing the required language skills in the learning process include: case method and role-playing games, dialogues, discussions, presentations, listening tasks, working in pairs or in groups, completing various written tasks, grammar tasks and explanations.

KNOWLEDGE, ABILITY, SKILLS TO COMPLETE THE COURSE

As a result of mastering the discipline, the student expands the professional lexical vocabulary, possess the skills of effective communication in a professional environment, the ability to competently express thoughts in oral and written speech, understand specific terminology and read specialized literature.

Management

CODE MNG254

CREDIT - 4

The discipline is aimed at preparing graduates for:

- the use of quantitative and qualitative methods to manage business processes and assess their effectiveness;
- design and management of any socio-economic system, part of the system, or process that satisfies the internal and external needs of an enterprise, organization;
- identification, formulation and solution of production tasks, including material, human and economic parameters;
- enterprise management; organization or institution, including institutions of higher professional education and scientific institutions, as well as their divisions, support of business processes in various areas of management, the use of modern tools for diagnosing activities and developing a strategy for the development of an enterprise and organization;
- the use of modern methods of assessing the effectiveness of management programs, tasks, activities;
- preparing graduates for work in the constantly changing conditions of the internal and external environment of the enterprise, country and the world

Psychology of management

CODE HUM204

CREDIT –4

PURPOSE AND OBJECTIVES OF THE COURSE

The main goal of the course is to study the characteristics of the behavior of individuals and groups of people within organizations; determining psychological and social factors influencing the behavior of employees. Also, much attention will be paid to the issues of internal and external motivation of people

The main goal of the course is to apply this knowledge to improve the efficiency of the organization.

BRIEF DESCRIPTION OF THE COURSE

The course is designed to provide a balanced coverage of all the key elements that make up the discipline. It will briefly explore the origins and development of organizational behavior theory and practice, and then explore the main roles, skills, and functions of management with a focus on management effectiveness, illustrated by real-life examples and case studies.

KNOWLEDGE, SKILLS AND ABILITIES AT THE END OF THE COURSE

At the end of the course, students will know: the basics of individual and group behavior; basic theories of motivation; basic theories of leadership; concepts of communication, conflict management and stress in the organization.

they will be able to identify the various roles of managers in organizations; look at organizations from the point of view of managers; understand how effective management contributes to an effective organization.

Professional computer programs

CODE - CIV 249

CREDIT - 6

The purpose of the discipline is the formation of the technological foundations of competencies, theoretical knowledge, practical skills and abilities of work in the environment of specialized information systems for support, analysis and research of subject areas of the construction industry to obtain an objective assessment of the calculation, project activities, forecasting and planning of scientifically grounded management decisions.

Mastering the methodology and technological tools of professionally-oriented computer programs to facilitate, accelerate and improve the quality of computational and analytical processing, modeling and presentation of information in the process of solving construction problems.

As a result of mastering the discipline, students must:

know:

- professionally oriented computer systems and technology their application in the field of calculation and design of building structures of buildings and structures;

- key aspects of the development of settlement systems and technologies, opportunities their use in the construction industry;

be able to:

- to carry out calculations of building structures of buildings and structures;
- apply modern computational systems and programs to solve engineering problems in the field of calculation and design of building structures;

- work in the environment of specialized computer programs;

own:

- skills of working with modern computational systems for calculating building structures of buildings and structures, including spatial structures.

Spatial coverage

CODE - CIV243

CREDIT - 4

Course outline: this discipline reflects the achievements of theory and practice in the field of spatial structures, as well as the results of new scientific research in accordance with the volume of the course program. In-depth training of building structures that have the prospect for further widespread distribution in the Republic of Kazakhstan.

Knowledge gained during the course:

- types of spatial structures, methods of forming double-sided curved surfaces;
- a state of full torque and without a torque moment;
- equilibrium equations, geometric, physical theory of shells;
- limiting conditions;
- theory of flat shells;
- calculation and design of permutation, rotation, suspension systems, Gaussian curves of positive and negative shells.

Skills and abilities obtained in the course of passing the discipline (professional, managerial, communication):

- to determine the forces in the shells under various limiting conditions;
- to determine the strength in deformable and non-deformable contoured shells according to the theory without a moment;
- calculation of momentterdi;
- to correctly design various spatial structures;
- uses reference and informative literature.

Modification in building materials technology

CODE - CIV222

CREDIT – 6

The purpose of mastering the discipline:

Formation of research competence through the development of theoretical knowledge and practical skills in the field of building materials science; To acquaint the undergraduates with the issues of technology and properties of building materials and products, the range of building materials, their structural features, technical characteristics, problems of using production waste and their application in accordance with operating conditions.

Objectives of mastering the discipline:

- to master the maximum of theoretical and practical knowledge necessary for the formation of technical and technological culture in the field of building materials science, to understand the essence of modern problems of obtaining new effective materials, to substantiate the interaction of natural and artificial components;

- master the terminology, methodology of modern materials science based on physical, chemical and other research methods and be able to use them to predict and assess operational reliability and durability.

- to actively use the basic scientific and practical principles and patterns of obtaining materials with specified characteristics;

- be able to competently assess the nature, direction and consequences of the impact of specific production and technical problems in compliance with the relevant theoretical and methodological concepts.

- be able to plan and organize work on the implementation of scientific developments in industrial practice, develop and make scientifically based decisions in accordance with specific production conditions.

Project management

CODE - CIV470

CREDIT – 6

The purpose and objectives of the discipline

The purpose of mastering the discipline "Project Management" is to develop students' comprehensive theoretical and applied knowledge on project management and create a methodological basis for the formation of professional competencies in the field of project management; mastering the knowledge of organizing the work of the project team for the implementation of specific projects; study of the types of efficiency of investment projects, methods of analysis and assessment of their commercial efficiency and study of the features of assessing the effectiveness of projects, taking into account risk factors and uncertainty.

The objectives of studying the discipline "Project Management" are:

- disclosure of the essence and characteristics of projects; substantiation of the possibilities and limitations of project management;
- research of the content of the category "project" as a socio-economic system;
- acquaintance with the concept of the project life cycle and the possibilities of using project management functions at various stages of their development and implementation;
- disclosure of methods and tools for structuring projects;
- consideration of methods and conditions for effective management of the project team, taking into account the factors of group dynamics;
- consideration of the basic principles, types and methods of assessing the effectiveness of projects;
- consider the role of risk in project management, approaches and methods of analysis, assessment and risk management;
- disclosure of the essence and capabilities of modern information technologies for project management.

The student must:

Know:

- essence and characteristics of projects;
- the content of the category "project" as a socio-economic system;
- project life cycle and the possibility of using project management functions at various stages of their development and implementation; basic principles of project management;
- project management processes, inputs and outputs of each process;
- the main problems hindering successful project management and ways to resolve them;
- foundations of public-private partnership.

Be able to:

- evaluate the effectiveness of the project, taking into account risk factors and uncertainties;
- evaluate the investment qualities of individual financial instruments and select the most effective of them;
- develop a project estimate and budget that meets the specified constraints;
- organize the implementation of the project;
- organize effective completion of the project.

Own:

- methods and tools for effective management of the project team;
- the basic principles, types and methods of assessing the effectiveness of projects.

Physico-chemical basis of ceramic materials and glass

CODE - CIV248

CREDIT – 6

When studying these disciplines, "input" knowledge, skills, experience and competencies are formed, which are necessary for the successful mastering of the discipline "Physicochemical Foundations of Ceramic Materials and Glass Production."

As a result of mastering the disciplines, the student must:

Know:

- regularities of the course of chemical processes, typical processes of chemical technology, appropriate devices and methods for their calculation;
- basic principles of organization of chemical production, methods for assessing production efficiency;
- types of resources in the chemical industry; principles of energy saving and rational use of raw materials in chemical technology;
- basic principles of organization of chemical production, its structure, methods for assessing production efficiency; general laws of chemical processes.

Be able to:

- Choose equipment for a specific chemical-technological process, calculate the main characteristics of a chemical process, choose a rational scheme for the production of a product, evaluate the technological efficiency of production;
- apply methods for assessing the resource efficiency of chemical technological processes and chemical industries;
- calculate the main characteristics of the chemical process, choose a rational scheme for the production of a given product, evaluate the efficiency of production;

Own:

- experimental methods for determining the physicochemical properties of inorganic compounds
- skills of designing the simplest devices of the chemical industry; methods for determining the optimal technological modes of equipment operation
- methods of analyzing the efficiency of chemical production, determining the technological parameters of the process

As a result of mastering the disciplines, the student must have the following general professional competencies:

- the ability and willingness to carry out the technological process in accordance with the regulations and use technical means to measure the main parameters of the technological process, properties of raw materials and products (PC-7);
- justify the adoption of a specific technical solution in the development of technological processes; choose technical means and technologies taking into account the environmental consequences of their use (PC-11);
- study scientific and technical information, domestic and foreign experience on the research topic (PC-25).

Dynamics of structures

CODE - CIV 208

CREDIT - 6

The purpose of mastering the discipline "Dynamics of structures" is:

- formation of students' complete and clear understanding of the principles of dynamic calculation of buildings and structures;

Discipline objectives:

- to teach methods of calculating buildings and structures for various types of dynamic loads;
- to form knowledge about the types of dynamic influences, loads, structural measures to ensure the strength and stability of buildings and structures in conditions of dynamic influences;
- to develop skills in performing the simplest dynamic calculations, application of existing calculation systems to dynamic calculations of buildings and structures.

Be able to:

- apply the regulatory framework and design principles when calculating buildings and structures under dynamic influences;
- choose the calculation methods adopted in our country in the application to the calculation of buildings and structures for dynamic effects.

Own:

- methods for calculating buildings and structures for dynamic impacts, incl. using automated calculation packages.

Know: the principles of collection and systematization of information source data for the design of buildings and structures with the subsequent development of technical documentation in accordance with regulatory documents

Seismic resistance of buildings and structures

CODE - CIV 246

CREDIT - 6

The purpose of mastering the discipline "Seismic resistance of buildings and structures" is to acquire in-depth knowledge and skills necessary for a specialist in the design of buildings and structures in seismically active areas of the earth, mastering the practice of calculating buildings and structures for dynamic loads, including seismic ones, including using software systems.

Know:

- types of dynamic loads, methods of their mathematical description;
- causes of earthquakes, seismically active areas of the earth, principles of seismic zoning and microseismic zoning, principles of earthquake classification by magnitude and magnitude;
- the basic laws of dynamic equilibrium of systems, knows the rules for performing matrix transformations, basic methods for solving differential equations;
- a regulatory framework for earthquake-resistant construction of civil and industrial buildings and structures, structures of increased responsibility, unique structures, including those working in conjunction with the soil and water environment.

Be able to:

- to provide a design scheme for a building, structure, to provide a method for calculating seismic loads, a method for determining the stress-strain state of a structure;
- to use the apparatus of mathematical analysis when solving engineering problems.

Have skills:

- determination of seismic forces according to the linear spectral technique (LSP), calculations of the strength and stability of structures, taking into account seismic forces;
- calculations of the strength and stability of buildings, structures for seismic loads, determined;

Modern concrete

CODE - CIV 247

CREDIT - 6

The objectives of mastering the discipline are: deepening the professional training of masters in the field of modern concrete and their production technology, identifying their role in construction.

The objectives of the course are: studying the technical and economic data of modern concretes, production technologies; expansion, systematization, deepening and consolidation, theoretical knowledge; developing the ability to independently solve a number of engineering and organizational problems related to the choice of modern materials, technologies and structures.

Know:

- ways of organizing production from the main technological lines of a wide range of products;
- methodology of technical and economic calculations when choosing modern materials, technologies and structures;

Be able to:

- select the necessary materials for the production of modern concrete, determine their suitability, taking into account economic and environmental factors;

- to justify and select rational technological and technical solutions;

- calculate technical and economic indicators when designing enterprises in the construction industry;

- independently solve a number of engineering, organizational problems related to the organization, planning and management of the production of building materials, products and structures.

Own:

- skills in correcting design and working technical documentation.

Mathematical modeling in the technology of construction materials

CODE - CIV 220

CREDIT - 6

The purpose of studying this discipline is to master the methods of mathematical modeling of the processes of production of building materials and products.

Tasks:

- getting ideas about the main methods of mathematical modeling of the processes of production of building materials and products, the construction of mathematical models of the main processes using a software package that implements finite element methods (FEM).

- mastering the principles of development and features of the user interface of the software complex;

- acquisition of skills in solving problems of mathematical analysis, in relation to modeling the processes of production of building materials and products;

- the formation of prerequisites for computer research of the tasks of those areas of research that correspond to the scientific topics of the master's student.

Master's student should know:

- basic provisions of the theory of similarity and principles of mathematical modeling;

- foundations of the culture of scientific research;

- scientific foundations for the integrated use of raw materials, local raw materials and man-made waste to obtain materials for building products and structures;

- the influence of the modes of technological influences on the structure of building materials;

- methodology for optimizing the production technology of materials of a given structure and properties;

- scientific basis for choosing a material with specified properties, depending on the specific conditions for the manufacture and operation of products and structures;

- theoretical and applied problems of standardization of new materials and technological processes of their production, processing and processing;

be able to:

- plan and carry out an engineering experiment;

- use information and communication technologies for scientific research;

- to select raw materials and design the composition of new building materials with unique functional, physical and mechanical properties, optimal cost and environmental friendliness (PC-1);

- carry out the development of physicochemical and physicomaterial processes of forming the structure of materials with a given set of properties;

- to establish the pattern and criterion for assessing the destruction of building material from the action of mechanical loads and the external environment.

Registration and defense of the master's project (RaDMP)

CODE - ECA2013

CREDIT –12

The purpose of the master's thesis is:

demonstration of the level of scientific / research qualifications of a master's student, the ability to independently conduct scientific research, testing the ability to solve specific scientific and practical problems, knowledge of the most general methods and techniques for their solution.

SHORT DESCRIPTION

A master's thesis is a final qualifying scientific work, which is a generalization of the results of an independent study by a master student of one of the urgent problems of a specific specialty of the corresponding branch of science, which has internal unity and reflects the course and results of the development of the chosen topic.

The master's thesis is the result of the research / experimental research work of the master's student, carried out during the entire period of the master's student's training.

Master's thesis defense is the final stage of master's preparation. A master's thesis must meet the following requirements:

- in the work, research should be carried out or urgent problems should be solved in the field of calculation and design of building structures, reconstruction of buildings and structures, construction technology, as well as the production of building materials, products and structures;
- the work should be based on the definition of important scientific problems and their solution;
- decisions must be scientifically grounded and reliable, have internal unity;
- the thesis should be written individually;

Content

- 1 Scope and content of the program
- 2 Requirements for applicants
- 3 Requirements for completing studies and obtaining a diploma
- 4 Working curriculum of the educational program
- 5 Descriptors of the level and amount of knowledge, abilities, skills and competencies
- 6 Competencies on completion of training
- 7 ECTS Diploma Supplement