MINISTRY OF EDUCATION AND SCIENCE OF RUSSIA

Federal State Educational Institute of Higher Education
"Moscow Architectural Institute (State Academy)"

ANNOTATION TO THE WORK PROGRAM OF THE DISCIPLINE (MODULE) Statics (B1.O.36)

Assigned to the department:	**Higher Mathematics and Structural Mechanics**
Educational Level:	**Bachelor**
Specialization:	**07.03.01 Architecture**
Basic professional educational program of higher education:	**Architecture**
Form of study:	**full-time**
Hours/credits:	**108 hrs (3 credits)**

The work program for a discipline (module) is based on:

1. Federal State Educational Standard for Higher Education 07.03.01 Architecture, approved by the order of the Ministry of Education and Science of Russia No 509 of 08.06.2017
2. Curriculum for the specialization 07.03.01 Architecture, approved by the Academic Council of MARCHI. Minutes No 6-18/19 of 27.03.2019.

The work program of the discipline (module) was approved at a department meeting. Minutes: No 10 of 04.06.2019.

Developed by Head of Department "Higher Mathematics and Structural Mechanics", PhD, assistant professor. G.M.Chentemirov;

Reviewed by: Head of Department "Building Structures", PhD prof. A.L.Shubin; professor of the Department "Higher Mathematics and Structural Mechanics", PhD, prof. L.Y. Kuzmin

INTRODUCTORY PART

1. Goals of Mastering the Module

The purpose of mastering the discipline of Structural Mechanics, section Statics, is to prepare the future architect for solving the simplest statically determinate and statically indeterminate building structures during the process of designing buildings and structures. The objectives of the discipline are to give students fundamental knowledge of analysis of various types of building structures, statically determinate and indeterminate under various types of load. To give an idea of the spatial work of various types of buildings and structures to use the acquired knowledge in architectural projects.

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

Know: how to analyze various types of rod structures, both statically determinate and indeterminate.

Be able to: analyze the simplest rod structures given the relevant load requirements.

2. The Place of the Module in the Educational Program of the Institute

2.1. "Higher Mathematics", "Analytical Mechanics and Strength of Materials".

Required previous disciplines:

Mathematics;

Analytical Mechanics and Strength of Materials

2.2. A list of subsequent academic disciplines that require knowledge, skills and abilities formed by this academic discipline:

Architectural structures

Subsequent disciplines:

Architectural structures

3. Requirements for the results of mastering the discipline (module)

The study of this discipline is aimed at developing in students the following competencies in accordance with competency achievement indicators:

GPC-4. Able to apply methods for determining the technical parameters of objects being designed

GPC-4.1. is able to: Perform a summary analysis of source data, requirements for the design of a capital construction object and requirements for the development of project documentation. Conduct research for design solutions in accordance with the features of the spacial characteristics of the object being designed. Conduct calculation of technical and economic indicators of spacial solutions.

GPC-4.2. knows: Spacial requirements for the main types of buildings, including functional requirements determined by: intended use of the building, characteristics of the building site, requirements to ensure a comfortable living environment. Fundamentals of building structures. Principles of environmental qualities of a building including acoustics, lighting, microclimate, taking into account the needs of persons with with limited mobility and persons with disabilities. Basic construction and finishing materials, products and designs, their technical, technological, aesthetic and operational characteristics. Basic technologies of construction and installation works. Methodology for carrying out technical and economic calculations.

UC-2. Universal Competence (UC). Able to determine the set of tasks within the set goal and choose the optimal ways to solve them based on current legal norms, available resources and other limitations.

UC-2.1. is able to: Participate in the analysis of the project tasks, the selection of methods and means for accomplishing them. Act in compliance with legal norms and implement anti-corruption measures.

UC-2.2. knows the requirements of the current codes and regulations for architectural design, sanitary standards, including requirements for organizing an accessible and barrier-free environment for persons with disabilities and low mobility persons. Requirements of anti-corruption legislation.

UC-8. Able to create and maintain safe living conditions, including in emergency situations.

UC-8.1. is able to: Provide first aid in case of emergency. Use first aid techniques and methods of protection in emergency situations. Comply with the basic requirements of information security and protection of state secrets.

UC-8.2. knows: The requirements of the section on life safety as part of an architectural project. The importance of information security in modern society.

Main Part

1. Module Scope and Types of Academic Work

Type of academic work	Hours	Semesters / Trimesters			
		2	**3**		
Classroom work	**70**	**34**	**36**		
Lectures (LEC)	32	16	16		
Practical lessons (PR)	32	16	16		
Work in groups (GR)		0	0		
Classroom time spent during attestations (AT)	6	2	4		
Self-preparation for the exam (SP)	32	0	32		
Independent work	6	2	4		
Type of intermediate attestation		test	exam		
Total hours:	108	36	72		
Credits:	3	1	2		

1 credit = 36 academic hours.

2. Sub-modules, topics and types of educational activities

Se-mes-ter	Sub-mo-dule	Topic	LEC	PR	GR	AT	SP	Total hours
5	1	Task and methods of Structural Mechanics.	2	2				4
5	1	Calculation of statically determined systems.	2	3			1	6
5	1	Beam trusses, their analysis and calculation.	2	1				3
5	1	Calculation of three-hinged arches with supports on different levels	2	1				3
5	1	Calculation of three-hinged arches with tie rods and pendants.	2	2				4

Se-mes-ter	Sub-mo-dule	Topic	LEC	PR	GR	AT	SP	Total hours
5	1	Design of statically determined frames and composite frames	2	3			1	6
5	1	Some features of the calculation of three-hinged frames	2	2				4
5	1	Statically determinate multi-span beams	2	2		2		6
Total in semester:								**36**
6	2	Analysis of statically indeterminate systems with the force method.	4	4			2	10
6	2	Methods of analysis of statically indeterminate symmetric systems under symmetric and skew-symmetric external loads using the force method.	2	2				4
6	2	Finding displacements in statically indeterminate systems.	2	2				4
6	2	Analysis of statically indeterminate systems by the displacement method.	4	4			2	10
6	2	Methods for analysis of statically indeterminate symmetric and skew-symmetric systems using the displacement method.	1	1				2
6	2	Finding displacements in statically indeterminate systems using the displacement method.	1	1				2
6	2	Analysis of multi-span statically indeterminate beams using the force method and the displacement method.	2	2		4		8
Total in semester:								**40**
Total:								**76**

The Fund of Assessment Tools is a mandatory section of the Work Program of the Discipline (WPD) (developed as a separate document).

Note: The Fund of Assessment Tools - a set of assessment materials as well as a description of forms and procedures designed to determine the level of student achievement of established learning outcomes.