

# 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) Architectural Materials Science (B1.O.28)

|   |  |
|---|--|
| Assigned to the department:                                 | <b>Architectural Materials Science</b> |
| Educational Level:  | <b>Bachelor</b>                        |
| Specialization:   | <b>07.03.01 Architecture</b>           |
| Basic professional educational program of higher education: | <b>Architecture</b>                    |
| Form of study:  | <b>full-time</b>                       |
| Hours/credits:  | <b>108 hrs (3 credits)</b>             |

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 05-19 of 24.05.2019.

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### INTRODUCTORY PART

#### 1. Goals of Mastering the Module

- acquiring the necessary knowledge about the multifaceted relationship between architecture and its material palette, classification, physical properties, production technology capabilities, nomenclature and characteristics of materials; - creative understanding of the experience of using materials in architectural and construction practice; - ability to apply acquired knowledge in modern architectural design.

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

**Know:** physical properties, main types, characteristics of materials, capabilities of modern technology for their production.

**Be able to:** evaluate the possibility of rational use of materials for specific buildings, taking into account operational, technical, economic and environmental requirements.

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

2.1. Requirements for preliminary preparation of the student: For successful mastery of the module, the student must have basic education equivalent to the high school curriculum.

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

In accordance with the working curriculum

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-3. General Professional Competencies (GPC). Able to participate in complex design based on a systematic approach, based on current legal requirements (codes), financial resources, analysis of the situation in social, functional, environmental, technological, engineering, historical, economic and aesthetic aspects.

GPC-3.1. knows how to: Participate in the development of urban and spacial planning solutions. Participate in the preparation of presentation materials, support of project documentation at the approval stages. Use methods of modeling and harmonization of artificial habitats when developing urban and spacial planning solutions. Use the techniques for preparing presentation materials for architectural projects and techniques of presenting them.

GPC-3.2. knows: Composition of design documentation drawings, social, functional and technological, ergonomic (including taking into account the characteristics of persons with disabilities and groups of persons with limited mobility), aesthetic and economic requirements for architectural objects of various types.

PC-2 Professional Competence (PC). Able to participate in the development and design of the architectural and design section of the project documentation.

PC-2.1. knows how to: participate in justifying the choice of architectural objects (including taking into account the characteristics of persons with disabilities and groups of persons with limited mobility); - participate in the development of project documentation; carry out calculations of technical and economic indicators; use computer-aided design and automation software in architectural projects.

PC-2.2. knows: legal and regulatory requirements for architectural design; - social, urban, historical and cultural, spacial, functional and technological, constructional, compositional, artistic, ergonomic requirements for various environmental objects; composition and rules for calculating technical and economic indicators used in technical and economic calculations of design solutions; - methods and techniques of computer-aided design, basic software packages for design, creation of drawings and models.

UC-1. Universal Competence (UC). Able to search, critically analyze and synthesize information, apply systematic approach to solving problems.

UC-1.1. is able to: Participate in pre-project research, including historical, cultural and sociological. Use tools and methods for working with bibliographic and iconographic sources. Document the results of work on collecting, processing and analyzing data, including using automation and computer-aided design and modeling tools.

UC-1.2. knows: The main sources of information, including regulatory, methodological, and reference sources. Types and methods of conducting pre-project research, including historical and cultural. Tools and methods for working with bibliographic and iconographic materials.

## Main Part

### 1. Module Scope and Types of Academic Work

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

1 credit = 36 academic hours.

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

| Se-<br>mes-<br>ter | Sub-<br>mo-<br>dule | Topic  | LEC | PR | GR | AT | SP | Total<br>hours |
|--------------------|---------------------|--|-----|----|----|----|----|----------------|
| 1                  | 1                   | Introduction to Architectural Materials Science Basic Concepts | 2   | 2  |    |    |    | 4              |

| Se-<br>mes-<br>ter        | Sub-<br>mo-<br>dule | Topic   | LEC | PR | GR | AT | SP | Total<br>hours |
|---------------------------|---------------------|---|-----|----|----|----|----|----------------|
|                           |                     | about the relationship between architecture and materials                                   |     |    |    |    |    |                |
| 1                         | 1                   | Classification of materials, their physical properties, concept of quality, standardization | 2   | 2  |    |    |    | 4              |
| 1                         | 2                   | Wood materials  | 2   | 4  |    |    |    | 6              |
| 1                         | 2                   | Natural stone materials   | 4   | 2  |    |    | 2  | 8              |
| 1                         | 2                   | Ceramic materials   | 2   | 2  |    |    |    | 4              |
| 1                         | 2                   | Materials from glass and other mineral melts  | 2   | 2  |    |    |    | 4              |
| 1                         | 2                   | Metal materials   | 2   |    |    | 2  |    | 4              |
| <b>Total in semester:</b> |                     |   |     |    |    |    |    | <b>36</b>      |
| 2                         | 2                   | Mineral binders and materials based on them   | 6   | 6  |    |    |    | 12             |
| 2                         | 2                   | Polymer-based materials   | 2   | 4  |    |    |    | 6              |
| 2                         | 2                   | Special purpose materials and products (additional information)                             | 8   | 6  |    | 4  | 4  | 22             |
| <b>Total in semester:</b> |                     |   |     |    |    |    |    | <b>40</b>      |
| <b>Total:</b>             |                     |   |     |    |    |    |    | <b>76</b>      |

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.