

MATERIALS SCIENCE AND COMPOSITE MATERIALS
METAL-BASED
annotation
TO THE CURRICULUM OF A HIGHER EDUCATION INSTITUTION

Specialty 1-36 07 02 Production of products based on three-dimensional technologies

	STUDY MODE	
	full-time	part-time
Year	2, 3	
Semester	4, 5	
Lectures, hours	16, 6	
Practical classes (seminars), hours		
Laboratory classes, hours	16 ,4	
In-class test (semester, hours)		
Course project, semester		
Pass/fail, semester		
Credit, semester	4, 5	
Classroom hours in the academic discipline	32, 10	
Independent study, hours	76, 98	
Total course duration in hours / credit units	108/3	

1. Summary of the academic discipline

The discipline studies the structure and properties of metals, alloys and other structural materials, as well as methods of their processing for the manufacture of parts with specified properties. The following topics are considered. The structure of metals. Iron and its alloys. General purpose structural steels. Metal-ceramic alloys. Refractory metals and their alloys. Aluminum, magnesium and their alloys. Copper and its alloys. Composite materials.

2. Learning outcomes:

To know:

- modern materials and effective methods of hardening treatment;
- fundamentals of theory and practice of thermal, chemical and thermal treatment of metal materials;

be able to:

- rationally use reference literature on the choice of materials, technologies of their processing, providing the necessary indicators of properties;
- correctly determine the application areas of a particular material;
- assign methods and modes of modifying processing structures.

own:

- practical skills in studying the structure, properties of materials and their heat treatment;

- methods of selecting a particular material based on the operating conditions.

3. Formed competencies:

SK-15. Have basic knowledge of polymer composite materials, as well as physical and physico-chemical phenomena accompanying the processes of their production, processing and operation.

4. Requirements and forms of current and intermediate certification.

The protection of laboratory work is carried out in a test form.

The test is carried out in writing in the form of answers to test questions.