

# ADDITIVE SYNTHESIS MATERIALS

## COURSE SYLLABUS ABSTRACT

Specialty 1 - 36 07 02 «Manufacture of products based on three-dimensional technologies»

	Форма получения высшего образования	
	Очная (дневная)	Заочная
Year	2	2
Semester	3, 4	3,4
Lectures, hours	66	16
Laboratory classes, hours	84	12
Classroom examination (semester, hours)		4 semester (2 hours)
Test, semester	3	3
Exam, semester	4	4
Contact hours	150	30
Independent study, hours	174	294
Total course duration in hours / credit units	324/9	

### 1. Course outline

The objectives of the discipline are to study the structure of metals and alloys, non-metallic materials, including polymers, ceramics, composite materials. Obtaining knowledge about the methods of obtaining and processing raw materials into products by the methods of additive technologies and the scope of their application. General purpose structural steels, alloyed steels. Composite cermet materials. Tool steels. Titanium and its alloys. Aluminum, magnesium and their alloys. Copper and its alloys. Non-metallic materials, including polymers, ceramics, as well as composite materials based on them. Types of materials used in the field of additive technologies and their scope, including powder, cord, wire, liquid. Ways of processing them into products. Features of additive synthesis materials and products obtained from them.

### 2. Course learning outcomes

Upon completion of the course, students will be expected to

#### **know:**

- the main groups of additive synthesis materials and their areas of application.
- fundamentals of the theory of heat treatment of metallic materials;
- practical skills in studying the structure, properties of materials, their heat treatment, as well as skills to improve the structure and properties of materials;

#### **be able to:**

- rational use of reference literature on the choice of materials, technologies for their processing, providing the necessary indicators of the properties of the resulting products;
- correctly determine the scope of a particular material;
- assign methods and modes of structure-changing processing.

#### **possess:**

- properties of materials;
- modern basic technological methods for the formation of products in the field of additive technologies;
- methods for determining the scope of a particular material.

### 3. Competencies

БПК-11 – Have systematic knowledge of materials used in additive technologies, their components, production technology, structure and properties

### 4. Requirements and forms of midcourse evaluation and summative assessment

To assess the current performance, a written or oral form is used (defense of laboratory work), and for an intermediate one, an oral-written form (test, exam).