

## ADDITIVE MANUFACTURING TECHNOLOGIES

(course title)

### **COURSE SYLLABUS ABSTRACT**

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

(speciality code and name)

	STUDY MODE	
	full-time	part-time
Year	3,4	4
Semester	6,7	7,8
Lectures, hours	68	16
Practical classes (seminars), hours	32	-
Laboratory classes, hours	50	8
In-class test (semester, hours)	-	6 семестр, (2 часа) 7 семестр, (2 часа)
Course project, semester	7	8
Pass/fail, semester	6	7
Exam, semester	7	8
Contact hours	150	28
Independent study, hours	102	224
Total course duration in hours / credit units	252/7	252/7

#### 1. Summary of the academic discipline

Types of additive technologies, theoretical foundations of processes (rheology, heat transfer, surface phenomena, structure formation). Production taking into account various model materials (liquid, bulk, powder, polymer, metal, melts, solutions, etc.). Production and technological characteristics of premixes, prepregs, powder, rod and granular materials. Consolidation in shaping processes (compaction, fusion, curing). The main methods of forming products using three-dimensional production technologies, calculation of parameters and applications. Ensuring the adhesive connection of products with the substrate and between its individual auxiliary elements. Three-dimensional technologies for the production of hybrid composite products and subassemblies. Product refinement: separation from the substrate, removal of the support material, machining, coating, welding, gluing, assembly. Ensuring and controlling the quality of products, accuracy and stability of sizes and shapes. Design of technological processes. Estimates of the cost and manufacturability of products, the effectiveness of shaping processes.

#### 2. Learning outcomes

to know:

- the theoretical foundations of the processes of forming products using three-dimensional technologies;
- the main technological operations during the shaping and refinement of products;
- methods of calculation and modeling of the processes of forming products, the technical standards used in this case;

be able to:

- choose suitable technological processes for obtaining products;
- calculate the parameters of typical technological processes of forming products using three-dimensional technologies and work them out in experimental industrial conditions;
- evaluate the manufacturability of the design of products according to economic criteria;

– to develop technological documentation for typical processes of manufacturing products;

to possess:

– skills in choosing the process of three-dimensional production according to technical and economic indicators, taking into account energy and resource conservation;

- skills in developing technological and related documentation;

– methods of analytical evaluation, forecasting and experimental testing of the parameters of the processing process and technological properties of materials;

– methods of ensuring the structure and operational properties of materials at the stage of forming products.

### 3. Competencies

BOD 13. Know the terminology, classification and scope of application of additive technologies, equipment for their implementation in production conditions.

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

The defense of laboratory work is carried out orally.

The test and the exam are conducted in writing in the form of answers to test questions.