

MECHANICS OF MATERIALS AND STRUCTURES

ANNOTATION TO THE CURRICULUM OF A HIGHER EDUCATION INSTITUTION

Specialty 6-05-0722-05 Production of products based on three-dimensional technologies

	Form of higher education
	Full-time (full-time)
Course	2
Semester	3,4
Lectures, hours	68
Practical (seminar) classes, hours	68
Lab Sessions, Hours	32
Term paper, semester	4
Exam, semester	3,4
Classroom hours in the academic discipline	168
Independent work, hours	192
Total hours per academic discipline / credits	360/10

1. Summary of the academic discipline Basic concepts. Mechanical characteristics of structural materials, strain gauge. Theory of stress and deformed state. Basic theories of strength. Calculations for tension or compression, bending, torsion. General case of forces on a member A universal method for determining displacements. Analysis of statically indeterminate systems by the force method. Stability of structural elements. Calculation of vessels, hull structures and pipelines.

2. Learning outcomes

The student must:

To know:

- the main hypotheses of the mechanics of materials and structures;
- the basics of the theory of the stressed and deformed state of structures and methods of its research;
- methods for calculating the rigidity, strength and stability of rod systems and other typical structural elements;

can:

- to conduct laboratory tests to determine the physical and mechanical characteristics, mechanical properties of structural materials;
- solve statically indefinable problems;
- draw up design schemes of typical structural elements;
- Calculate typical structural elements for rigidity, strength and stability;
- to make calculations of elastic elements of machines for strength and rigidity;
- correctly select the elements of units and parts of machines and their methods
- Plot internal force factors under different types of loading;
- Count on strength and stiffness in tension-compression, bending and torsion;
- Calculate structural elements that work on shear, compression, and under complex loading;

- Calculate the stability of the compressed members;

Have the skills to:

- methods of calculation of structural elements of machines, engineering structures and equipment elements for strength, rigidity and stability;
- Determination and assessment of physical and mechanical properties of materials;

- analysis of the behavior of real structures under stress and drawing up design schemes; 3.

Competencies to be formed

Know the basics of research activities, search, analyze and synthesize information. Be capable of self-development and improvement in professional activities. Take the initiative and adapt to changes in professional activities. Select structural materials and forms of structural elements, design schemes, make calculations of technical structures and their elements for strength, stability, rigidity.

4. Requirements and forms of current and intermediate certification.

Full-time education. Semester 3 - calculation and design tasks - oral questioning, problem solving; written exam. 4th semester - coursework - defense, written exam