

FOUNDATIONS OF THE THEORY OF ELASTICITY AND FINITE ELEMENT METHODS

(course title)

COURSE SYLLABUS ABSTRACT

1-36 11 01-01 Innovative technology for the construction industry (production and operation).

1-36 11 01-02 Innovative technology for the construction industry (production and operation)
(speciality code and name)

1-36 11 01- 01 01 Innovative technology for the construction and operation of roads

1-36 11 01- 01 02 Elevators, escalators and hoisting and transport machines
(specialisation code and name)

	STUDY MODE
	full-time
Year	2,3
Semester	4,5
Lectures, hours	32
Laboratory classes, hours	68
Pass/fail, semester	4,5
Contact hours	100
Independent study, hours	116
Total course duration in hours / credit units	216/6

1. Course outline

The purpose of the academic discipline is to form specialists who can reasonably and effectively apply a set of knowledge, skills and abilities for calculating and analyzing the stress-strain state of parts and structures used in construction, road and hoisting and transport machines

2. Course learning outcomes

Upon completion of the course, students will be expected to

know: the basic equations of the theory of elasticity and the provisions of the mechanics of a deformable body; basic relations of the plane problem of elasticity theory in Cartesian and polar coordinate systems; approximate (numerical and analytical) methods for solving problems; statement of the FEM problem; the main stages of solving the FEM problem; software that implements the FEM

be able to: solve plane problems of elasticity theory by various methods; carry out typical calculations and determine the type of stress state of the body; to form boundary conditions for numerical methods of solution; simulate SSS of metal structures using application software; analyze the results of the calculation of metal structures.

possess: own analytical methods for determining stresses, deformations and displacements in beams, plates; tools of approximate methods for solving the main problems of the theory of elasticity; skills in using application software that implements the finite element method to analyze the stress-strain state of metal structures in solving design problems.

3. Formed competencies BOD-6 Select the forms of structural elements operating in difficult operating conditions under the influence of static and dynamic loads, taking into account the temperature effect and the duration of operation, compare the design options according to the specified parameters to obtain the optimal solution. BOD-7 Perform calculations of technical structures and their elements for strength, stability, rigidity, use knowledge of the structure and principles of the action of general-purpose machine parts, determine rational options for gear drives of machines and mechanisms, ensure a high level of reliability and performance of the designed machines and their structural elements

4. Requirements and forms of current and intermediate certification. – The offset consists of a test on the theoretical material and an analysis of the stress-strain state of the part.