

REPUBLIC OF UZBEKISTAN
MINISTRY OF HIGHER EDUCATION, SCIENCE AND INNOVATIONS
FERGANA STATE TECHNICAL UNIVERSITY

Computer technologies in the design of building structures
MODULE HANDBOOK

Field of knowledge:	700000	- Engineering and construction industries
Field of Education:	730 000	- Architecture and construction
Educational Program:	60730300	- Civil Engineering

Module title	Computer technologies in the design of building structures
Code (if available)	CTDBST76
Semester(s) of module teaching	7
Responsible for the module	Abdurakhmonov Abdukholiq Abdukhodi, Department of Civil Engineering, Senior Lecturer
Language of instruction	Uzbek
Connection to the curriculum	Selection
Teaching methods	practical training
Study load (including classroom and independent study hours)	Total hours: 180 hours Auditorium hours: 72 hour, practical training-72 hours, Independent study – 108 hours.
Credit units	6
Required and recommended prior knowledge for studying the module	Automation of building and structure design, Building structures, seismic resistance of buildings and structures, structural mechanics, theoretical mechanics, soil mechanics
Module objectives/intended learning outcomes	The purpose of the module: The purpose of teaching science to students is to familiarize students with the possibilities of automating the process of working with projects and design documents of buildings and construction structures; to form professional thinking, mastery of design methods using modern computer technologies. The science of computer technologies in the design of building structures is a science that emerged as a result of the development of scientific and technical knowledge in higher educational institutions. It includes computer design, mathematics, drawing and drafting geometry, computer science and information technologies, building mechanics and building structures. To achieve the above goal, one of the main issues in the design of buildings and structures is to be able to study scientific and technical literature on design calculations, write a summary summary or abstract, apply the methods of conducting it; be able to summarize and analyze the results of theoretical and practical research; have the skills to use computers based on computational techniques when processing the results. The following requirements are imposed on the knowledge, skills and qualifications of students in the subject. The student: • knows how to correctly create computer models of buildings and structures in the process of designing them, has the skills to calculate and design them, has the skills to use similar computer calculation programs and correctly calculate complex spatial problems in engineering calculations in a short time, • determines the internal forces (N, Q, M) in the cross-section of structural elements under the influence of external loads, determines the required cross-sectional areas, determines the cross-section of reinforcement from reinforced concrete structures, checks structures in the first and second limit states and determines their dimensions, enters the mechanical characteristics of the materials necessary for the calculation, places loads, analyzes the results obtained and chooses the correct solution, etc.

Content	Module 1. Calculation of building structures Introduction. Lira program interface, Column calculation in Lira program, Beam calculation in Lira program, Calculation of multi-span beam. Module 2. Connections in the flat frame calculation scheme Introduction of connections and hinges in the flat frame calculation scheme and placement of loads. Performing a flat frame reinforcement calculation and analysis of the results of the selection of reinforcement. Modeling the spatial frame of a two-span, two-story building and placement of loads. Calculation of a flat slab. Module 3. Collection of loads based on the regulatory document. Collection of loads based on the regulatory document QMQ 2.01.07-96 "Loads and effects". Normative and design loads. Modeling the spatial frame of a multi-story building. Modeling the spatial frame of a multi-story building, assigning its dimensions and placement of loads. Creating a calculation model of a multi-storey frame-panel building and assigning the dimensions of the structures and placing the loads. Module 4. Performing reinforcement calculations Analysis of the results of performing reinforcement calculations and selecting reinforcement. Modeling complex buildings. Modeling complex buildings and entering their dimensions. Summarizing and placing the loads acting on a complex building. Creating a calculation model of a multi-storey complex structure building. Assigning the dimensions of a multi-storey complex structure building and placing the loads. Module 5. Calculation of structures located on elastic soil. Calculation and design of foundations. Flat steel frame and its calculation. Truss structure and its static calculation Calculation and design of industrial building structures Module 6. Calculation of buildings under the influence of wind loads according to the regulatory document "Loads and Effects". Calculation of buildings under the influence of wind loads according to the normative document QMQ 2.01.07-96 "Loads and influences". Creation of a geometric scheme of a cylindrical reservoir, performance of static calculation and analysis of calculation results. Calculation of buildings under the influence of seismic forces according to the normative document QMQ 2.01.03-2019 "Construction in seismic zones". Calculation of buildings under the influence of accelerograms. Formation of tables of calculation results
Forms of assessment	oral, presentation, written work, practical assignments, and final exams.
Requirements for study and assessment	To successfully complete the module, the student must attend classes and achieve the minimum scores in the current, intermediate and final assessments.

Bibliography	1. Yusufkhojaye SA "Construction constructions" textbook Tashkent-2019. 2. VF Usmanov "Reinforced concrete and stone structures" textbook. Sahhof, 2022, 552 pages. 3. Introduction to the LIRA software package 10.4 Study Guide / O.A. Kovalchuk, A.V. Kolesnikov, E.M. Rusanova, R.N. Suvorov Moscow 2015. 158 p. 4. LIRA software package for calculating and designing structures. Basic theoretical and calculation provisions: Textbook / Yu.N.Pchelnikova, I.A.Kurokhtina; Karaganda State Technical University. – Karaganda: Publishing house KSTU, 2015. - 84 p.
Reviewers	1. A.T. Juraboyev - Senior Lecturer (PhD) of the Department of "Architecture" of Fergana State Technical University; 2. B.O. Egamberdiev - Head of the Educational and Scientific Laboratory "Assessment of Seismic Resistance of Buildings and Structures";