

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

Design and structural engineering of buildings and 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	<i>Design and structural engineering of buildings and structures</i>
Code (if available)	<i>DCBST76</i>
Semester(s) of module teaching	<i>7</i>
Responsible for the module	<i>Mirzababayeva Saxiba Mirzaakbarovna, docent, Department of Civil Engineering</i>
Language of instruction	<i>Uzbek</i>
Connection to the curriculum	<i>Elective</i>
Teaching methods	<i>Lectures, practical training, independent study</i>
Study load (including classroom and independent study hours)	<i>Total: 180 hours</i> <i>Auditorium hours: 72 hours</i> <i>Lecture: 22 hours</i> <i>Practical training : 50 hours</i> <i>Independent study: 108 hours</i>
Credit units	<i>6</i>
Required and recommended prior knowledge for studying the module	<i>Construction Structures, Structural Mechanics, Soil Mechanics, Earthquake Resistance of Buildings and Structures</i>
Module objectives/intended learning outcomes	Module Objective: <i>To develop students' theoretical and practical knowledge of the fundamentals of designing industrial and residential buildings and their structural elements; the physico-technical principles of building design; urban planning fundamentals; and to cultivate the relevant knowledge, skills, and competencies aligned with the specialization profile in building design.</i> <i>The module aims to teach students how to effectively utilize architectural building designs in the construction and design process, how to create and apply architectural projects of buildings and structures in construction and engineering practice, and how to identify economically efficient solutions for reinforced concrete structures of buildings and facilities. It further focuses on forming students' theoretical and practical knowledge of the principles of designing and calculating residential buildings and structures, including their structural components.</i> <i>Requirements for students' knowledge, skills, and competencies in the discipline are as follows:</i> <i>- Students should study the volumetric-planning and structural solutions of buildings, as well as the functions and characteristics of building structural elements and details. This is essential because graduates of this specialization must have a clear understanding of the fundamentals of building design and construction theories.</i> <i>- Students are required to possess knowledge of the basics of designing residential buildings and structures, their structural elements, the physical and technical foundations of building design, urban planning principles, and the processes of building restoration and reconstruction.</i> <i>- Students must be able to utilize architectural building designs in the construction and erection of buildings, as well as create and apply architectural projects of buildings and structures in construction and engineering practice.</i> <i>- Students should understand the basic principles of calculating</i>

	building structures using the limit state method, the main physical and mechanical properties of building structures, and the fundamentals of structural behavior under load. - Taking into account the climatic conditions of the construction area, industrial base, and other local factors, students must be competent in selecting volumetric-planning and structural solutions for buildings and structures, as well as be proficient in design and calculation of building structures according to relevant normative documents.
Content	Module 1. Residential Buildings. Elements of Residential Buildings. The purpose and significance of the course "Architecture of Industrial and Residential Buildings." General information about buildings. Basic requirements for buildings. Residential buildings and their structural systems. Main elements and structural schemes of residential buildings. Soils and foundations. Structural elements of residential buildings. Structural elements of walls. Separate supports and girders, partition walls. Floors: classification, characteristics, and structural designs. Ventilated and non-ventilated pitched roofs. Water drainage from roofs. Windows and doors of buildings, their classification. Balconies, verandas, and terraces. Multi-storey residential buildings constructed from stone materials, small and large blocks. Volume-block buildings: their types, structural schemes, and structural solutions. Monolithic reinforced concrete buildings. Buildings constructed in seismic and dry-hot climate regions: requirements and structural solutions applied to them. Module 2. Public Buildings. General information about public buildings. Introduction to urban planning standards and regulations relevant to the design of public buildings and structures. Volumetric-planning and compositional solutions of public buildings. Functional principles and classification of public building design. Volumetric schemes of public buildings. Functional-technological schemes. Main volumetric elements of public buildings: entrances, main halls, service and auxiliary room groups. Horizontal and vertical communications. Natural and climatic factors influencing the design of public buildings. Lighting, acoustics, and thermal climate considerations. Ensuring adequate illumination, insolation, sound and noise insulation, and solar protection. Comfortable indoor microclimate. Engineering equipment of public buildings. Visualization and conceptualization of functional processes occurring within buildings. Human traffic flow, evacuation, movement speed, and related calculations. Buildings constructed from large prefabricated blocks. Structural schemes and types of buildings made from large blocks.
Forms of assessment	Oral presentations, written assignments, practical tasks, laboratory work, and final exams.
Bibliography	1. M. Riley, A. Cotgrave. Construction Technology 1: House Construction. Palgrave, 2018. 2. N.I. Goncharova. Architecture of Buildings and Structures: Textbook. Fergana: "Classik" Publishing House, 2022, 428 p. 3. N.I. Goncharova, Z.A. Abobakirova, Sh.M. Davlyatov.

	<i>Architecture of Buildings and Structures. Textbook. Fergana, 2019.</i> 4. S.M. Qodirova. <i>Design of Residential and Public Buildings. Textbook. Tashkent, 2020.</i> 5. M.M. Miralimov. <i>Architecture of Buildings and Structures. Study Guide. Tashkent, 2019.</i> 6. . M.M. Vakhitov, Sh.R. Mirzayev. <i>Architecture I, II, III Parts. Textbook. "Tafakkur" Publishing House, Tashkent, 2010, p. 255.</i> 7. 7. Y.M. Maxkamov, J.D. Akhmedov. <i>Architectural Structures. Textbook. Fergana, 2021, p. 242.</i> 8. A.L. Tabibov, O.S. Kasimov, D.Sh. Saipova. <i>Building Structures: Study Guide. Cho'lpon NMIL1, 2019, 200 p.</i> 9. S.M. Mirzababayeva. <i>Timber Structures. Textbook. Fergana: "Glebe EDIT", ISBN: 978-620-0-64030-7, Publication Permit №388-150, 2022.</i> 10. V.S. Fyodorov, Ya.I. Shvidko, V.E. Levitsky. <i>Construction Structures: Textbook. Moscow: KNORUS, 2018, 332 p.</i> 11. Z.Sh. Khodjaeva. <i>Reinforced Concrete and Masonry Structures. Study Guide. Tashkent, 2020, 173 p.</i> 12. K.Q. Shukurova. <i>Steel Structures (Problem Collection). Study Guide. "TIBBIYOT NASHRIYOTI MATBAA UYI" LLC, Tashkent, 2022, 208 p.</i> 13. V.F. Usmanov. <i>Reinforced Concrete and Masonry Structures. Textbook. SAHHOF, 2022, 552 p.</i>
Reviewers	Z.A. Abobakirova – (PhD) docent at the Department of Civil Engineering, Fergana State Technical University; O.J. Rakhmonov – Head of the Construction Testing Laboratory and Building Structures Technical Condition Inspection Department, Regional Inspection for Construction and Housing and Communal Services of Fergana Region.