

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

Building Physics. Energy Efficient Building Engineering
MODULE HANDBOOK

Field of Knowledge :	700000	- Engineering, machining and construction industries
Field of education:	730,000	- Architecture and construction
Education program :	60730400	Civil Engineering

Module title	<i>Building Physics. Energy Efficient Building Engineering</i>
Code (if available)	<i>BPEEBET56</i>
Semester(s) of module teaching	5
Responsible for the module	Goncharova Natalya Ivanovna , Construction engineering Department , Ph.D. , Professor Nabiev Muminjon , Construction engineering Department , Ph.D. , Associate Professor Nasriddinov Hassan Shavkatovich , Construction engineering chair , large teacher
Language of instruction	Uzbek , Russian
Connection to the curriculum	Selection
Teaching methods	lecture , practical training , independent education .
Study load (including classroom and independent study hours)	Total hours : 180 hours Auditorium Hours : 72 hours lecture – 30 clock , practical training – 42 hours , independent 108 hours of training .
Credit units	6
Required and recommended prior knowledge for studying the module	Thermal regime of rooms. Construction physics . Energy efficiency of civil buildings . Saving energy resources.
Module objectives/intended learning outcomes	The purpose of the module: Students should have the skills to design civil buildings in the fields of environmental physics, thermal protection of buildings, noise protection, natural light, insulation and energy saving, especially in the field of building exploitation in conditions of decreasing energy resources. To achieve the above goal, the subject performs the tasks of forming students with theoretical knowledge, practical skills, a methodological approach to assessing energy efficiency processes, and a scientific worldview. The following requirements are imposed on the knowledge, skills and qualifications of students in the subject . The student: • Climatic features of the Central Asian region and their influence on the formation of indoor microclimate; • buildings in hot, dry climates design the basics know and be able to use; • Knowledge of developing energy-saving architectural and design solutions for civil buildings; • Must have experience and skills in calculating and designing barrier structures based on the conditions for ensuring thermal protection of buildings . • The main stages of designing energy -efficient buildings : understanding all project stages, from research studies to the development of project documentation; • Regulatory documents and standards : knowledge of state standards, QMQ, ShNQ, GOSTs and other regulatory documents regulating the design of energy-efficient buildings ; • Must have the basic concepts, terms, and rules for assessing the technical condition of energy-efficient buildings, including the ability to take into account standards and regulations, and the skills to use construction standards .
Content	Module 1. Construction i climatology. Introduction . Construction climatology. The influence of climate

	on the design of buildings and their external enclosing structures. Climatic and physical-geological data of Uzbekistan: solar radiation, temperature, humidity and wind regimes. Module 2. Construction Physics basics . Thermal engineering and its properties. Buildings thermal protection to do theoretical basics . Home concepts from the heat protection to do Insolation . Buildings heat protection provision from the conditions external buildings calculation Lighting . Various in the rooms lighting for normative requirements . Window the area to determine . Construction Acoustics . Architectural and structural measures against noise. Measures against airborne noise. Calculation of the airborne noise insulation index of a barrier structure. Module 3. Energy efficiency buildings . Energy efficient of buildings descriptions and main rules . Energy effective of buildings types and parameters . Ecological importance . World on the scale energy effective buildings to the construction was requirements . Module 4. Energy and ecology each other effect problems . Energy and ecology each other effect problems . Buildings heat with in providing usable energy reserves and them to types to be to learn . Unconventional and new harvest divisor energy sources practical to use attraction to be done and them environment ecology the secret of the effect to study . Module 5. Ensuring thermal protection of civil buildings . Citizenship of buildings energy economical architectural , planning and constructive solutions ."Sunny " houses . External climate citizenship of buildings heat to the balance heat-energy the impact optimization . Sanitary-hygienic and consumer approaches to ensuring thermal protection of civil buildings. Module 6 . Measures to ensure energy conservation and energy efficiency of buildings. "solar" buildings. Conversion of solar energy into thermal energy by means of active solar systems. Passive solar systems, types of solar collectors and structural materials necessary for improving energy efficiency. Basic principles of assessing the thermal and energy efficiency of a building. Technical and economic foundations for selecting energy-efficient solar building options when designing buildings and structures. Buildings energy economy and energy efficiency increase measures study .
Forms of assessment	oral, presentation, written work, practical assignments, final exams.
Requirements for study and assessment	To successfully complete the module, the student must attend classes and achieve the minimum scores set in the current, midterm, and final assessments.
Bibliography	1. Nabiyev M. Building Energy Efficiency Engineering, Building Physics. Textbook. Fergana. 2024. 190 pages. 2. Goncharova N.I. Engineering of Energy-Efficient Buildings. Textbook. - Fergana. "Classik" Publishing House, 2022. - 428 pages. 3. Rashidov Jasur. "Scientific-Research Laboratory Works on

	<i>Building Physics (Construction-Thermal Engineering)."</i> <i>Methodological Guide: Tashkent, 2023, 18 pages.</i> 4. Obolensky N.V. <i>Architectural Physics</i>. Moscow: Architecture, 2007. 5. Viktorova O.L., Karpova O.V. <i>Fundamentals of Building Physics: Study Guide</i>. Penza: PSUAE, 2005. – 77 pages. 6. <i>Architectural Physics / Edited by V.K. Litskevich</i>. Moscow: Architecture-S, 2007. – 448 pages. 7. Shchipacheva E.V. <i>Designing Energy-Efficient Civil Buildings in Hot Arid Climates. Study Guide - TTYMI</i>, 2008. 8. Blazi V. <i>Designer's Handbook. Building Physics</i>. Moscow: "Technosphere", 2005. 9. Aloyan R.M., Fedosov S.V. <i>Energy-Efficient Buildings: State, Problems and Solutions</i>. Ivanovo State Polytechnic University, 2016. 10. Danilevsky L.N. <i>Principles of Design and Engineering Equipment of Energy-Efficient Residential Buildings</i>. Minsk, BusinessOffset; 2011. - 375 pages. 11. Tabunshchikov Yu.A., Brodach M.M., Shilkin N.V. <i>Energy-Efficient Buildings</i>. Moscow: AVOK-PRESS, 2003. 12. Beregovoy A.M., Grechishkin A.V., Beregovoy V.A. <i>Energy-Economical and Energy-Active Buildings in Architectural and Construction Design [Text]</i>. 3rd ed., revised and supplemented. Penza: PSUAE, 2012. 13. Afanasyeva O.K. <i>Architecture of Low-Rise Houses Using Renewable Energy Sources</i>. Moscow, 2007. 14. Solovyov A.K. <i>Physics of the Environment [Text]</i>. Moscow: ASV Publishing, 2011. – 342 pages. 15. Kholshchevnikov V.V., Lukov A.V. <i>Local Climate and Indoor Microclimate/ Study Guide - Moscow: Association of Construction Universities Publishing, 2001.</i>
Reviewers	<i>K. Maksivov - Fergana State Technical University, Department of " Civil Engineering " associate professor Ph.D .;</i> <i>O. Rakhmonov - Fergana region construction territorial control in the field Head of the inspection laboratory</i>