Course title	**Green Architecture and Energy Efficiency (ECTS 6)**
Topic/module code	YaAVET2406
Semesters in which the course is taught	2nd/4th semester
Assigned instructor	Janizaqov Abduvahob Esirgapovich, Associate Professor
Language of instruction	Uzbek
Course type	Compulsory
Study hours (including independent study)	**Total hours — 180.** **Classroom hours — 72.** Lecture hours — 24. Laboratory hours — none. Practical class hours — 48. **Independent study — 108 hours.**
ECTS	6
Course aim and objectives / learning outcomes	**The aim of teaching the course** is to introduce students to the theoretical and practical foundations of the course "Green Architecture and Energy Efficiency." The essence of the course is to study the inexhaustible diversity of natural forms that help identify forms corresponding to social requirements, beginning with the modeling of bionic principles and their architectural-biological integration and extending to refined architectural modeling, the creative development of architectural-bionic practice, and the development of skills in applying energy-saving technologies and design methods. **The objective of the course** is to foster a creative approach to modern architecture of buildings and structures based on new scientific achievements; to create a wide range of possible optimal solutions; to correctly apply structural and compositional solutions; to strive for harmony between architecture and nature while taking into account the psychophysical impact on human activity; and to develop a scientific worldview. **Learning outcomes:** 1. Understand the significance of the course "Green Architecture and Energy Efficiency" in studying specialized disciplines. 2. Become familiar with the basic provisions of energy-efficient construction standards that create comfortable living conditions. 3. Explain the principles and characteristic techniques of designing energy-saving structures. 4. Identify the features of designing buildings that have minimal impact on the environment.
Course content (topics)	**I. Main theoretical part (Lectures)** Topic 1. Introduction to Green Architecture and Energy Efficiency. Regulatory and legal framework for energy efficiency. Topic 2. Green architecture: the unity of the beauty of nature, comfort, the environment, and arhitectural forms. Energy balance of buildings. Topic 3. Passive building systems. Requirements for planning solutions. Requirements for structural solutions. Topic 4. Active building systems. Requirements for planning solutions. Requirements for structural solutions.

	Topic 5. Human ecology. Energy-efficient and sustainable construction. Topic 6. High-tech building. A building that ensures an environmentally safe and comfortable living environment. Topic 7. The concept of architectural and planning solutions for buildings — the optimal form of a building; optimal use of natural conditions. Topic 8. Building block configuration as a factor in reducing heat losses. Main types of building service systems for heating, cooling, and ventilation. Topic 9. Innovative materials and technologies in architecture. Heating systems. Installation of ventilation systems for passive buildings. Topic 10. Architectural, engineering, and technological energy-efficient solutions using solar radiation heat and geothermal heat. Topic 11. Three stages of studying indoor microclimate quality. Modern concepts of indoor air quality. Topic 12. Indicators of environmental safety of residential buildings. “Sick building” syndrome. Domestic and international experience in building certification under green building systems (GOST, LEED, BREEAM). **II. Guidelines and recommendations for organizing laboratory classes.** Laboratory classes are not предусмотрены in the standard curriculum of the course. **III. Guidelines and recommendations for practical classes.** Preparation of the instructor for a practical class begins with studying the initial documents (curriculum, thematic plan, etc.) and ends with preparing a lesson plan. The instructor should have a clear understanding of the aims and objectives of the practical class and the amount of work each student is expected to complete. Methodological guidelines are the instructor’s main methodological document for preparing and conducting practical classes. The aim of practical classes is to understand theory and acquire skills, apply them consciously in educational and professional activities, and develop the ability to confidently formulate and express one’s own point of view. **Recommended practical topics:** 1. The concept, subject, methods, system, and sources of energy saving. 2. Green architecture and energy efficiency as an academic discipline. 3. The first examples of energy-efficient buildings. 4. Theoretical foundations of energy saving and building energy efficiency. 5. Climatic characteristics. 6. Sustainable architecture and bioclimatic architecture. 7. The concepts of “environment” and “ecology.”

	8. Main types of facilities based on energy-efficient and environmentally friendly technologies. 9. Green architecture as a modern design trend. 10. Formation of digital architecture. Selection of an energy-efficient building form. 11. Building orientation and insolation. Wind regime. 12. Heating, ventilation, and air purification systems. Environmental safety of buildings. **IV. Independent study and independent work.** The independent learning competency helps students develop self-directed learning and improve the effectiveness of their professional activities. Students complete independent assignments on their mobile devices under the guidance of the instructor, either in traditional or electronic form. **Recommended topics for independent study:** 1. Energy efficiency and climate change. 2. Environmentally friendly, sustainable, and smart architecture. 3. Climatic and physical-geological data for design. 4. Determination of climatic classifications of the construction area. 5. Theoretical foundations of energy saving and building energy efficiency. 6. Climatic characteristics. 7. Main types of facilities based on energy-efficient and environmentally friendly technologies. 8. Selection of an energy-efficient building form. 9. Building orientation and insolation. Wind regime. 10. Heating, ventilation, and air purification systems.
Student assessment	Students' knowledge is assessed during semester and final examinations based on their mastery of the teaching materials (test results, assignments, written and oral work). Throughout the "Green Architecture and Energy Efficiency" course, students are assessed on a 100-point scale. Of these, 50 points are allocated to current and midterm assessment (60% of the 50 points for current assessment and independent study, and 40% for midterm assessment), while 50 points are allocated to the final assessment. Students whose combined current and midterm assessment score is below 30 points are not admitted to the final examination. A student who obtains 30 or more points in the final assessment is considered to have successfully completed the course.
Requirements for admission to examinations	The student must fully master the theoretical and practical concepts of the topic and be able to correctly present the results of analysis. The student must complete the assignments given as part of independent work and current and midterm assessment. In addition, within the established period, the student must obtain the required number of points in current assessment, midterm assessment, independent study, and final assessment in the relevant course.

	A student who has not submitted current assessment, midterm assessment, and independent study assignments, or who has scored less than 30 points for these assignments and assessment types, is not admitted to the final assessment. In addition, a student who, without a valid reason, misses 25% or more of the classroom hours allocated to the course is excluded from the course, is not admitted to the final examination, and is considered not to have earned the relevant credits for the course. A student who fails the final examination or obtains a score between 0 and 29.9 points in this type of examination is considered to have an academic debt.
Recommended literature	**Main literature:** 1. Janizaqov A.E. Analysis of Building Structures. Textbook. Jizzakh, JizPI Publishing House, 2026. — 243 pages. 2. Janizaqov A.E. Architectural Structures. Textbook. Jizzakh, JizPI Publishing House, 2024. — 277 pages. **Additional literature:** 3. Tabunshchikov, Yu.A., Brodach, M.M., Shilkin, N.V. Energy-Efficient Buildings. Moscow: AVOK-PRESS, 2003. — 200 pages. 4. Janizaqov A.E. Architecture of Residential Buildings. Study Guide. Jizzakh, JizPI Publishing House, 2025. — 185 pages. **Internet resources:** 6. www.gov.uz — Government Portal of the Republic of Uzbekistan. 7. www.lex.uz — National Database of Legislation of the Republic of Uzbekistan. 8. https://t.me/archbookuz 9. www.ZiyoNet.uz