Course title	Information Technologies in Construction (4 ECTS)
Course/module code	QAT1104
Semester(s) in which the course is taught	Semester 1
Assigned instructor	Sherzod Ummatovich Eshonqulov, Associate Professor
Language of instruction	Uzbek
Course type	Compulsory
Workload (including independent study)	Total workload – 120 hours Contact hours – 48 hours Lecture hours – 24 Practical class hours – 24 Independent study – 72 hours
ECTS	4
Course aim and objectives / learning outcomes	Course aim The aim of teaching this course is to provide students with theoretical foundations and knowledge of the principles of applying modern information and communication technologies in architecture and construction, teach the basic concepts and categories, familiarise students with informatization processes in the architecture and construction sector, and develop the skills required to apply these technologies in practice. Course objectives The objectives of the course are to study the areas of application of information systems and technologies in architecture and construction; develop theoretical knowledge, practical skills, methodological approaches to relevant processes and a scientific worldview; understand the essence of laws and categories; and reveal the role and significance of the human being in life through the formation of a personal attitude towards them.
Course content (topics)	I. MAIN THEORETICAL PART (LECTURES) Topic 1. Aim and objectives of the course “Information Technologies in Construction”. Topic 2. Technical tools for implementing information and computer technologies. Topic 3. Software of modern computers in architecture and construction. Topic 4. Information-processing technologies in architecture and construction. Topic 5. Information security and methods of protecting information in construction and architecture. Topic 6. Application of artificial intelligence technologies in the algorithmisation and programming of information processes in construction and architecture. Topic 7. Basic constructs of programming languages in artificial intelligence systems and their application features. Topic 8. The concept and types of computer graphics. The concept of computer vision and image processing in AI, and their main types. Topic 9. AI-based automated design systems in the construction sector. Topic 10. Three-dimensional computer modelling.
Course content (topics) – continued	II. GUIDELINES AND RECOMMENDATIONS FOR PRACTICAL CLASSES The instructor’s preparation for practical classes begins with studying the initial documents (curriculum, thematic plan, etc.) and ends with preparing the lesson plan. The instructor should understand 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 principal methodological document for preparing and conducting practical classes. The purpose of practical classes is to understand theoretical material and acquire skills. They aim to develop the ability to apply these skills consciously in educational and professional activities and to formulate one’s own point of view with confidence. Recommended practical topics: 1. Working with office and organisational equipment. 2. Technologies for preparing complex documents in construction. 3. Preparing construction-company data in spreadsheets. 4. Technologies for creating presentations for construction companies. 5. Working with database management systems. 6. Methods of information protection. 7. Solving construction-related problems using object-oriented programming languages. 8. Creating structured applications in object-oriented programming systems. 9. Creating and editing objects using vector-graphics software. Analysing and designing objects based on data using artificial intelligence systems. 10. Designing objects in computer-aided design systems. 11. Creating 3D models using artificial intelligence and computer-vision technologies. 12. Modelling and automating processes and objects in various fields using AI-based software tools. Creating objects using software for automating construction structures.
Course content (topics) – continued	III. INDEPENDENT LEARNING AND INDEPENDENT WORK Independent-learning competencies help students develop self-directed learning and improve the effectiveness of their professional activities. Students complete independent assignments on their mobile devices under the instructor’s guidance, in either a traditional or electronic

	format. Recommended topics for independent study: 1. The level of development of artificial intelligence and its current stages of advancement. 2. Development and prospects for applying artificial intelligence technologies in Uzbekistan. 3. Hardware support for artificial intelligence systems. Computer operating principles and main components. 4. Software support for artificial intelligence systems and the role of operating systems in them. 5. Overview of the Windows operating system and its versions. 6. Programming languages and their capabilities. 7. Give examples of general concepts related to object-oriented programs and describe them. 8. Capabilities of MS PowerPoint. 9. Capabilities of spreadsheet applications and differences between them. 10. Working with function wizards in spreadsheets. 11. Capabilities of Mathcad. 12. General information about databases. 13. Databases and their organisation. Technology for using Microsoft Access. 14. Computer networks and their types. 15. Global computer networks. 16. Website creation capabilities. 17. Computer security issues. 18. Electronic documents and electronic digital signatures.
Student assessment	a) Requirements for a grade of 5: • Fully explain the essence and content of the course. • Present course topics scientifically and logically, without scientific errors or confusion. • Clearly understand the theoretical or practical significance of the course materials. • Demonstrate independent and free thinking within the scope of the course. • Give clear and concise answers to questions. • Be thoroughly prepared with lecture notes. • Complete independent assignments fully and accurately. • Master all practical skills and competencies. • Apply theoretical knowledge in different situations. • Use a systematic approach and maintain continuity. b) Requirements for a grade of 4: • Understand the essence and content of the course and present topics without scientific or logical inconsistencies. • Understand the practical significance of the course content. • Complete the tasks and assignments within the scope of the syllabus. • Answer course-related questions correctly. • Have well-prepared course notes. • Complete independent assignments in full. • Make an effort to master all practical skills and competencies. d) Requirements for a grade of 3: • Have a general understanding of the course. • Cover topics narrowly and make some inconsistencies in presentation. • Complete independent assignments in full. • Present information without sufficient fluency. • Give vague or confusing answers to course-related questions. • Have course notes that are not thoroughly prepared. e) The grade is unsatisfactory (2) if: • The student has not prepared for classes. • The student has no understanding of the classes related to the course. • Independent assignments have not been completed in full. • Course notes appear to have been copied from others. • Written work contains serious errors and inconsistencies. • The student cannot answer questions related to the course and demonstrates insufficient knowledge.
Requirements for admission to examinations	Students must fully master the theoretical and methodological concepts related to the course, correctly present analysis results, independently reflect on the processes being studied, complete the tasks and assignments set for assessment, and submit the written work for the final assessment.
Recommended references	CORE REFERENCES 1. Turapov, U., Eshonqulov, Sh., and Burliyev, A. “Information Technologies in Construction”. Textbook. Tashkent, 2020. 488 pp. 2. Richard L. Halterman. Fundamentals of C++ Programming. Copyright © 2019. All rights reserved. 634 pp. 3. Brian P. Hogan. HTML5 and CSS3, Second Edition: Level Up with Today’s Web Technologies. Copyright © 2019 The Pragmatic Programmers, LLC. All rights reserved. 290 pp.

	4. Raavi O'Connor. Autodesk 3ds Max® 2019 Modeling and Shading Essentials. Copyright © 2019 Raavi Design. 466 pp. ADDITIONAL REFERENCES 5. Mirziyoyev, Sh. M. We Will Build Our Great Future Together with Our Brave and Noble People. Tashkent: "Uzbekistan", 2017. 488 pp. 6. Mirziyoyev, Sh. M. Critical Analysis, Strict Discipline and Personal Responsibility Must Become the Daily Rules of Every Leader's Activities. Tashkent: "Uzbekistan", 2017. 102 pp. 7. Mirziyoyev, Sh. M. The Rule of Law and the Protection of Human Interests Are the Guarantee of the Country's Development and People's Well-being. Tashkent: "Uzbekistan", 2016. 47 pp. 8. Randy H. Shih. AutoCAD 2018 Tutorial – First Level: 2D Fundamentals. Better Textbooks. Lower Prices. 9. M. Aripov. Information Technologies. Study guide. Tashkent: "Noshir", 2019. 366 pp. 10. M. M. Aripov et al. Informatics and Information Technologies. Textbook. Tashkent: TSUL, 2018. 278 pp. 11. S. S. Qosimov. Information Technologies: Textbook for Higher Education Institutions. Tashkent: Aloqachi, 2006. 360 pp. INTERNET (INFORMATION) RESOURCES www.lex.uz – National Database of Legislation of the Republic of Uzbekistan. www.lex.uz – National Database of Legislative Documents of the Republic of Uzbekistan. www.uz – National search engine. www.gov.uz – Government portal of the Republic of Uzbekistan. www.ZiyoNET.uz – Information and educational portal of the Republic of Uzbekistan. www.e-darslik.uz http://www.vse.uz http://linux.manas.kg/books/how intranets work/ch32.htm www.SDCpublications.com http://www.practical-photoshop.com