Name of subject	Information technology in technical systems (ECTS 4)
Subject/module code	TTAT1304
Science taught semester (s).	3rd semester
Responsible teacher	Hasanov Umid Jumayevich, PhD, Associate Professor
Education language	Uzbek
Connection to the curriculum	Compulsory
Training hours (this including independent education)	**Total hours - 120.** **Contact hours - 48.** Lecture session hours – 24 Practical training - 12 Laboratory hours - 12 **Independent education -72 hour**
ECTS	4
Science goals and objectives / learning outcomes	**The purpose of teaching the subject** is to help students in the age of digital technology. modern information communication technologies application method and tools, computer modeling, principles of programming technologies from developing the skills to teach and apply them in practice consists of. **The task of the subject** is education directions according to applicable automated design systems using solving problems , modeling, design and product design working exit and knowledge of the essence of programming, and the scientific understanding of students in relation to them information and communication technologies through the formation of worldviews opportunities manifestation to grow. **Learning outcomes:** 1. Will gain skills in intelligent control systems and artificial intelligence, expert systems. 2. Will acquire skills in modern automated design systems and their application in technical fields . 4. Will acquire skills to work independently in graphic modeling programs and geoinformation system programs. 5. On the network reliability increase for backup , monitoring and other methods by hand takes ; 6. Information database , cloud technologies about to knowledge has will be ;
Course content (topics)	**I. Main Theoretical Part (Lecture Sessions)** **1-topic. "Technical" in systems information technologies" science subject and tasks.** "Technical" in systems information technologies" science subject and styles. Technical in systems information communication technologies (ICT) main functions and application in the field of information technology. ICT in Uzbekistan field in development main directions, current laws, Decrees of the President of the Republic of Uzbekistan and the Cabinet of Ministers decisions. In the republic computerization and ICT develop programs, tasks study. ICT technician in the directions implementation to grow principles, digital the economy develop for the purpose digital infrastructure modernization to do. Technical in systems management for modern application of technologies. Computer ethics. **2-topic. Intellectual management systems. Expert systems** Intellectual systems purpose, functions and methodology. Expert

systems. Expert system structural part. Expert systems classification, structure structure.

3-topic. Modern automated design systems and them technician in the fields application.

Design processes and stages. In automated design used model and parameters classification. Automated design systems structure and types. Synthesis and analysis issues. Create analytical, parametric and numerical models based on a conceptual design and analysis.

4-topic. Mathematician modeling, numerical analysis methods in systems done increase. Accountable experiment.

Mathematica, Maple, Matlab, MathCAD programs in the example static and dynamic models done increase. System in the composition programming.

5-topic. Graphic modeling. Design in the process practical graphic programs from the possibilities use.

3D Max, CATIA, KOMPAS, Solid Works, AutoCAD, Parasolid, Solid Edge, CorelDraw practical programs in the example of graphic modeling.

6-topic. Imitation modeling.

Imitation models and their types. To the parameter based models in the system application. Proteus, Simulink, PCAD, T-Flex practical in programs imitation models create.

7-topic. Geoinformation systems.

Geoinformation systems classification, models features and Application method: Micro Main, Main Tenance, Premium, Geologia Surpoc, Arc GIS practical in programs modeling and design.

8-topic. Network information base. Cloudy technologies.

Databases and their models on the Internet. Clipper, Application of Oracle, MySQL systems in technical and technological processes. Cloudin technologies SaaS, PaaS and IaaS models.

9-topic. Information security in technical and technological processes to provide.

Bank in systems, in geosystems, electromechanical in systems, modern information protection in biosystems, monitoring systems methods current to, information protection to do tools and methods efficiency assessment, information protection to do software and technician Use of tools. Study of cryptographic methods of information security and them information safety in increasing application. Best Crypt, Pretty Good Privacy, InfoWatch CryptoStorage programs.

10-topic. Technical in systems network safety.

Information communication technologies safety provide software and hardware that enables the exchange and transmission of data for the purpose of installing, configuring, and testing networks, including hardware systems Perform a transfer. Prevent cyber attacks that affect system performance mechanisms for detecting and protecting against threats, and repelling attacks study. Comodo Firewall Pro, Avast Internet Security, AVG Internet Security, Outpost Firewall, Zone Alarm Free Firewall, Kerio Winroute Firewall from cross-network screen programs use.

11-topic. Modern programming technologies. To the object

object-oriented programming languages.

Modern programming technologies. Programming languages and systems, their usage and classification. Programming of languages main modules.Programming systems place, task technician issues in solution JavaScript, Java, Python, Ruby, PHP, C++, CSS, C#, Objective- C programming in systems software create applications learning styles.

12- topic. Basic constructs of the C++ programming language and features of its use in the system.

Program structure. C++ programming of the language main constructions, Features of their use. Operators, categories, procedures. Program Project structure. Cases and forms of program creation. Program structure parts. Various technician in the fields of information categories structure. Linear computational processes programs. Examples in technical systems linear programming application. Identifier, variables categories (types). Input and output of data, manipulation in the algorithmic language S++ as a row, format specifications and modifiers, standard librarytitle files .

II. Instructions and recommendations for organizing practical training.

The teacher's preparation for a practical session begins with studying the initial documents (curriculum, thematic plan, etc.) and ends with the development of a lesson plan. The teacher should have an idea of the goals and objectives of the practical session, as well as the amount of work that each student must perform.

Methodological guidelines are the teacher's main methodological document in preparing and conducting practical classes.

The goal of practical training is to understand theory and acquire skills. Its conscious application in educational and professional activities consists in developing the ability to confidently formulate one's own point of view.

All practical work and exercises are done on computers. Students will be able to from EXM in the power supply system during execution use and EXM issues at solution according to skills they produce

Recommended topics for practical training:

1. Practical programs using engineering issues mathematician models create (Mathematica, Maple, Matlab, MathCAD).
2. Design in the process practical programs graphic from the possibilities use and visualization (3D Max, CATIA, COMPASS, Solid Works, AutoCAD, Parasolid, Solid Edge, CorelDraw).
3. Creating simulation models in practical programs (Proteus, Simulink, PCAD, T-Flex). Representing engineering problems and developing models in geoinformation systems.
4. Protection cryptographic from the methods use.
5. To the object directed programming technologies.
6. Logical programming technology.
7. Programming in systems applications create technology

III. Guidelines and recommendations for organizing laboratory exercises.

In laboratory classes, students develop practical skills and competencies in calculating and drawing tables and graphs, conducting experiments, and analyzing various indicators of processes in electrical networks and systems. The proposed topics are selected based on opportunities and conditions.

Suggested topics for laboratory exercises:

	1. CAD systems practical programs interface study andapplication. 2. Mathematics in solving engineering problems in CAD systemsto the models calculation experiment and numerical perform the analysis increase. 3. Technical to objects relevant graphic models practical in programs to express, recycling and visualization. 4. Technical to objects imitation models create and analysis to grow. 5. Identify and mitigate cyber attacks that affect system 6. To the object directed programming in systems structural applicationscreate. 7. Engineering in solving problems programming systems using graphics and multimedia from the possibilities use. 8. Internet on the network information base software system tools create using **IV. Be careful . study and independent work.** Independent learning competence serves to support students' independent self-development and increase the effectiveness of professional activities. Students perform independent work on their mobile devices under the guidance of a teacher in a traditional or electronic form. **Recommended topics for independent study:** 1. Digital the economy in development information communication technologies place. 2. In Uzbekistan information communication field in development main directions, current laws, President of the Republic of Uzbekistan decrees and resolutions of the Cabinet of Ministers decisions. 3. Systematic and practical software of supply development trends. 4. The role of expert systems in management and their application 5. Intelligent control systems in roboticsapplication prospects 6. Automated design systems in mechanics, energy,electronics, geology, mechanical engineering and other in the fields application. 7. Application of three-dimensional graphics capabilities in design technologies. 8. Geoinformation systems application problems. 9. Cybersecurity on the surface international documents and edge hand countriesexperience. 10. Information communication in systems information safety. 11. Non-standard modules create and them in the program application. 12. Web to program based practical systems.
Exam form	Written
Teaching/learning and examination requirements	Complete mastery of theoretical and methodological concepts and practical knowledge of the discipline, the ability to correctly reflect the results of analysis, independently reason about the processes being studied and carry out tasks in the current, intermediate forms of control and independent work, pass written work on the final control. When drawing up final exam questions, deviations from the content of the discipline program are not allowed. The bank of final exam questions for each discipline is discussed at the meeting and approved by the head of the department.

	No later than 1 week before the start of the final control, tickets signed by the head of the department, enclosed in an envelope, are sealed by the Dean's office and opened 5 minutes before the start of the exam in the presence of students. Final exam duration is 80 minutes. Answers to final exam questions are recorded in copybooks with the seal of the Dean's office. After completion of the final work, the work is immediately encrypted by a representative of the Dean's office, and the copybooks are handed over to the commission for verification. From the moment of completion of the final exam, a period of 72 hours is allotted for checking and posting the results on the electronic platform. The teacher who taught the students in this discipline is not involved in the process of conducting the exam and checking the students' answers. Student(s) who are dissatisfied with the final exam results may submit a written or oral appeal within 24 hours of the publication of the final exam results. Complaints submitted after 24 hours from the publication of the final exam results will not be accepted.
Scope of assessment criteria and procedure	CURRENT CONTROL Purpose: Determining and assessing the student's level of knowledge, practical skills, and competencies on course topics. Instructions: The student's activity in daily classes is assessed through the student's mastery of course topics, as well as constructively interpreting and analyzing the educational material, developing module-specific skills, acquiring practical skills (in terms of quality and the specified number) and competencies, solving problem situations aimed at applying professional practical skills, working in a team, preparing presentations, etc. Current control form: Activity in lessons Preparing educational materials Working with sources within the subject Using educational technologies Working in a team Preparing presentations Working with projects. MIDTERM CONTROL Purpose: Assessing the student's knowledge and practical skills and level of mastery of lecture material after completing the relevant section of the course. Form and procedure of intermediate control: Midterm examination is held during the semester during the training sessions after the completion of the relevant module of the curriculum of the subject. Midterm examination is held once in written form within the framework of this subject. Midterm examination questions cover all topics of the subject. INDEPENDENT LEARNING Purpose: Independent learning is aimed at fully covering the content of this course, expanding the theoretical knowledge acquired, and establishing independent learning activities for students. Form and procedure of independent education: independent work assignments are completed in the form of an educational project, presentation, case study, problem solving, information search, digest, colloquium, essay, article, abstract, etc. Completed assignments for independent study are placed in the electronic system and checked based on the anti-plagiarism program and evaluated by the subject teacher. In this case, the uniqueness of the completed assignment should not be less than 60%, otherwise the assignment will not be accepted for assessment. The number of independent work assignments, depending on the nature of the subject, should not be less than 3 for one subject (module). Independent work assignments account for 60% of the points allocated for current and intermediate control. FINAL CONTROL

Purpose: The final examination is held at the end of the semester to determine the level of mastery of the student's theoretical knowledge and practical skills in the relevant subject. The final examination is held at a specified time according to the examination schedule created by the Registrar's Office on the electronic platform.

Requirements: The student must have passed the current control, intermediate control and independent learning assignments by the deadline for the final control type in the relevant subject. A student who has not passed the current control, intermediate control and independent learning assignments, as well as who has received a score in the range of "0-29.9" for these assignments and control types, is not included in the final control type. Also, a student who has missed 25 percent or more of the classroom hours allocated to a subject without a reason is excluded from this subject and is not included in the final control type and is considered not to have mastered the relevant credits in this subject. A student who has not passed or was not included in the final control type and has received a score in the range of "0-29.9" for this type of control is considered to be an academic debtor.

Final control form: The final examination in this subject will be conducted in written form. If the final examination is conducted in written form, the requirements for assessment must also be reflected.

Criteria for assessing student knowledge

5 grade	100 points		Assessment criteria
5	90-100	Excellent	When a student is considered to be able to make independent conclusions and decisions, think creatively, observe independently, apply the knowledge he has gained in practice, understand, know, express, and narrate the essence of the subject, and have an idea about the subject.
4	70-89,9	Good	When the student is considered to be able to observe independently, apply the knowledge he has gained in practice, understand, know, express, and narrate the essence of the subject, and has an idea about the subject.
3	60-69,9	Satisfactory	When the student is found to be able to apply the knowledge he has gained in practice, understands, knows, can express, and narrate the essence of the subject, and has an idea about the subject.
2	0-59,9	Unsatisfactory	When it is determined that the student has not mastered the science program, does not understand the essence of the subject, and does not have an idea about the science.

Course assessment criteria and procedure

Assessment type	Total points allocated	Control (task) form	Distribution of points	Qualifying score
Current assessment	30 points	System tasks	20 points (divided by the number of tasks)	18 points
		Student activity (in seminars, practical, laboratory classes)	10 points	

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<tr><td rowspan="2">Midterm assessment</td><td rowspan="2">20 points</td><td>Supervision: Written work</td><td>10 points</td><td rowspan="2">12 points</td></tr>
<tr><td>System tasks</td><td>10 points (divided by the number of tasks)</td></tr>
<tr><td>Final assessment</td><td>50 points</td><td>Written assignment (5 questions)</td><td>50 points (10 points per question)</td><td>30 points</td></tr>
<tr><td colspan="5">* Note: 60% of the points allocated for current and intermediate control are allocated to independent work assignments. Independent work assignments are evaluated as system assignments through the electronic platform.</td></tr>
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<tr><td>Recommended Literature</td><td>
Main literature

Kadyrov MM "Information Technologies" textbook, part 1, T.: "Sano-standard" publishing house, - 2018, 320 page.
Kadyrov MM Technical in systems information technologies Part 2: textbookG' MM Kadyrov - Tashkent: "Philosophers of Uzbekistan are national society", Tashkent 2019, 306 page.
R.A. Adabaeva, Sh.T.Nasridinova, NX Shoakhmedova, LT Ibragimova, Sh.T. Ermatov. "Information and communication" technologies and systems» - T.: "Sano-standard" publishing house, - 2017, 552 page.
Kenjabayev AT, Ikromov M.M., Allanazarov A.Sh. "Information-" communication technologies» study manual. – Tashkent: "Uzbekistan" philosophers national society» publishing house, Tashkent 2017,408 page.

Additional literature
<ol start="5">
Decree of the President of the Republic of Uzbekistan dated February 7, 2017 No. PF-4947- number "Uzbekistan" Republic further develop according to Action strategy about decree.
Hasanov U. Fundamentals of Programming (Textbook). – T “JizPI”, 2024, 39 pages.
Mominov B. B. Programming I (Textbook). – Tashkent: “Nihol Print”, 2021, 280 pages.
Kunwoo Lee. Principles of CADG'CAMG'CAE: The Computer Aided Engineering Design Series. 5th Edition. Addison Wesley Longman, USA, 2015.
Mominov B. B. Programming I (Textbook). – Tashkent: “Nihol Print”, 2021, 280 pages.
SK Ganiev, MM Karimov, KA Tashev. Information safety. – T.: "Science and Technology", 2017, 372 pages.

Information sources
<ol start="11">
www.lex.uz – Uzbekistan Republic Law documents informationnational base.
www.ziyonet.uz – Uzbekistan Republic education portal.

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