NAVOI STATE UNIVERSITY

TTAT1104 INFORMATION TECHNOLOGIES IN TECHNICAL SYSTEMS — COURSE SYLLABUS

Department of Digital Technologies | 60710200 Biotechnology

COURSE PASSPORT & ACADEMIC METADATACourse

Title: Information Technologies in Technical Systems (TTAT1104)

Course Type: Mandatory

Field of Study: 700000 Engineering & Construction

Program: 60710200 Biotechnology

Academic Year: 2025–2026

Semester: 1 (or 3)

Form of Education: Full-time

Language: Uzbek

Total Workload: 120 Hours

Credits: 4 ECTS

Weekly Hours: 4 hours/week

Assessment: Examination

Aligned UN SDGs: SDG 9 (Industry, Innovation & Infrastructure), SDG 4 (Quality Education)





1. Course Description & SDG Integration

The Information Technologies in Technical Systems course provides essential training on computer hardware architectures, positional number systems, logic circuits, computer graphics, computer-aided design (CAD) systems, network technologies, cryptographic data protection, and cloud computing.

In alignment with SDG 9 (Industry, Innovation & Infrastructure) and SDG 4 (Quality Education), the course prepares biotechnology students to implement automated technical control systems, CAD models, artificial intelligence, and mobile applications in technical and industrial environments.

2. Course Aims & Learning Outcomes

Course Aim: To provide theoretical foundation and practical skills in applying IT components, software tools, CAD systems, network protocols, and cybersecurity in engineering and technical systems.

- Knowledge: Master positional number systems, logic gates, hardware components, database management in technical systems, CAD platforms, and network architectures.
- Skills: Execute document processing, electronic spreadsheets, interactive online presentations, computer graphics, and CAD design.
- Practical Competency: Implement cryptographic protection, navigate E-Government services, and build cloud-based control workflows for technical systems.
- SDG Competencies: Leverage digital technologies for industrial innovation, technical system automation, and digital infrastructure resilience (SDG 9).

3. Prerequisites

Prerequisites: Informatics and Information Technologies, Computer Graphics, Web Design.

4. Course Structure & Workload Allocation

Activity Type	Semester Hours	Total Hours Allocation
Lectures	20 Hours	20 Hours
Practical Classes	26 Hours	26 Hours
Independent Study	74 Hours	74 Hours
Total Workload	120 Hours	120 Hours (4 ECTS)

5. Detailed Course Curriculum Outline

5.1 Lecture Syllabus Outline

• **L1: Introduction to IT in Technical Systems:** Role of IT in engineering, positional number systems, logic functions, and information encoding.

• **L2: Hardware Components & Architecture:** System units, microprocessors, memory hierarchy, and technical system interfaces.

• **L3: Electronic Document & Spreadsheet Processing:** Applied software tools for engineering documentation and data analysis.

• **L4: Presentation Technologies & Multimedia:** Interactive technical presentations, video processing, and multimedia tools.

• **L5: Database Management in Technical Systems:** Relational databases, SQL queries, and data storage in technical environments.

• **L6: Computer Graphics & CAD Systems:** 2D/3D technical graphics, automated design systems (CAD), and engineering modeling.

• **L7: Network & Internet Technologies:** Local and wide area networks, protocols, web technologies in technical systems.

• **L8: Information Security & Cloud Systems:** Cryptographic protection, cyber security in technical control systems, cloud platforms, and AI integration.

5.2 Practical & Laboratory Outline

- Number system conversions, binary arithmetic, and logic circuit design.
- Hardware component analysis and peripheral interface configuration.
- Engineering document formatting and spreadsheet data processing in technical tasks.
- Interactive technical presentation design and video content creation.
- Database development and technical record management.
- 2D/3D Engineering graphic modeling and CAD software practice.
- Network configuration, web resource utilization, and internet technology applications.
- Cryptographic data protection, antivirus management, and cloud platform integration.

5.3 Independent Study (Mustaqil Ta'lim) Topics

- Collaborative technical document preparation using online office tools.
- Creating interactive online technical presentations and video tutorials.
- Organizing technical video conferences and online webinars.
- Designing electronic assessment and control resources for technical systems.
- Developing specialized mobile applications and software modules for technical systems.

6. Recommended Literature & Information Sources

- Ayupov R.H., Tursunov S.Q. Digital Technologies: Innovations and Development Prospects. TDPU, Tashkent, 2020.
- Qo'chqorova S.S. et al. Application of Information Technologies in Professional Activity. Navoiy, 2023.
- Norbekov A. et al. Multimedia Systems and Technologies. Navoiy, 2023.
- Ma Will W.K. Engaged Learning and Innovative Teaching in Higher Education: Digital Technology. Springer, 2024.