NAVOI STATE UNIVERSITY

TAT1204 INFORMATION TECHNOLOGIES IN MEDICINE — COURSE SYLLABUS

Department of Digital Technologies | 60910200 General Medicine & 60910300 Pediatrics

COURSE PASSPORT & ACADEMIC METADATA

Course Title: Information Technologies in Medicine (TAT1204 / TAT11208-1.09)
Course Type: Mandatory
Field of Study: 900000 Healthcare & Social Security
Program: 60910200 General Medicine & 60910300 Pediatrics
Academic Year: 2025–2026
Semester: 2
Form of Education: Full-time
Language: Uzbek
Total Workload: 120 Hours
Credits: 4 ECTS
Weekly Hours: 4 hrs/week
Assessment: Examination
Aligned UN SDGs: SDG 3 (Good Health and Well-Being), SDG 4 (Quality Education)





1. Course Description & SDG Integration

The Information Technologies in Medicine course focuses on modern digital healthcare solutions, medical informatics, telemedicine systems, electronic health records (EHR), computational anatomy, and biomedical data processing.

In alignment with SDG 3 (Good Health and Well-being) and SDG 4 (Quality Education), the course equips future medical doctors and pediatricians with competencies in VR-based computational anatomy, cloud computing (Google, Dropbox, Yandex platforms), health information security, and Python programming for clinical diagnostics.

2. Course Aims & Learning Outcomes

Course Aim: To establish comprehensive theoretical knowledge and practical digital skills in processing, analyzing, and securing medical data using modern software and telecommunication tools.

- Knowledge: Understand digitalization of healthcare in Uzbekistan, hardware/software specifications, telemedicine architectures, cloud storage models, and medical information security.
- Skills: Perform clinical data analysis in MS Excel, construct databases in MS Access, program biomedical algorithms in Python, and utilize VR computational anatomy models.
- Practical Competency: Navigate cloud platforms (Google Docs/Sheets), process medical graphics/infographics (CorelDraw), and apply electronic digital signatures in e-health portals.
- SDG Competencies: Utilize digital health technologies to improve patient care quality and clinical workflow efficiency (SDG 3).

3. Prerequisites

Prerequisites: Informatics and Information Technologies, Computer Hardware Systems, Basics of Computer Programming.

4. Course Structure & Workload Allocation

Activity Type	Semester 2 Hours	Total Hours Allocation
Lectures	12 Hours	12 Hours
Practical Classes	32 Hours	32 Hours
Laboratory Classes	16 Hours	16 Hours
Independent Study	60 Hours	60 Hours
Total Workload	120 Hours	120 Hours (4 ECTS)

5. Detailed Course Curriculum Outline

5.1 Lecture Syllabus Outline

• L1: Healthcare Digitalization in Uzbekistan: Informatics in medical problem solving. Hardware and software infrastructure in healthcare facilities.

• L2: Office Automation & Biomedical Data Processing: Digital data processing technologies, statistical and computational analysis of medical records.

• L3: Multimedia, Telemedicine & Medical Information Security: Graphic/animated clinical modeling, telecommunication platforms, medical web resources, and cybersecurity.

• L4: Modeling Medical Systems & Object-Oriented Programming: Physical and mathematical models in clinical diagnostics, object-oriented programming concepts in medicine.

• **L5: Digital Health Technologies & VR Computational Anatomy:** Historical milestones, VR-based computational anatomy, and medical mobile applications.

• **L6: Cloud Computing & Storage Models in Healthcare:** Google, Dropbox, and Yandex cloud platforms, collaborative medical document management.

5.2 Practical & Laboratory Outline

- Number systems, arithmetic/logic fundamentals, and encoding digital medical information.
- Computer hardware components and auxiliary medical peripherals.
- Preparing clinical multimedia presentations and animations in MS PowerPoint.
- Automated Physician Workstation: Designing clinical databases (forms, reports) in MS Access.
- Processing medical statistical data and electronic spreadsheets in MS Excel.
- Physiological process modeling and Python programming for clinical decision support.
- Exploring VR-based computational anatomy and medical data visualization platforms.
- Cloud services in healthcare: Collaborative document and spreadsheet processing in Google Workspace (Docs, Sheets).

5.3 Independent Study (Mustaqil Ta'lim) Topics

- Formulating and solving differential equations in biological and medical contexts.
- Developing mathematical modeling techniques for disease progression and clinical systems.
- Designing standardized clinical forms and medical record templates in MS Office.
- Database creation and statistical medical data reporting.
- Modern digital health technologies: Smart gadgets, Internet of Things (IoT), 5G/Wi-Fi 6, and 3D printing in medicine.
- Virtual Reality (VR) components, concepts, and clinical simulation applications.
- Cloud computing models and secure cloud storage architectures in health management.

6. Recommended Literature & Information Sources

- Bazarbayev M.I. et al. Information Technologies in Medicine. Sano-standart Publishing, Tashkent, 2018.
- Turakulov V.N., Isroilova L.S., Otaqulova D.R., Nuraliyeva P.E. Information Technologies in Medicine (Textbook). Navoiy, 2023.
- Carlo Combi, Elpida Keravnou, Yuval Shahar. Temporal Information Systems in Medicine. Springer Nature, 2010.
- Eyal Wirsansky. Applying Genetic Algorithms to Solve Real-World Deep Learning and AI Problems. Packt Publishing, 2020.