NAVOI STATE UNIVERSITY

BDI60910200-1.09 INFORMATION TECHNOLOGIES IN MEDICINE (GENERAL MEDICINE) — COURSE SYLLABUS

Faculty of Mathematics & Informatics - 60910200 General Medicine

COURSE PASSPORT & ACADEMIC METADATA

Course Title: Information Technologies in Medicine (BDI60910200-1.09 / TAT1204)

Course Type: Mandatory

Field of Study: 900000 Healthcare & Social Security

Program: 60910200 General Medicine

Academic Year: 2025–2026

Semester: 2

Form of Education: Full-time

Language of Instruction: 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 for General Medicine focuses on clinical informatics, medical decision support systems, electronic health record (EHR) systems, computational anatomy, telemedicine networks, and biomedical programming.

In alignment with SDG 3 (Good Health and Well-Being) and SDG 4 (Quality Education), the course prepares medical students to process patient records, model physiological systems using Python, manage automated physician workstations, and utilize cloud computing safely in general clinical practice.

2. Course Aims & Learning Outcomes

Course Aim: To cultivate comprehensive theoretical understanding and practical digital competencies required for clinical data processing, disease modeling, and medical database administration.

- Knowledge: Understand healthcare IT infrastructure in Uzbekistan, hardware/software configurations, telemedicine, cloud storage models, and cybersecurity regulations.
- Skills: Execute statistical clinical data analysis in MS Excel, build relational health databases in MS Access, program biomedical algorithms in Python, and apply VR computational anatomy models.
- Practical Competency: Use cloud platforms (Google Workspace, Dropbox) for collaborative health documentation, design patient admission forms, and apply electronic digital signatures (EDS).
- SDG Competencies: Utilize health information technologies to improve general clinical workflows, patient diagnostics, and healthcare system 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:** Digitalization of healthcare system, informatics in clinical problem solving, computer hardware and software specifications.

• **L2: Office Automation & Clinical Data Processing:** Office automation in medical facilities, digital data processing, statistical and computational analysis of patient records.

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

• **L4: Modeling Medical Systems & Object-Oriented Programming:** Physical and mathematical models in disease diagnosis, object-oriented programming concepts in clinical software.

• **L5: Digital Health Technologies & VR Computational Anatomy:** Evolution of digital health, VR-based computational anatomy, and clinical mobile applications.

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

5.2 Practical & Laboratory Outline

- Positional number systems, binary arithmetic, logic gates, and digital medical encoding.
- Computer hardware components, system architecture, and auxiliary medical peripherals.
- Designing multimedia clinical presentations and medical animations in MS PowerPoint.
- Automated Physician Workstation: Building relational databases (forms, queries, reports) in MS Access.
- Statistical medical data processing and spreadsheet modeling in MS Excel.
- Physiological process modeling and Python programming for clinical decision support.
- Exploring VR-based computational anatomy platforms and medical data visualization tools.
- Cloud services in healthcare: Collaborative clinical document and spreadsheet management in Google Workspace (Docs, Sheets).

5.3 Independent Study (Mustaqil Ta'lim) Topics

- Formulating and solving differential equations in biological and medical systems.
- Developing mathematical modeling methods for clinical diagnostic processes.
- Designing standardized clinical forms, medical certificates, and patient chart templates in MS Office.
- Database creation and statistical analysis of patient health datasets.
- Modern digital health technologies: Smart gadgets, Internet of Things (IoT), Wi-Fi 6 / 5G, and 3D printing in pediatrics.
- Virtual Reality (VR) components, concepts, and clinical simulation models.
- 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.