№ ЛД-16-ИН

ABSTRACT OF THE WORK PROGRAM OF THE DISCIPLINE "INFORMATION TECHNOLOGIES IN MEDICINE"

The main professional educational program of higher education is a specialty program in the specialty 31.05.01 Medical care, approved on23.05.2023.
Form of study full-time;
The term of development of OPOP in 6 years;
Department of Chemistry and Physics.

1. The purpose of the discipline: - mastering by the student of the basic theoretical foundations of medical informatics and the practice of applying modern information and telecommunication technologies in medicine and healthcare. Study of methods and algorithms for digital filtering, processing and transformation of data in modern information systems. Study of implementation methods in information systems of effective algorithms for data transformation and analysis. Study of the main types of digital filters, methods of their analysis and synthesis, features of digital filtering of information, the use of wavelet transformations in information processing, the main applications of signal and image processing in medicine.
2. The place of the discipline in the structure of the OOP: The discipline "Information technology in medicine" is optional for students studying in the specialty 31.05.01 Medicine (according to the educational program, partially implemented in English).
3. Requirements for the results of mastering the discipline:
   The process of studying the discipline is aimed at the formation and development of competencies: OPK1, PK18. As a result of studying the discipline, the student should *know* the following concepts:
   - Digital signals. Digital signal processing. Functional transformations of signals. Digital processing operations. Linear digital filtering. Discrete transformations.
   - Fourier transform. Short-term Fourier transform. Scopes of digital signal processing. Non-recursive and recursive digital filters. Impulse response of filters. Transfer functions of filters. Z-transform.
   - Stability of filters. Frequency characteristics of filters. Phase and group delay of signals. Block diagrams of digital filters. Isolation of noise in signals. Recovery of lost data.
   - Approximation of derivatives. Data integration. Integration algorithms. Filtering random signals. Continuous wavelet transforms. Examples of wavelets. Discrete wavelet transform.
   - Visualization. Fast algorithms and implementation in Matlab language.
   - Application of orthogonal transformations in the problem of decoding medical images.

be able to:

- to use the knowledge gained on the main functions of operating systems to solve learning problems associated with the use of ready-made computer information materials;

- to use the studied information technology tools for solving practical problems;

- decipher medical images;

own:

- skills in working with the MATLAB package;

- basic information transformation technologies: graphic, text, tabular editors, Internet search.

4. The total workload of the course is 1.0 credit units (36 hours).

5. Semester: 7

6. The main sections of the discipline:

- Analysis of biomedical signals - digital signals and images.

- Digital images in MATLAB and their application in medical research.

- Software for the implementation of information processes in medicine. Basic technologies of discrete orthogonal and wavelet transformations of medical information.

- Object recognition when decoding medical images.

Author:

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