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Use of Interdiscipline Integration in the Teaching of Physics

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Annotation: The article discusses the discipline "physics", which is studied in medical universities. The analysis of the content of this discipline is carried out. Highlighted professionally oriented questions disclosed in the discipline "physics". A classification of professionally oriented issues is given. The article describes professionally oriented physical tasks that can be used in the process of studying physics in medical universities.

Keywords: physics, professionally oriented questions, physics problem, modern methods of teaching physics, physics and medicine.

The role of medicine and physics in our daily lives is invaluable. Every day the influence of physics on the development of medicine is growing, which is why the medical industry is being modernized. Many devices manufactured by physicists allow doctors to perform any type of examination. Research allows patients to make accurate diagnoses and find different ways to recover. The first full-scale contribution to medicine was the discovery of Wilhelm Roentgen in the field of radiation, which is now called by his name. Today, X-rays allow you to easily diagnose this or that disease in a person, to get detailed information at the level of bones, and so on.

In the nineteenth century, medical students studied physics at a very serious level. Nowadays, physics is also available in a number of studied disciplines, but students often do not consider it very important to study it. This situation needs to be corrected, as physics is entering medicine at an increasingly rapid pace: laser surgery, soft tissue ultrasound examination, magnetic resonance imaging, X-rays, operations with a gamma scalpel, and more.

Currently, diagnostic studies of varying degrees of complexity and the safest surgical interventions can only be performed using modern technical tools developed and maintained by physicists. A physician's mandate, of course, does not include adjusting and repairing used equipment, but he or she must understand the basics of device operation.

Therefore, in the process of teaching physics students at the Medical University, it is necessary to cover the departments directly related to medicine. Modern multimedia technologies play an important role in the educational process. Demonstration devices used in lectures and practical trainings allow to improve the educational process and acquaint future doctors in detail with the physical methods used in modern medical diagnostics and treatment.

With an activity-based approach to education, a key element of student work will be problem solving, i.e., mastering activities, especially new types of activities: teaching and research, research and design, creativity, and more. In this case, real knowledge will be the result of working on organized tasks. efficient and effective system. However, V.V. Davydov said that with the development of activities, the student is able to form a system of values supported by society. From the consumer of passive knowledge, the student becomes an active subject of educational activity.

Analyzing the educational and methodological literature, we can conclude that in different years in pedagogical theory and practice different pedagogical approaches to the organization of teaching physics, mathematics and computer science prevailed: knowledge-based, competency-based, activity-based, task-oriented, person-centered. This was due to a change in methodological attitudes, a change in the educational paradigm, and a social order for education.

The selected approaches to the organization of physics teaching for students of the Medical University are methodological approaches, as they determine the educational model and determine the choice of pedagogical educational technologies.

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The use of modular teaching technology is especially effective in teaching physics to students of medical universities (for example, medical, pediatric faculties) in cases where there is a large amount of materials and insufficient number of study hours. Modular training involves the rigorous structure of learning materials, the content of training and the organization of the work of listeners with complete, logically completed learning blocks (modules). The use of modular lessons has a positive effect on the development of independent activity of students, self-development, improving the quality of knowledge. The use of modular teaching technology allows a university teacher to:

1. implementation of a differential approach to teaching and taking into account the specifics of medical universities;
2. allows the use of different types of activities (individual, pair, group);
3. helps to collect materials for tests or exams, increase the quality of teaching students, increase motivation to study physics, develop extracurricular methods of teaching and professional activities.

Problem-based learning technology is effectively implemented in the teaching of Physics to students of medical universities. The introduction of problem-based learning technology into the learning process using problem situations in the classroom provides the following.

1) formation of students' ability to apply the acquired knowledge in practical professional activities;
2) develop skills that allow navigation in a non-standard situation (ability to reflect, set goals, plan, model and actively communicate).

Programmed learning technology, due to its specificity, can be used in the study of such sections of mathematics, given the practical problems, the solution of which is strictly algorithmic. These sections include the "Algebra and Geometry" section.

Some physical concepts are fundamental to understanding the structure and functioning of the human body. For example, in terms of the general laws of mechanics, the locomotor system is a system of arms: the hip joint type I, the ankle joint type II, and the wrist type III arm. A flat position of the head (atlantooccipital articulation is also the first impulse) is related to the equality of gravitational moments applied to the center of gravity of the skull and the gravitational force of the muscles. A change in any of these forces will cause the head to change position.

Hands are widely used in medical devices: various types of scissors, forceps, nippers and others. Some manipulations performed by the dentist also involve performing the arm (the dentist uses the law of conservation of momentum when removing a tooth). Many diagnostic and treatment methods are based on the use of physical principles: the operation of a medical thermometer is based on the thermal expansion of mercury, the stethoscope (phonendoscope) device used for auscultation is based on the properties of vibrations and waves.

The future doctor should know physics, because reliance on physical laws allows to study the activity of a living organism, to explain normal physiological and pathological processes. Despite the complexity and interdependence of various processes in the human body, most of them are close to physical processes.

Blood circulation is a process associated with the work of the heart (mechanics), the formation of biopotentials (electricity), fluid flow (hydrodynamics), the propagation of elastic vibrations through blood vessels (vibrations and waves). Respiration is related to heat exchange (thermodynamics), evaporation (phase transformations). In addition to physical macroprocesses in the body, there are molecular processes that ultimately determine the behavior of biological systems. Understanding the physics of these microprocesses is necessary to accurately assess the state of the organism, the characteristics of a number of diseases, the effects (including side effects) of drugs.

Individual teaching technology can be used in the organization (conduct) of independent work of students in the teaching of mathematics, physics and computer science to medical students. In the examination of independent work, the teacher's interaction with one student allows an objective assessment of the student's knowledge and skills in the subject. When doing

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independent work, the student interacts alone with learning tools (books, computers, etc.), which helps to shape his intellectual skills.

Group learning technologies (working in small groups, working in groups) can be used by university teachers to teach students the subject of "Computer Science". One of the main tasks of teaching at the university, especially the teaching of medical students, the development of creative abilities, intellectual skills is carried out most effectively through the method of projects, working in small groups. The use of group technologies helps to form the knowledge and skills (analysis, forecasting, interpersonal relationships, etc.) that medical students need in their future careers.

The following sections are offered in the course under consideration: “Mechanical vibrations and waves. Acoustics ";" Transmission processes in biological systems. Biomechanics "; “Bioelectrogenesis. Electrical and magnetic properties of tissues and the environment ";" Electromagnetic oscillations and waves ";" Medical electronics ";" Optics ";" Physics of atoms and molecules. Elements of quantum biophysics "; “Ionizing radiation. Fundamentals of Dosimetry ". In each of the above sections, career-oriented questions can be distinguished. However, when we say professionally oriented questions, we mean questions, the study and solution of which will be necessary for the future professional activity of the physician.

Vocational-oriented questions of a physics course in a medical university, as well as the study of professionally-oriented physical problems, as well as professionally-oriented physical tasks are understood as physical tasks with a clear professional-oriented nature. , this solution may be useful in the future professional practice of the physician.

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