

<b>Title:</b>	Modern physical methods in medicine and health care
<b>Lecture hours:</b>	45
<b>Study period: (summer/winter)</b>	winter
<b>Number of credits:</b>	7
<b>Assessment methods:</b>	Preparation of a multimedia presentation on a selected topic
<b>Language of instruction:</b>	English
<b>Prerequisites:</b>	<p>K_W01 has extended knowledge of physics and its historical development, as well as the civilizational importance and impact of physics on other fields of science</p> <p>K_W02 contains information about the latest computer discoveries and contemporary trends in the development of physics;</p> <p>K_W07 has knowledge of experimental and observational techniques in physics</p> <p>K_W08 knows the theoretical foundations of the creation and operation of research and measurement equipment in physics</p> <p>K_U01 is able to carry out the removal of chemical substances</p> <p>K_U02 you can plan experimental research in the field of physics, develop the results of these research and draw conclusions justifying it</p> <p>K_U04 can detect detailed information and skills in physics in other fields</p> <p>K_U05 knows the basic English-language journals in the field of physics included in the list of scored journals and can create the necessary information, and can also use scientific databases</p> <p>K_K01 the importance of one's own knowledge and understands the importance of education, one can inspire and organize the learning process of one's own and others;</p> <p>K_K02 can act and work in a group, in various roles</p> <p>K_K03 has working devices in the group, performing various roles;</p> <p>K_K05 - understands that the subject of teaching is reading scientific and popular science journals in the fields of physics in order to expand and deepen knowledge</p>
<b>Course content:</b>	<p>1-2. Introduction. Milestones of the application of physics and physical methods in medicine and protection of health.</p> <p>3-6. Tomography and its types:</p> <ul style="list-style-type: none"> <li>- Computed tomography (CT). High-resolution X-ray microtomography</li> <li>- Positron emission tomography (PET). Advanced tomography methods. TOF PET tomography.</li> <li>- Nuclear magnetic resonance tomography (MRT).</li> </ul> <p>7-8. White light sources. Traditional and modern sources. Fluorescent lamps. White light diodes. Principles of white light diode engineering.</p> <p>9-10. Ultrasonic methods. Characteristics of ultrasonic materials. The use of ultrasound in medicine. Measurement of image resolution. Doppler effect. Piezoelectric and electromechanical effects.</p> <p>11-12. Fluorescent markers and their use in biology and medicine.</p> <p>13-14. Lasers. Laser radiation. The use of lasers in medicine. Laser therapy. Laser radiation and its main features. Types of lasers used in medicine. Interaction of laser radiation with tissues.</p> <p>15-16. Optical scanning microscopy.</p> <p>17-18. Scanning electron microscopy.</p> <p>19-20. Digital radiography. Storage phosphors.</p> <p>21-22. Synchrotron radiation and its application in materials science, biology and medicine.</p> <p>23-24. Radioscopic methods. Nuclear magnetic resonance spectroscopy. Application in medicine.</p> <p>25-26. Radioscopic methods. Electron paramagnetic resonance spectroscopy (EPR). Application in science and medicine.</p>
<b>Learning outcomes:</b>	<p>Assessment of the student's presentation (0.3)</p> <p>Exam: 5 questions from different parts of the course (0.7)</p>
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