

Study program: DENTISTRY	
Type and level of studies: Integrated academic studies, Level 1/2	
Course unit: BIOPHYSICS	
Teacher in charge: Associate Professor Vladimir Zivkovic, MD, DSc	
Language of instruction: ENGLISH	
ECTS: 3	
Prerequisites: Enrollment in the first year, first semester of study	
Semester: WINTER SEMESTER	
Course unit objective: Introducing students with the biophysical foundations of the functioning of organic systems of the organism. Adoption of basic principles in the field of nuclear physics. Understanding the basic principles in the field of radiological physics.	
Learning outcomes of Course unit:	
<ul style="list-style-type: none"> • Knowledge about biomechanical properties of body functions (cell transport, skeletal muscles, locomotor system and cardiovascular system); • Knowledge about basic principles of nuclear physics; (usage of radioactive isotopes for medical purposes and biophysical effects of radiation and radiation protection); • Knowledge about basic principles of radiological physics (characteristics of X-ray tubes and apparatus, basic features of multidetector computed tomography and usage of radiological information system and image archiving system-PAKS); • Skills about measurement of basic body biomechanical properties as well as functioning of X-ray apparatus and multidetector computed tomography 	
Course unit contents	
<p><i>Theoretical classes</i> <i>Transports across the cell membrane. Body fluids. Distribution and composition of body fluids in different parts of the body. Membrane potentials. Biomechanical characteristics of the locomotor system. Biomechanical properties of skeletal muscles. Biomechanical properties of the cardiovascular system. Atom and nucleus structure. Conventional and quantum model of atoms. Radioactivity units. Physical half-life. Biological and effective half-life. Basic principles of interaction of gamma radiation with matter. Basic features of x and γ rays. Radiation detection mechanism and detector types. Types of radioactive decay. Basic features of alpha, beta and gamma decay. Application of radioactive isotopes in medicine. Biophysical effects of radiation. Radiation protection. Basic features of X-ray tubes and apparatus. Types of X-ray machines. Multidetector computed tomography. Radiological information system and image archiving system-PACS.</i></p> <p><i>Practical classes</i> <i>Osmosis. Registration of electrical potentials of the cell membrane. Functional tests of the locomotor system. Skeletal muscle functional tests. Functional examinations of the cardiovascular system. Fundamentals of nuclear physics. Application of radioactive isotopes in medicine. Biophysical effects of radiation. Radiation protection. Introduction to the technical characteristics of X-ray tubes. X-ray quality and quantity. Introduction to the basic parts of X-ray machines. Introduction to the basic types of X-ray machines. Introduction to the basic types of multidetector computerized tomography devices (scanners). Introduction to the functioning of the radiological information system. Significance and application of PACS</i></p>	
Literature	
<ul style="list-style-type: none"> • Vladimir Lj. Jakovljevic (editor-in-chief). Ganong's review of medical physiology. 1st edition in Serbian. Faculty of Medical Sciences, University of Kragujevac; 2015. (Kim E. Barrett, Susan M. Barman, Scott Boitano, Heddwen Brooks. Ganong's Review of Medical Physiology. 24th Edition. LANGE Basic Science; 2012.) • Bosnjakovic V, Kostic K. Fundamentals of Nuclear Medicine, Second Edition. Faculty of Medicine, Belgrade, 1994 • Group of authors. Nuclear medicine. Faculty of Medicine, Belgrade, 2005. • Lazic J, Sobic V. Radiology, a textbook for medical students. Medical Book, 1997. • Bosnjakovic P. Radiology practicum. Medical Book, 1997. 	
Number of active teaching hours: 30	Other classes

Lectures: 15	Practice: 15	Other forms of classes:	Independent work:
Teaching methods: Lectures and small group work.			
Examination methods (maximum 100 points)			
Exam prerequisites	No. of points:	Final exam	No. of points:
Student's activity during lectures	15	oral examination	
practical classes/tests	15	written examination	70
Seminars/homework		
Project			
Other			
Grading system			
Grade	No. of points	Description	
10	95-100	Excellent	
9	85 – 94	Exceptionally good	
8	75 – 84	Very good	
7	65 – 74	Good	
6	55 – 64	Passing	
5	< 55	Failing	

(Table 5.2) Course unit description