

Information sheet for the course Biophysics, Biochemistry and Radiology

University: <i>Alexander Dubček University of Trenčín</i>	
Faculty: <i>Faculty of Health Care</i>	
Course unit code: <i>BfyzBchRad/d</i>	Course unit title: <i>Biophysics, Biochemistry and Radiology</i>
Type of course unit: <i>compulsory</i>	
Planned types, learning activities and teaching methods: <i>Lecture: 2 hours weekly/26 hours per semester of study; full-time</i>	
Number of credits: 2	
Recommended semester: <i>1st semester in the 1st year (full-time)</i>	
Degree of study: <i>I (bachelor)</i>	
Course prerequisites: <i>none</i>	
Assessment methods: <i>Written or oral examination (50 score points) - for obtaining the particular grades it is necessary to achieve:</i> <i>at least 45 score points for the grade A</i> <i>at least 40 score points for the grade B</i> <i>at least 35 score points for the grade C</i> <i>at least 30 score points for the grade D</i> <i>at least 25 score points for the grade E</i>	
Learning outcomes of the course unit: <i>The student will acquire knowledge by studying the subject of basic concepts and theoretical principles biochemistry in relation to the physico-chemical properties of essential biomolecules and the relationship of their structure and biological activity. The student will be able to use the biochemical terminology in the praxis.</i> <i>The student will acquire knowledge by studying the subject, objectives and tasks of medical imaging, biophysical principles of methods used in radiology and nuclear medicine. The will acquire basic knowledge of radioactivity, ionizing radiation, protection of patients and staff from the effects of ionizing radiation.</i>	
Course contents: <ol style="list-style-type: none"> 1. Atom, atomic composition, core, cover, base particles. Biophysics of cells. Electric speeches of cells. Action potential. Reflex arc. 2. Radioactivity and ionizing radiation. Establishment. Detection. Effects on living matter. X-ray imaging using X-rays. Radiology. 3. Ultrasound. The principles of ultrasound investigation. Ultrasonic devices. 4. Basic principles of Magnetic Resonance Imaging. 5. Biophysical principles of some medical imaging methods. 6. Contrast agents udes in radiology. Side effects. First aid for anaphylactic shock. 7. Principles of diagnostic imaging methods according to organ systems. Diagnostics of diseases of the chest organs, blood vessels and heart. Diagnostics of diseases of the breast and soft tissue. Diagnostics of CNS, skeleton and GIT. 8. Introduction to biochemistry. Carbohydrates. Lipids. 9. Biomembranes - red blood cells, blood groups, ion channels 10. Cholesterol, phytosterols. Amino Acids. Proteins. Selected fibrillar proteins (α-keratin, fibroin, collagen, elastin). Selected globular proteins (hemoglobin, myoglobin). 11. Enzymes. Vitamins. 12. Nucleic acids. 	

13. *Introduction to clinical biochemistry.*

Recommended of required reading:

1. NAVRÁTIL, L. – ROSINA, J.: *Lékařská biofyzika.* Praha : MANUS, 2009. 349 p. ISBN 80-902318-5-3.
2. HRAZDÍRA, I. - MORNSTEIN V.: *Úvod do obecné a lékařské biofyziky.* Brno : MU 1998. ISBN 80-210-1822-4.
3. SLOBODNÍKOVÁ, J. – FURDOVÁ, A. – KRÁLIK, G. – ŠRAMKA, M.: *Moderné zobrazovacie, diagnostické a liečebné metódy.* Bratislava : VŠZaSP sv. Alžbety, 2012. 144 p. ISBN 978-80-89464-18-8 .
4. ŠAJTER, V. a kol.: *Biofyzika, biochémia a rádiológia.* Martin : Osveta, 2006. 272 p. ISBN 80-8063-210-3.
5. ŠEVČÍKOVÁ, L. a kol.: *Vybrané kapitoly z lekárskej biofyziky, rádiológie, rádiodiagnostiky a rádioterapie v onkológii.* Bratislava : SZU, 2004. 79 p.
6. ZAHRADNÍK, P. - KOLLÁROVÁ, M.: *Prehľad chémie 2, Organická chémia a biochémia.* Bratislava: SPN, 1997. 325 p. ISBN 80-08-01005-3.
7. VOET, D.: *Biochemie.* Praha : Victoria Publishing, 1990. 1325 p. ISBN 80-85605-44-9.

Language: Slovak

Remarks: -

Evaluation history: Number of evaluated students - 543

A	B	C	D	E	FX
11.97%	11.42%	17.31%	18.6%	22.84%	17.86%

Lectures:

doc. MUDr. Jana Slobodníková, CSc. RNDr. Zdenka Krajčovičová, PhD.

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Supervisor: *doc. PhDr. Dagmar Mastiliaková, PhD.*