

## Information sheet for the course Biophysics

<b>University:</b> <i>Alexander Dubček University of Trenčín</i>	
<b>Faculty:</b> <i>Faculty of Health Care</i>	
<b>Course unit code:</b> <i>Biofyz/d</i>	<b>Course unit title:</b> <i>Biophysics</i>
<b>Type of course unit:</b> <i>compulsory</i>	
<b>Planned types, learning activities and teaching methods:</b> <i>Lecture: 2 hours weekly/26 hours per semester of study; full-time</i>	
<b>Number of credits:</b> <i>4</i>	
<b>Recommended semester:</b> <i>1<sup>st</sup> semester in the 1<sup>st</sup> year (full-time)</i>	
<b>Degree of study:</b> <i>I (bachelor)</i>	
<b>Course prerequisites:</b> <i>none</i>	
<b>Assessment methods:</b> <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>	
<b>Learning outcomes of the course unit:</b> <i>The student will acquire basic knowledge by studying the physical principles and fundamental physiological processes in the body, the use of physical processes and methodologies to study the structures and functions of biological energy facilities, the physical point of view in an effort to exact physico-chemical description of biological processes.</i>	
<b>Course contents:</b> <ol style="list-style-type: none"> <li><i>1. Basic definitions, SI units, causality, laws of physics</i></li> <li><i>2. Atom, atomic composition, core, cover, base particles.</i></li> <li><i>3. Study of metabolic, regulatory and bioenergetic processes in the cell, general description of the signaling pathways in the cell, characterization of intracellular and extracellular signaling molecules and their receptors</i></li> <li><i>4. Description of regulatory and control mechanisms of cell cycle control processes, control cellular metabolism enzymes, global regulatory programs in cells (apoptosis)</i></li> <li><i>5. Phenomenology bioenergetic processes, oxidative phosphorylation</i></li> <li><i>6. Action potential. Reflex arc.</i></li> <li><i>7. Radioactivity and ionizing radiation. Establishment. Effects on living matter.</i></li> <li><i>8. Study of physico - chemical nature of physiological and pathological processes and principles of diagnosis and therapy of diseases.</i></li> <li><i>9. Physico-chemical properties of tissues and organs</i></li> <li><i>10. Characterization of sensory</i></li> <li><i>11. Detection mechanisms and causes of various diseases</i></li> <li><i>12. Share on streamlining the various therapeutic approaches</i></li> <li><i>1. Use a wide range of physical imaging in the diagnosis of various diseases</i></li> </ol>	
<b>Recommended of required reading:</b> <ol style="list-style-type: none"> <li><i>1. NAVRÁTIL, L. – ROSINA, J.: Lékařská biofyzika. Praha : MANUS, 2009. 349 p. ISBN 80-902318-5-3.</i></li> <li><i>2. HRAZDÍRA, I. - MORNSTEIN V.: Úvod do obecné a lékařské biofyziky. Brno : MU 1998. ISBN 80-210-1822-4.</i></li> </ol>	

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.

**Language:** *Slovak*

**Remarks:** -

**Evaluation history:** *Number of evaluated students - 120*

A	B	C	D	E	FX
16.67%	20.83%	20.0%	17.5%	20.0%	5.0%

**Lectures:** *doc. MUDr. Jana Slobodníková, CSc.*

**Last modification:** *22.4.2014*

**Supervisor:** *doc. MUDr. Jana Slobodníková, CSc.*