

**Table 5.2** Course specification

Type and level of studies: Bachelor of Science Degree			
<b>Course name: Regulations of Biochemical Processes</b>			
Course status: elective			
Number of ECTS credits: 5			
Requirement: none			
<p><b>Course aim</b>(1) To provide students with basic knowledge necessary to understand the function and structure of signaling pathways - from primary messengers through receptors, effector molecules, and secondary messengers to effector proteins; (2) Enable understanding of the basic principles of transduction as well as the mechanisms for their termination. (3) To provide students with basic knowledge of mechanisms involved in muscle contraction and relaxation processes, blood coagulation mechanisms, humoral immune response, tumor metastases (which are the result of intercellular communication and the stimulation of specific receptors on target cells).</p>			
<p><b>Course outcome</b> After completing the course, students will be able to: (1) describe basic pathways of signal transduction and list the biomolecules involved in the process, (2) understand the general features of signal transduction such as: specificity, sensitivity, cooperativity, signal amplification through enzymatic cascades, modularity, desensitization, integration, (3) understand a different types of cell response to different stimuli. (4) search biochemical literature (books, scientific papers, and resources from the Internet) and independently write texts on a selected topic in the field of biochemical signaling.</p>			
<p><b>Course content</b> <i>Theory</i> Ligand-receptor interactions, different types of receptors. The function of different effector molecules in the signals transmission. Production of secondary messengers. Activation of selected cytosolic proteins in the signal transmission. Mechanisms of signal termination. The role of adapter proteins. Cell-cell interactions - two way signaling by membrane proteins - integrins. Their role in immune response, blood clotting and tumor metastases. The importance of acetylcholine receptors and internal depots of Ca<sup>2+</sup> in muscle contraction and relaxation. Sensory transduction in vision, olfaction, and gustation. Oncogenes, tumor suppressor genes, programmed cell death.</p> <p><i>Practice: Practical classes, OFT, SRW</i> Animations of antibody-antigen interactions, the process of vision, GPCRs in olfaction; process of muscle contraction and relaxation. Writing and presenting a seminar paper.</p>			
<p><b>Literature</b> 1. Storey, K.B. Functional Metabolism-Regulation and adaptation. Wiley-Liss, 2004. 2. Moran, A.L., Horton A.R., Scrimgeour G., Perry M. Principles of Biochemistry (5th Ed), Pearson, 2012. 3. Krauss G. Biochemistry of Signal Transduction and Regulation, Fifth, Completely Revised Edition, Wiley-VCH, 2014.</p>			
<b>Number of classes of active teaching</b>			Other classes
Lectures: 2	Practice: 2	OFT: SRW:	
<b>Teaching methods</b> Lectures, seminar(s)			
<b>Assessment of knowledge (maximum of 100 points)</b>			
<b>Pre-exam obligations</b>	<b>Points</b>	<b>Final exam</b>	<b>points</b>
activity during lecture classes	5	written exam	45
seminars	30	oral exam	20