

Course Title	Cell Biology
Number of Lectures	23 (46 h)
Number of Seminars	12 (24 h)
Language of the Course	English
Name of the Lecturer, occupation, scientific degree	Vadim Demidchik, Doctor of Biological Sciences, Fellow of High Education Academy, UK
Lecturer's personal page	http://www.bio.bsu.by/fbr/demidchik_english.html
Goals	To introduce students to fundamental concepts of modern cell biology
Prerequisites	Physiology, biochemistry, molecular biology
Contents	<p>The diversity of cells, their key molecules of life and metabolism, key modern techniques to investigate cells, model systems to study cell processes, molecular physiology of the cell, foundations of chemistry and biochemical energetics, protein and DNA plan and chemical structure, regulation of protein functions, basics of proteomics, transcription of genes and formation of functional mRNA, molecular mechanism of the synthesis of proteins, DNA replication, cloning and characterisation, using DNA mutations to analyse protein and cell functions, transposablæ elements, regulation of eukaryote gene activity, post-tanscriptional control, visualizing cells and their components, major cell organelles, key proteins and lipids of biomembranes, ion exchange mechanisms, transport across the cell membrane, passive and active transport, physical principles of ion transport, structure, classification, function and regulation of ion channels and active transporters, types of membrane receptors and their physiological roles, transport of water thorough biomembranes, pricnciples of cell energetics, basics of photosynthesis and respiration, vesicle transport, cell walls, mechanisms of plant cell growth, endo- and exocytosis, fundamentals of cell signaling, cell surface and membrane receptors and their functions, intracellular signaling cascades and specialized pathways, role of Ca^{2+} and reactive oxygen species, sensing hormones, structure and function of cytoskeleton and 'cell to cell' contacts, biology of some specialized cells, cells and stress, programmed cell death and cell development.</p>
Teaching methodology	Lectures, essays and seminars
Recommended literature	<p>1. Lodish, H., Lodish, A. Berk, A., C.A. Kaiser, M. Krieger, M.P. Scott, A. Bretcher, H. Ploegh, P. Matsudaira (2008) Molecular Cell Biology 6th edition. W.H. Freeman and Company, New York.</p> <p>2. Alberts B., Johnson A., Lewis J., Raff M., Roberts K., Walter P. (2008) Molecular Biology of the Cell 5th Edition. Garland Publishing, New Yor.</p> <p>3. Wilson J., Hunt T (2002) Molecular Biology of the Cell: A Problem Approach 5th edition. Garland Publishing, New Yor.</p> <p>4. Becker W.N., Kleinsmith L.J., Hardin J., Bertoni G.P. (2009) The World of the Cell 7th edition. Pearson: New York.</p>
Examination methodology	Oral examination: 60%. Coursework: 40%