

Tantárgy neve		Modern biophysical methods in biology and medicine	
Kurzus kód	AOMOD42T4, FOMOD42D4		
ECTS Kredit	2		
Gyakorlat	24		
A tárgyfelvétel	Completing Biophysics and Cell Biology		
Tantárgyfelelős	Dr. Varga Zoltán		
Oktatott félév	Tavaszi		
Oktatási nyelv	Angol		
Vizsga Típusa	Gyakorlati jegy (5 fokozatú)		
Helyszín, időpont		Wednesdays, 18-20 ZOOM	
#	Week Date	Lecture	Lecturer
1-3	Week 2 2/18	Selected applications of Magnetic Resonance Imaging: exploitation of molecular motions.	Dr. Dóczy-Bodnár Andrea
4-6	Week 3 2/25	Luminescence spectroscopy. Theoretical and technical background and principles of application of fluorescence spectroscopy. Fluorescence conjugation of biomolecules, techniques based on fluorescence resonance energy transfer.	Dr. Fazekas Zsolt
7-9	Week 4 3/4	Modern microscopic methods for structural and functional characterization of cells. Theoretical background of fluorescence microscopy and image processing. Generation of scanning and wide-field images. Detectors, analog/digital conversion and digital storage of images. Digital image analysis: principles and biological applications. Principles of confocal microscopy. High resolution non-linear optical microscopy.	Dr. Vereb György
10-12	Week 5 3/11	Modern electrophysiological techniques. Passive and active electrical properties of the cell membrane, structure and function of ion channels. Principles and application of the patch clamp technique: recording ionic currents and membrane potential.	Dr. Varga Zoltán
13-15	Week 6 3/18	Structure of the cell membrane, mobility of proteins and lipids in the membrane. Novel models for the structure of the cell membrane, lipid domains. Fluorescence recovery after photobleaching (FRAP), fluorescence correlation spectroscopy and its applications. Superresolution microscopy.	Dr. Vámosi György
16-18	Week 7 3/25	Principles and applications of flow cytometry. Structure of a flow cytometer and its application fields: immunogenetics, receptor and antigen research and diagnostics, DNA and cell cycle analysis, measurement of membrane potential, membrane permeability and determination of cytosolic pH and ion concentrations, application of fluorescence resonance energy transfer to determine protein associations. (FCET).	Dr. Nagy Péter
19-21	Week 8 4/1	LSC - Laser-Scanning Cytometry (imaging cytometry, slide-based imaging cytometry). Limitations of the flow cytometry and microscopy. Comparing flow cytometry, confocal microscopy and laser-scanning cytometry. How does laser-scanning cytometry work? Strength and limitations of the laser-scanning cytometry. Laser scanning-cytometry in cell biology and clinical research.	Dr. Bacsó Zsolt
22-24	Week 12	Closing test	
<p>Med., Dent., Pharm.: practical grade, 5 levels, as follows: below 50%: fail 50%-59%: pass 60-69%: satisfactory 70-79%: good >=80%: excellent</p> <p>Molecular Biology MSc.: final exam</p> <p>Requirements for signature: attending at least 5 lectures out of 7.</p>			