

NAME	<b>MEMBRANE BIOPHYSICS</b>	COD:
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MASTER DEGREE	YEAR OF STUDY <b>1</b>	SEMESTER R <b>1</b>	STATUS OF THE DISCIPLINE (F-fundamental / S-specialisation / C-complementary) <b>S</b>	TYPE OF THE DISCIPLINE (OB-obligatory / opt-optional / facultative) <b>OB</b>
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TOTAL HOURS/WEEK				TOTAL HOURS /SEMESTER	TOTAL HOURS INDIVIDUAL ACTIVITY*	NUMBER OF CREDITS	TYPE OF EVALUATION (P-on going, C-coloquy, E-exam, M-mixt)	LANGUAGE
C	S	L	Pr.					
2		1		42	80		E	Romanian

TEACHER	TEACHING AND SCIENTIFIC DEGREE, SURNAME, NAME	DEPARTMENT
	<b>PROF. DR. DAN FLORIN MIHAILESU</b>	<b>DAFAB</b>

BACKGROUND	Biophysics, Cell Biology
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OBJECTIVES	Advanced knowledge in molecular structure and dynamics of biomembranes in normal and pathological conditions
SUBJECTS	<ol style="list-style-type: none"> <li>1. Reference data bases; software for visualization and computations biomembranes structure and dynamics</li> <li>2. General structure of biomembranes; membrane proteins; 3D structure of membrane proteins; experimental methods; basics of X-ray crystallography</li> <li>3. Order and dynamics in biomebranes. Experimental techniques</li> <li>4. Membrane lipids, cholesterol. Amphiphilic molecules, hydrophobic effect, phase transitions. Membrane models (monolayer, bilayer, micelles, liposomes)</li> <li>5. Liposomal drug delivery</li> <li>6. Lipid- protein interactionApa in biomembrane.</li> <li>7. Water in biomebranes, aquaporines</li> <li>8. Molecular dynamic simulations of biomebranes</li> <li>9. Permeability and conductance. (Electro)Diffusion</li> <li>10. Electrolytes in medicine</li> <li>11. Specific and non-specific binding, implications of membranes surface electric charge</li> <li>12. Membrane electrostatics, membrane potential, electric dipol potential of membrane</li> </ol>
EXPERIMENTS	<ol style="list-style-type: none"> <li>1. Experimental models of biomembranes (monolayer, bilayer)</li> <li>2. Active transport</li> <li>3. Noise analysis in biomembranes</li> <li>4. 3D structure and dynamics of biomembranes</li> <li>5. Building a computational model of membranes; energy minimization</li> </ol>

TEACHING METHODS	Interactive lectures, simulations and animations; virtual experiments. Scientific literature presentations and debates
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REFEENCES	<p>1. Fundamental Principles of Membrane Biophysics. Navid Njus (<a href="ftp://202.131.109.94/Bio-%20Tech%20Department/E-book%20Collection/Fundamental%20Principles%20of%20Membrane%20Biophysics.pdf">ftp://202.131.109.94/Bio-%20Tech%20Department/E-book%20Collection/Fundamental%20Principles%20of%20Membrane%20Biophysics.pdf</a>)</p> <p>2. Membrane Biophysics,. Mohammad Ashrafuzzaman, Jack A. Tuszynski. Springer; 2012</p>
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EVALUATION	conditions	Laboratory experiments, reports on lab activities
	criteria	Progress of theoretical knowledge and practical skills of each student
	forms	Written evaluation – final exam
	formula of the final grade	<p>a) Final theoretical evaluation b) Test during laboratory activities c) Final laboratory test Optional: d) reviews and oral presentations during lecture or scientific meetings <math>a \times 0.6 + (b+c) \times 0.4</math> An extra point is obtained for d)</p>

Specific competences *	
<b>1. Competences about learning and understanding</b>	<ul style="list-style-type: none"> <li>- knowing and correctly using specific terms for this subject</li> <li>- understanding fundamental processes in ethology</li> <li>- identification of terms, relationships, processes based on the knowledge acquired</li> <li>- acquire basic and specific knowledge</li> </ul>
<b>2. Competences about explanation and interpretation</b>	<ul style="list-style-type: none"> <li>- explaining and interpreting processes and theoretical ideas specific to the subject</li> <li>- generalizing, particularization, integration of the information</li> <li>- making connections between results</li> <li>- ability to analyze and synthesize information</li> </ul>
<b>3. Instrumental competences</b>	<ul style="list-style-type: none"> <li>- connections between different types of representations, between representations and object</li> <li>- describing states, systems, processes, phenomena</li> <li>- ability to put into practice the theoretical knowledge</li> <li>- research abilities</li> </ul>
<b>4. Competences about attitude</b>	<ul style="list-style-type: none"> <li>- developing positive attitudes and responsibility towards science</li> <li>- getting involved in its own personal development</li> <li>- implication in scientific activities related to the subject</li> <li>- ability to collaborate</li> </ul>

Prof. dr. Dan Mihailescu