

Course Title	Systems Biomedicine				
Course Code	BMS405				
Course Type	Compulsory				
Level	Bachelor (1st Cycle)				
Year / Semester	4 <sup>th</sup> Year / 7 <sup>th</sup> Semester				
Teacher's Name	TBA				
ECTS	6	Lectures / week	3 Hours	Laboratories / week	0 Hours
Course Purpose and Objectives	<p>As knowledge of genome and gene expression deepens and lists of molecules (proteins, lipids, ions) involved in cellular processes are being developed, the need to understand how these molecules interact with each other to form modules that act as discrete functional systems arises. The main objective of the course is the introduction of students to the fundamentals of systems biomedicine, primarily as a discipline based on the analysis of dynamical interactions among individual members of a biological system aiming to the understanding of the system as a whole, and not merely its individual components.</p>				
Learning Outcomes	<p>Upon the successful completion of the course, the students will be able to:</p> <p>comprehend the basic terms used in systems biomedicine</p> <p>describe modern laboratory approaches based on '-omics' methods and their importance in identifying key factors in diseases development</p> <p>integrate the '-omics' results into a meaningful whole and define the global model of biological processes responsible for disease development</p> <p>learn about the usage of global '-omics' methods in early diagnostics, prognostics and drug development</p>				
Prerequisites	BMS100, BMS320	Co-requisites	None		
Course Content	<p><b><u>Theory:</u></b></p> <p>Modern experimental approaches in disease research based on simultaneous analysis of thousands of genes/proteins/metabolites and their interactions in a living system</p> <p>Monitoring of biological system functions in four dimensions (space and time)</p> <p>The importance of visualization (i.e. 'imaging') in systems biomedicine</p> <p>Fundamentals of global, comprehensive '-omics' methods (DNA-chips, RT-PCR, proteomics methods) in studying molecular pathological processes</p>				

	The role of '-omics' methods in early diagnostics, prognostics, disease development, discovery of new molecular targets for treatment as well as in research on drug mechanisms of action and drug safety Fundamentals of bioinformatics in systems biomedicine										
Teaching Methodology	Face- to- face										
Bibliography	<p>Systems Biomedicine, Concepts and Perspectives Edison Liu Douglas Lauffenburger 1<sup>st</sup> Edition, Academic Press <b>ISBN:</b> 9780123725509.</p> <p>Frontiers Research Topics. Comprehensive Systems Biomedicine. December 2014. Topic Editors, Enrico Capobianco and Pietro Lio. ISSN 1664-8714, ISBN 978-2-88919-374-5 DOI 10.3389/978-2-88919-374-5.</p>										
Assessment	<table border="1"> <tr> <td>Mid – Term Examination</td> <td>30%</td> </tr> <tr> <td>Final Examination</td> <td>40%</td> </tr> <tr> <td>Assignments/Lab</td> <td>20%</td> </tr> <tr> <td>Class Participation</td> <td>10%</td> </tr> <tr> <td></td> <td>100%</td> </tr> </table>	Mid – Term Examination	30%	Final Examination	40%	Assignments/Lab	20%	Class Participation	10%		100%
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	100%										
Language	English										

