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Course unit (module) title	Code
Science Forum I	

Lecturer(s)	Department(s) where the course unit (module) is delivered
Coordinators: Audronė Jakaitienė, PhD **Tuitors:** Osvaldas Rukšėnas, Habil. PhD., Allan Rasmusson, PhD; Björn A. Grüning, PhD; E. Pranckevičienė, PhD; Daiva Petkevičiūtė-Gerlach, PhD.	Joined forces from different research units

Study cycle	Type of the course unit (module)
Second cycle	Compulsory

Mode of delivery	Period when the course unit (module) is delivered	Language(s) of instruction
Face-to-face, self-study Lectures, seminars and practice	2nd semester	English

Requirements for students	
Prerequisites:	**Additional requirements (if any):**

Course (module) volume in credits	Total student's workload	Contact hours	Self-study hours
5	134	50	84

Purpose of the course unit (module): programme competences to be developed		
The aim of the course is to develop the ability to critically evaluating the latest research achievements, to discuss the latest scientific issues and problems in systems biology, *to be informed in advances in systems biology science.*		
Learning outcomes of the course unit (module)	**Teaching and learning methods**	**Assessment methods**
1.1., 3.1. Be prepared to discuss advanced topics in cell structure and behavioural patterns at the molecular level, the functions of human organs and systems, the mechanisms of physiological regulation and applications of genomics, proteomics, transcriptomics and epigenomics.	Lectures, debates, group discussion, practical assignments, e-conferences with nominated lectures	Completion of practical assignments; Written examination.
2.1. Be able to develop innovating concepts and projects for fundamental or applied research in order to solve arising system biology issues.		
2.1. Be able to gather and analyse information on subjects related to system biology with a critical approach, and to carry out a technological watch.		
4.1. Perform duties within the deadlines and goals of a project		
4.1. Perform practical and theoretical work in system biology in accordance with the bioethics requirements.		
4.2. Have summarising skills enabling them to communicate in a clear manner with specialists from other fields or the public about professional project, on work results, or about the results of tasks.		

5.1 Be able to work autonomously and as a part of a multidisciplinary team; act honestly and according to ethical obligations		
5.2. Be able to critically analyse their own research quantitative results and know possible ways for improvement		

Content: the possible topics	Contact hours							Self-study work: time and assignments	
	Lectures	Tutorials	Seminars	Exercises	Laboratory work	Internship/work placement	Contact hours	Self-study hours	Assignments
Research methods in Systems biology Tutors: O. Rukšėnas; A. Jakaitienė	4		4				**8**	**32**	Self-study of Tutorials material provided by the lecturer. Reading material in web pages provided by a professor and prepare for the class discussion.
Omics data analysis with GALAXY Tutors: Björn A. Grüning, E. Pranckevičienė	8			8			**16**	**20**	Study lecturers' provided material. Preparation for practical exercises.
Mathematical modelling of DNA mechanics Tutor: D. Petkevičiūtė-Gerlach	4			4			**8**	**10**	Study lecturers' provided material. Preparation for practical exercises.
Image Analysis in Systems Biology Tutors: Allan Rasmusson, PhD	8		2	8			**18**	**22**	Study lecturers' provided material. Preparation for practical exercises.
Total	**24**		**6**	**20**			**50**	**84**	

Assessment strategy	Weight,%	Deadline	Assessment criteria
Research methods in Systems biology			
Written proposal for a research project	35%	In June	Students should submit proposal for a research project based on their master thesis (prepared according to the rules presented and the template provided at the lecture). The following parts of the proposal will be evaluated:

			• a concise presentation of the scientific proposal, with particular attention to the importance of the research project (30%), • the feasibility of the outlined scientific approach (30%) • description of the proposed work in the context of the state of the art of the field (30%) • references to literature should also be included (10%). Maximum length of the proposal is 3 pages without title and reference.
Omics data analysis with GALAXY			
Written examination	25%	During the course; At the end of the course	Accumulative score: • A comprehensive assessment of scientific publications (10%) • An activities during exercises (10%). • Open problem-based complex questions testing both theoretical knowledge and practical skills obtained during lecturers and exercises (80%).
Mathematical modelling of DNA mechanics			
Assessment in Written	15%	At the of the topic	Solving practical assignments. The scoring for each assignment is given. Maximum grade of the assessment is 10 points. The evaluation criteria of exam questions are presented to the students in writing at the end of a first day.
Image analysis			
Practical Project with Written Report	25%	At the of the course	Weekly exercises consist of writing summaries for each topic and practical implementations in Python. Final assessment is a report of all summaries and description of how the implementations were used to solved some idealized real-world problems.
Final grade	**100**	**At the end of the course**	**Final grade of the course is weighted average of all activities.**

Author	**Year of publication**	**Title**	**Issue of a periodical or volume of a publication**	**Publishing place and house or web link**
Compulsary reading				
Janice R. Matthews and Robert W. Matthews	2008	Successful Scientific Writing: A Step-by-Step Guide for the Biological and Medical Sciences	Third Edition	Cambridge University Press
Uri Alon	2019	An Introduction to Systems Biology: Design Principles of Biological Circuits	2nd Edition	Chapman & Hall/CRC Mathematical and Computational Biology
D. Petkevičiūtė	2012	A DNA Coarse-Grain Rigid Base Model and Parameter Estimation from Molecular Dynamics Simulations		PhD Thesis
Rafael C. Gonzalez and Richard E. Woods	2002	Digital Image Processing		Prentice Hall, Available at VU Library

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