


KAPITAŁ LUDZKI
 NARODOWA STRATEGIA SPÓJNOŚCI

 Projekt współfinansowany przez
 Unię Europejską w ramach
 Europejskiego Funduszu
 Społecznego

UNIA EUROPEJSKA
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 FUNDUSZ SPOŁECZNY


Course title		ECTS code	
Omics analysis in chemoinformatics		13.3.1304	
Name of unit administrating study			
null			
Studies			
faculty	field of study	type	drugiego stopnia
Wydział Chemii	Chemia	form	stacjonarne
		specjalty	Digital Chemistry
		specialization	wszystkie
Teaching staff			
dr Agnieszka Gajewicz-Skrętna; dr inż. Karolina Jagiełło; prof. dr hab. Tomasz Puzyn; dr Alicja Mikołajczyk; Klaudia Chmielewska			
Forms of classes, the realization and number of hours		ECTS credits	
Forms of classes		2	
Auditorium classes		auditorium classes - 30 h	
The realization of activities		student's own work – 10 h	
classroom instruction		tutorial classes – 10 h	
Number of hours		Total: 50 h - 2 ECTS	
Auditorium classes: 30 hours			
The academic cycle			
2023/2024 summer semester			
Type of course		Language of instruction	
an elective course		English	
Teaching methods		Form and method of assessment and basic criteria for evaluation or examination requirements	
<ul style="list-style-type: none"> In the computational laboratory students will conduct hands on exercises project-based method (research, implementation, practical project) 		Final evaluation	
		Graded credit	
		Assessment methods	
		completion of the final project - completion of all assigned projects during classes in the computer lab - written report for each assigned project	
		The basic criteria for evaluation	
		Assessment criteria in accordance with the University of Gdańsk Study Regulations - correctness of the reports on assigned projects, the final grade of the lab. is based on the partial grades received from each report and presentation of the final project; failure to complete the experimental part means failing the laboratory exercises	
Method of verifying required learning outcomes			
Required courses and introductory requirements			
A. Formal requirements			
none			
B. Prerequisites			
Repetitory in mathematics; Repetitory in general and inorganic chemistry, Repetitory in organic chemistry and biochemistry			
Aims of education			
Familiarizing the students with techniques of omics data analysis and their importance in predicting biological responses induce by stressor at the molecular level			
Familiarizing the students with Python/R scripts used in omics data analysis			
Course contents			

<p>Introduction to available transcriptomic/proteomic/metabolomic databases, e.g., AOPWiki, GEO databases</p> <p>Curation and preprocessing of omics data.</p> <p>Advanced unsupervised and supervised method in omics data analysis</p> <p>Adverse Outcome Pathways – the novel approach in selecting endpoints for chemoinformatic models</p> <p>Tools for determining doses induced perturbation in gene expression</p> <p>Predicting biological response induced by stressor at the molecular level</p>	
<p>Bibliography of literature</p> <p>Literature required to pass the course</p> <p>Scientific publication in the field</p> <p>B. Extracurricular readings</p> <p>S.P. Putri, E. Fukusaki (Eds) "Mass Spectrometry-Based Metabolomics: A Practical Guide", CRC Press, Taylor & Francis, Boca Raton, 2014</p> <p>N. Lutz, J. Sweedler, R. Wevers "Methodologies for Metabolomics : Experimental Strategies and Techniques", Cambridge University Press, Nowy Jork, 2012</p>	
<p>The learning outcomes (for the field of study and specialization)</p> <p>K_W03: demonstrates in-depth knowledge in the field of modern measuring techniques used in chemical analysis</p> <p>K_W04: applies the acquired knowledge to an in-depth description of the properties of chemical connections, methods of their synthesis and analysis</p> <p>K_W11: demonstrates in-depth knowledge about the current trends in the development of chemistry as a science and the latest discoveries in this field</p> <p>K_U04: applies acquired knowledge of chemistry and related scientific disciplines</p> <p>K_U05: presents the results of research in the form of an independently written paper containing a description and justification of the purpose of the work, adopted methodology, results and their significance in comparison to other similar research</p> <p>K_U06: presents the results of scientific discoveries in chemistry and related disciplines in an understandable way</p> <p>K_K04: correctly identifies and resolves dilemmas related to the profession of a chemist</p>	<p>Knowledge</p> <p>At the end of the course every student:</p> <p>Knows advanced methods applied for omics data curation, preprocessing and analysis</p> <p>knows basic software packages to be used for omics data analysis</p>
	<p>Skills</p> <p>At the end of the course every student:</p> <p>uses Python/R environment for omics data analysis and applying them for chemoinformatic models</p> <p>correctly interprets the results based on omics data</p>
	<p>Social competence</p> <p>At the end of the course every student:</p> <p>is convinced that the use of omics data strengthens the predicting biological response induced by chemicals at the molecular level</p> <p>can critically evaluate experimental results and understand the necessity of their control</p> <p>understands the need of deeper learning in computational data analysis and developing predictive models</p>
	<p>Contact</p> <p>agnieszka.gajewicz@ug.edu.pl</p>