KAPITAŁ LUDZKI
NARODOWA STRATEGIA SPÓJNOŚCI

Projekt współfinansowany przez Unię Europejską w ramach Europejskiego Funduszu Społecznego

UNIA EUROPEJSKA
EUROPEJSKI FUNDUSZ SPOŁECZNY

Course title	ECTS code
Omics analysis in chemoinformatics	13.3.1304

Name of unit administrating study

null

Studies

faculty	field of study		
Faculty of Chemistry	Chemistry	type	second tier studies (MA)
		form	full-time
		specialty	all
		specialization	all

Teaching staff

dr Agnieszka Gajewicz-Skrętna; prof. dr hab. Tomasz Puzyn; mgr Alicja Mikołajczyk; dr inż. Karolina Jagiełło

Forms of classes, the realization and number of hours

Forms of classes

Auditorium classes

The realization of activities

classroom instruction

Number of hours

Auditorium classes: 30 hours

ECTS credits

2
auditorium classes - 30 h
student's own work – 10 h
tutorial classes – 10 h

Total: 50 h - 2 ECTS

The academic cycle

2022/2023 summer semester

Type of course

an elective course

Language of instruction

english

Teaching methods

•In the computational laboratory students will conduct hands on exercises
•project-based method (research, implementation, practical project)

Form and method of assessment and basic criteria for eveluation or examination requirements

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

presentation of the final project (K_W03, K_W04, K_W11)
- Discussion with the students (K_U04, K_U05, K_U06).
- Observation of the student's behavior during classes and during consultations. (K_K04).

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

Introduction to available transcriptomic/proteomic/metabolomic databases, e.g., AOPWiki, GEO databases
Curation and preprocessing of omics data.
Advanced unsupervised and supervised method in omics data analysis
Adverse Outcome Pathways – the novel approach in selecting endpoints for chemoinformatic models
Tools for determining doses induced perturbation in gene expression
Predicting biological response induced by stressor at the molecular level

Bibliography of literature

Literature required to pass the course
Scientific publication in the field
B. Extracurricular readings
S.P. Putri, E. Fukusaki (Eds) "Mass Spectrometry-Based Metabolomics: A Practical Guide", CRC Press, Taylor & Francis, Boca Raton, 2014
N. Lutz, J. Sweedler, R. Wevers "Methodologies for Metabolomics : Experimental Strategies and Techniques", Cambridge University Press, Nowy Jork, 2012

The learning outcomes (for the field of study and specialization)

K_W03: demonstrates in-depth knowledge in the field of modern measuring techniques used in chemical analysis

K_W04: applies the acquired knowledge to an in-depth description of the properties of chemical connections, methods of their synthesis and analysis

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

K_U04: applies acquired knowledge of chemistry and related scientific disciplines

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

K_U06: presents the results of scientific discoveries in chemistry and related disciplines in an understandable way

K_K04: correctly identifies and resolves dilemmas related to the profession of a chemist

Knowledge

At the end of the course every student:
Knows advanced methods applied for omics data curation, preprocessing and analysis
knows basic software packages to be used for omics data analysis

Skills

At the end of the course every student:
uses Python/R environment for omics data analysis and applying them for chemoinformatic models
correctly interprets the results based on omics data

Social competence

At the end of the course every student:
is convinced that the use of omics data strengthens the predicting biological response induced by chemicals at the molecular level
can critically evaluate experimental results and understand the necessity of their control
understands the need of deeper learning in computational data analysis and developing predictive models

Contact

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