


KAPITAŁ LUDZKI
 NARODOWA STRATEGIA SPÓJNOŚCI

 Projekt współfinansowany przez
 Unię Europejską w ramach
 Europejskiego Funduszu
 Społecznego

UNIA EUROPEJSKA
 EUROPEJSKI
 FUNDUSZ SPOŁECZNY


Course title		ECTS code	
Introduction to R programming		13.3.1294	
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			
prof. dr hab. Tomasz Puzyn; Klaudia Chmielewska; dr Alicja Mikołajczyk; dr inż. Karolina Jagiełło; dr Agnieszka Gajewicz-Skrętna			
Forms of classes, the realization and number of hours		ECTS credits	
Forms of classes		5	
Laboratory classes, Lecture		Lecture – 15 h	
The realization of activities		Laboratory classes - 45 h	
classroom instruction		Student's own work – 30 h	
Number of hours		Tutorial classes – 35 h	
Lecture: 15 hours, Laboratory classes: 45 hours		TOTAL: 125 h – 5 ECTS	
The academic cycle			
2023/2024 summer semester			
Type of course		Language of instruction	
obligatory		English	
Teaching methods		Form and method of assessment and basic criteria for evaluation or examination requirements	
<ul style="list-style-type: none"> - critical incident (case) analysis - discussion - group work - multimedia-based lecture 		Final evaluation	
		<ul style="list-style-type: none"> - Graded credit - Examination 	
		Assessment methods	
		Lecture – exam with multiple-choice questions	
		Laboratory classes – written reports	
		The basic criteria for evaluation	
		according to “Rules and regulations for studies at the University of Gdansk”	
		Lectures: passing the final exam in the form of a multiple-choice question test (a score of 50% or more required to pass the exam).	
		Lab classes: the arithmetic mean of partial grades received during the semester for written reports on laboratory exercises.	
Method of verifying required learning outcomes			
Required courses and introductory requirements			
A. Formal requirements			
none			
B. Prerequisites			
none			
Aims of education			
familiarize students with the R programming language and software environment			
presenting the benefits of using R for exploratory data analysis and data visualizations			

familiarize students with basic R programming concepts to automate data analysis and data visualizations	
Course contents	
The course covers practical issues in statistical computing, exploratory data analysis and data visualizations which includes introduction to R programming (basic data structures; data inspection and manipulation; data formatting and analysis; accessing add-on R packages (how to find, install, and work with them), visualization in R (methods for graphing data), introduction to basic programming structures (writing R functions; loops, if-else statements; organizing and commenting R code; writing documents with R Markdown).	
Bibliography of literature	
Literature required to pass the course	
Teetor S. 25 Recipes for Getting Started with R: Excerpts from the R Cookbook. O'Reilly Media, 2011	
Murray S. Learn R in a Day. SJ Murray, 2013	
Extracurricular readings	
Mahoney M. Introduction to Data Exploration and Analysis with R, 2019	
Peng R.D. (2020). R Programming for Data Science, 2020	
The learning outcomes (for the field of study and specialization)	Knowledge
	Skills
	Social competence
	Contact

K_W06:
applies mathematics to the extent necessary to understand, describe and model chemical processes of extended complexity

K_W08:
demonstrates in-depth knowledge of theoretical computational and IT methods used to solve problems in chemistry

K_W09:
classifies specialist IT tools used in statistical evaluation of experiment results

K_U02
critically assesses the results of conducted, performed observations and theoretical calculations and discusses errors

K_U03
finds necessary information in specialist literature, databases and other sources, lists basic scientific journals in chemistry

K_K02
works in a team taking on various roles in it

K_K06
raises her/his professional and personal competences by using information provided in various sources

At the completion of this course, the student is expected to be able to:
know and understand the fundamental programming concepts in R,
describe and summarize the differences between R, RStudio and RStudioCloud,
know the most important and useful R functions and R packages for data manipulations, exploratory data analysis and data visualizations,
know the benefits of using R for data analysis.

At the completion of this course, the student is expected to be able to:
use the fundamental R functions and R packages for data manipulation, exploratory data analysis and data visualizations,
use web resources such as CRAN, Github or Bioconductor to find, install and load the suitable packages,
analyze, interpret and modify (whenever needed) the existing R scripts,
write scripts and loop functions to automate data formatting, analysis and visualizations,
design and establish custom approaches for analyzing, visualizing and interpreting obtained results,
use help pages such as StackOverflow to find relevant information, understand commands and solve problems.

At the completion of this course, the student is expected to be able to:
feel empowered and inspired to learn more R on their own and/or within a community of R users,
appreciate the benefits of working with the R programming language and software environment and strive to increase the attractiveness and transparency of their research,
develop interpersonal skills such as communication, cooperation in group (taking different roles), and problem-solving abilities,
understand the principles of working safely, responsibly, and efficiently using the workstations connected to the Internet,
understand the social aspects of practical use of knowledge and abilities as well as connected with them responsibility.

Contact
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