University of Gdańsk

Subject card

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| Subject name and code | Introduction to R programming, PG_00117806 | | | | | | |
| Field of study | Chemistry | | | | | | |
| Date of commencement of studies | October 2024 | | Academic year of realisation of subject | 2024/2025 | | | |
| Education level | postgraduate studies | | Subject group | Obligatory subject group in the field of study | | | |
| Mode of study | full-time studies | | Mode of delivery | at the university | | | |
| Year of study | 1 | | Language of instruction | English | | | |
| Semester of study | 2 | | ECTS credits | 3.0 | | | |
| Learning profile | academic | | Assessment form | | | | |
| Conducting unit | | | | | | | |
| Name and surname of lecturer (lecturers) | Subject supervisor | | dr hab. Agnieszka Gajewicz-Skrętna | | | | |
| | Teachers | | | | | | |

| Lesson types | Lesson type | Lecture | Tutorial | Laboratory | Project | Seminar | SUM |
|---|---|---|---|---|---|---|---|
| | Number of study hours | 0.0 | 0.0 | 45.0 | 0.0 | 0.0 | 45 |
| | E-learning hours included: 0.0 | | | | | | |

| Learning activity and number of study hours | Learning activity | Participation in didactic classes included in study plan | Participation in consultation hours | Self-study | SUM |
|---|---|---|---|---|---|
| | Number of study hours | 45 | 8.0 | 22.0 | 75 |

**Subject objectives**

**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

## Learning outcomes

| Course outcome | Subject outcome | Method of verification |
|---|---|---|
| [CHEMMU2_U03] Finds necessary information in specialist literature, databases and other sources, lists basic scientific journals in chemistry. | At the completion of this course, the student is expected to use web resources such as CRAN, Github or Bioconductor to find, install and load the suitable packages. | [SU2] presentation/project/paper/ report<br>[SU5] implementation of a problem task |
| [CHEMMU2_W06] Applies mathematics to the extent necessary to understand, describe and model chemical processes of medium complexity. | At the completion of this course, the student is expected to know and understand the fundamental R functions for data manipulation, exploratory data analysis and data visualizations. | [SW2] presentation/project/paper/ report<br>[SW5] implementation of a problem task |
| [CHEMMU2_K02] Works in a team taking on various roles in it. | At the completion of this course, the student is expected to develop interpersonal skills such as communication, cooperation in group (taking different roles), and problem-solving abilities. | [SK2] presentation/project/paper/ report<br>[SK8] observation of student's independent or team work |
| [CHEMMU2_U02] Critically assesses the results of conducted, performed observations and theoretical calculations and discusses errors. | At the completion of this course, the student is expected to design and establish custom approaches for analyzing, visualizing and critical interpreting obtained results, as well as use help pages such as StackOverflow to find relevant information and/or solve problems. | [SU2] presentation/project/paper/ report |
| [CHEMMU2_K06] Undertakes research tasks consciously and responsibly, understanding the social aspects of the practical application of the acquired knowledge and skills and the responsibility related to it. | At the completion of this course, the student is expected to understand the principles of working safely, responsibly, and efficiently using the workstations connected to the Internet, as well as understand the social aspects of practical use of knowledge and abilities as well as connected with them responsibility. | [SK2] presentation/project/paper/ report<br>[SK5] implementation of a problem task |
| [CHEMMU2_W08] Demonstrates knowledge of theoretical computational and IT methods used to solve problems in chemistry. | At the completion of this course, the student is expected to know the most important and useful R functions and R packages for data manipulations, exploratory data analysis and data visualizations. | [SW2] presentation/project/paper/ report<br>[SW5] implementation of a problem task |
| [CHEMMU2_W09] Classifies specialist IT tools used in statistical evaluation of experiment results. | At the completion of this course, the student is expected to describe and summarize the differences between R, RStudio and RStudioCloud. | [SW2] presentation/project/paper/ report<br>[SW5] implementation of a problem task |

## Subject 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).

## Prerequisites and co-requisites

## Assessment methods and criteria

| Subject passing criteria | Passing threshold | Percentage of the final grade |
|---|---|---|
| test | 51.0% | 100.0% |

## Recommended reading

| | |
|---|---|
| Basic literature | • Teetor S. 25 Recipes for Getting Started with R: Excerpts from the R Cookbook. O'Reilly Media, 2011<br>• Murray S. Learn R in a Day. SJ Murray, 2013 |
| Supplementary literature | • Mahoney M. Introduction to Data Exploration and Analysis with R, 2019<br>• Peng R.D. (2020). R Programming for Data Science, 2020 |
| eResources addresses | Adresy na platformie eNauczanie: |

## Example issues/ example questions/ tasks being completed

## Work placement

Not applicable

Document generated electronically. Does not require a seal or signature.