

Course title: Programming in data analysis

ECTS credit allocation (and other scores): 4.5

Semester: autumn

Level of study: ISCED-7 - second-cycle programmes (EQF-7)

Branch of science: Natural sciences

Language: English/Polish

Number of hours per semester: 15 lectures + 45 classes = 60 hours

Course coordinator/ Department and e-mail: Mariusz Bodzioch / WMil, mariusz.bodzioch@matman.uwm.edu.pl

Type of classes: classes and lectures

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#### Substantive content

**CLASSES:** An introduction to a selected programming language with a particular focus on its applications in data analysis. Data types. Data formats. Data transformation. Data analysis. Data visualisation. Time series analysis.

**LECTURES:** An introduction to a selected programming language with a particular focus on its applications in data analysis. Data types. Data formats. Data transformation. Data analysis. Data visualisation. Time series analysis.

**Learning purpose:** To learn the fundamentals of programming in data analysis in a selected computational environment using text-based programming.

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On completion of the study programme the graduate will gain:

**Knowledge:** The student knows and understands the fundamentals of work in a selected programming environment and the basic data analysis problems.

**Skills:** The student can apply a selected programming environment to visualise and analyse data.

**Social Competencies:** The student is prepared to perceive reality processes through the prism of data analysis; independently form opinions concerning the information technology and IT tools, and independently search for information.

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**Basic literature:** 1) H. Wickham, G. Grolemund, R for Data Science. Import, Tidy, Transform, Visualize, and Model Data, Helion, 2016; 2) N. Zumel, J. Mount, Practical Data Science with R, Manning, 2014; 3) T. Nield, Essential Math for Data Science, O'Reilly Media, 2022; 4) D. Freeman, J. Ross, Programming Skills for Data Science: Start Writing Code to Wrangle, Analyze, and Visualize Data with R: Core Skills for Quantitative Analysis with R and Git, Pearson Education, 2018.

**Supplementary literature:** 1) P. Bruce, A. Bruce, P. Gedeck, Practical Statistics for Data Scientists. 50+ Essential Concepts Using R and Python. 2nd Edition, O'Reilly Media, 2020; 2) M. Walesiak, E. Gantar, Statystyczna analiza danych z wykorzystaniem programu R, PWN, 2009.

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The allocated number of ECTS points consists of:

Contact hours with an academic teacher: 2.38 ECTS points.

Student's independent work: 2.12 ECTS points.