

Course Syllabus

Course from study programme for the cycle: 2022/2023

I. General Information

Course name	Multidimensional data analysis
Programme	Informatics/Mathematics
Level of studies (BA, BSc, MA, MSc, long-cycle MA)	MA/BA
Form of studies (full-time, part-time)	Full-time
Discipline	Informatics, Mathematics
Language of instruction	English

Course coordinator	dr Małgorzata Nowak-Kępczyk
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Type of class (<i>use only the types mentioned below</i>)	Number of teaching hours	Semester	ECTS Points
lecture	30	INF: I, II, III MAT: VI	INF: 6 MAT: 5
tutorial			
classes			
laboratory classes	30	INF: I, II, III MAT: VI	
workshops			
seminar			
introductory seminar			
foreign language classes			
practical placement			
field work			
diploma laboratory			
translation classes			
study visit			

Course pre-requisites	Statistical analysis of data or descriptive statistics or mathematical statistics. 89 / 5 000 Not available for students who have completed the subject of "Wielowymiarowa analiza danych"
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II. Course Objectives

C1. Introduction to the basic methods of multidimensional data analysis
C2. Developing the skills of proper interpretation of multidimensional data

III. Course learning outcomes with reference to programme learning outcomes

Symbol	Description of course learning outcome	Reference to programme learning outcome
KNOWLEDGE		
W_01	Student has structured knowledge in the field of multidimensional data analysis methods	INF:K_W01,K_W02, K_W04 MAT: K_W08, K_W09
W_02	Student distinguishes and selects methods for specific needs	INF: W01,K_W02, K_W04 MAT: K_W09
SKILLS		
U_01	Student performs cluster analysis (data clustering)	INF: K_U01, K_U02, K_U03, K_U05, K_U07, K_U09, K_U17 MAT: K_U35
U_02	Student explains the results obtained by applying principal component analysis (PCA), linear discriminant analysis (LDA), classification or scaling	INF: K_U01, K_U02, K_U03, K_U05, K_U07, K_U09, K_U17 MAT: K_U35
SOCIAL COMPETENCIES		
K_01	Student knows the limitations of his own knowledge and understands the need for continuing learning	INF: K_K01, K_K03, K_K06 MAT: K_K01
K_02	Student understands the need for systematic work and meeting deadlines of performed tasks	INF: K_K04, K_K05 MAT: K_K02, K_K05

IV. Course Content

<p>Data clustering analysis Factor analysis PCA - principal component analysis LDA - linear discriminant analysis Canonical correlation analysis Decision tree learning Multidimensional scaling</p>
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V. Didactic methods used and forms of assessment of learning outcomes

Symbol	Didactic methods (choose from the list)	Forms of assessment (choose from the list)	Documentation type (choose from the list)
KNOWLEDGE			
W_01	Conversational lecture	Exam/ tests	Evaluated exam/ test
W_02	Conversational lecture	Exam/ tests	Evaluated exam/ test

SKILLS			
U_01	Laboratory classes/ Project-based learning design thinking	Presentation/test	Project rating card/ evaluated test
U_02	Laboratory classes/ Project-based learning design thinking	Presentation/test	Project rating card/ evaluated test
SOCIAL COMPETENCIES			
K_01	Discussion design thinking	Observation	Observation report
K_02	Discussion design thinking	Observation	Observation report

VI. Grading criteria, weighting factors.....

Lecture.

The completion of laboratory classes is required. Final grade based on written exam

90 – 100% (5,0)

80 – 89% (4,5)

70 – 79% (4,0)

60 – 69% (3,5)

50 – 59% (3,0)

less than 51% (2,0)

Laboratory classes.

At least 80% of attendance required. Final grade based on two tests and project

90 – 100% (5,0)

80 – 89% (4,5)

70 – 79% (4,0)

60 – 69% (3,5)

50 – 59% (3,0)

less than 51% (2,0)

Further details shall be given during the laboratory classes and lecture.

VII. Student workload

Form of activity	Number of hours
Number of contact hours (with the teacher)	Lecture: 30 hrs. Laboratory classes: 30 hrs. Individual consultations: 30 hrs. In total: 90 hrs.
Number of hours of individual student work	Preparation for classes: 30 hrs. Studying books: 30 hrs. Preparation for tests and exams: 30 hrs. In total: 90 hrs.

VIII. Literature

Basic literature
Documentation of statistical packages used during lectures and laboratory classes
Additional literature
Foster Provost, Tom Fawcett, Data Science for Business: What You Need to Know about Data Mining and Data-Analytic Thinking. Joel Grus, Data Science from Scratch: First Principles with Python.