DOCTORAL SCHOOL OF WROCŁAW UNIVERSITY OF SCIENCE AND TECHNOLOGY

SUPERVISOR DECLARING/CONDUCTING COURSE: prof. dr hab. inż. Krzysztof Bogdan
FACULTY OF PURE AND APPLIED MATHEMATICS, DEPARTMENT OF PURE MATHEMATICS

COURSE CARD

Course name in Polish: Nowoczesne techniki matematyczne, statystyczne i informatyczne – cz. 1
Course name in English: Modern Mathematical, Statistical and Numerical Techniques in Science – Part 1
Course language: Polish
University-wide general course type:
1) basic science course (mathematics, physics, chemistry, computer science or other): mathematics
Subject code: MAQ100123W

	Lecture	Foreign language course	Seminar	Mixed forms
Number of hours of organized classes in university (ZZU)	30			
Grading	Exam			

PREREQUISITES RELATING TO KNOWLEDGE, SKILLS AND OTHER COMPETENCES

1. Completed courses in mathematical analysis and linear algebra.

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COURSE OBJECTIVES

C1 Mastering knowledge and skills in the field of statistical and IT data analysis.

PROGRAM CONTENTS

Form of classes – lecture (Lec)		Number of hours
Lec1	Exploratory data analysis	2
Lec2	Available data sets and sampling methods	2
Lec3	Probability models and selected elements of mathematical analysis	4
Lec4	Basic statistical inferences: confidence intervals and significance tests	4
Lec5	Monte Carlo Methods 1	2
Lec6	Midterm 1	2
Lec7	Linear regression and selected elements of linear algebra	4
Lec8	Analysis of variance	4
Lec9	Analysis of qualitative data	2

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Lec10	Monte Carlo methods 2	2
Lec11	Midterm 2	2
	Sum of hours	**30**

TEACHING TOOLS USED
N1. Lecture—slides and traditional N3. Written works: homework and problems

ACHIEVED SUBJECT LEARNING OUTCOMES		
Type of learning outcome	Code of learning outcome	Assessment of learning outcome
Knowledge	P8S_WG	knows basic statistical models and their mathematical foundations
Skills	P8S_UW	is able to choose the statistical procedure for typical data, use the IT environment to perform calculations and interpret the obtained results
Social competence	P8S_KK	is aware of the role of cooperation, including international cooperation, in the process of research and analysis of the results obtained

PRIMARY AND SECONDARY LITERATURE

PRIMARY LITERATURE:

    [1] J. Koronacki, J. Mielniczuk, Statystyka dla studentów kierunków technicznych i przyrodniczych, WNT, 2009

    [2] G. Hager, G. Wellin, Introduction to High Performance Computing for Scientists and Engineers, Champan & Hall, 2010

SECONDARY LITERATURE:

    [3] D. Moore, G. McCabe, Introduction to the Practice of Statistics, ed. IV, Freeman, 2003

    [4] N. Fieller, Basics of Matrix Algebra for Statistics with R, CRC Press, 2016Jumps in Finance, Springer, 2010 (187-231).

SUBJECT SUPERVISOR (NAME AND SURNAME, E-MAIL ADDRESS)

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