DOCTORAL SCHOOL OF WROCŁAW UNIVERSITY OF SCIENCE AND TECHNOLOGY

SUPERVISOR DECLARING/CONDUCTING COURSE: prof. Jacek Cichoń, prof. Mirosław Kutyłowski
DEPARTMENT: Department of Fundamentals of Computer Science
SCIENTIFIC DISCIPLINE: Information and communication technology

COURSE CARD

Course name in Polish: Wybrane zagadnienia Algorytmiki
Course name in English: Selected problems of algorithmics
Course language: English
University-wide general course type*: No
The course is intended for all PhD students: ~~YES~~ / NO
1) ~~BASIC COURSE~~
2) SPECIALIST COURSE
3) ~~SEMINAR~~
4) ~~HUMANISTIC COURSE~~
5) ~~LANGUAGE~~

Subject code: ITQ100135W

* delete as applicable

	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. Knowledge of at least one programming language
2. Knowledge of fundamentals of mathematical analysis
3. Knowledge of fundamentals of probability calculus

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COURSE OBJECTIVES

C1 Acquaintance with modern methods of algorithms analysis
C2 Acquaintance with a vast range of modern algorithmic techniques (construction of algorithms)

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PROGRAM CONTENTS

Lecture (Le)		Number of hours
Le1	An overview of computational models and complexity classes	2
Le2	Distributed algorithms	4
Le3	Parallel algorithms	4
Le4	Random algorithms	4
Le5	Online algorithms	4
Le6	Quantum algorithms	4
Le7	Big Data algorithms	4
Le8	Functional programming methods	4
	Total hours	**30**

TEACHING TOOLS USED

N1. A traditional method
N2. A computer and an overhead projector

ACHIEVED SUBJECT LEARNING OUTCOMES

Type of learning outcome	Code of learning outcome	Assessment of learning outcome
Knowledge	P8S_WG	Exam
Skills	P8S_UW	Completion of a selected project

PRIMARY AND SECONDARY LITERATURE

PRIMARY LITERATURE:

[1] S. Dasgupta , C. Papadimitriou, U. Vazirani, *Algorithms*, McGraw-Hill Education, 2006
[2] J. Leskovec, A. Rajaraman, J. D. Ullman, *Mining of Massive Datasets*, 2016
[3] Y. Billig, *Quantum Computing for High School Students*, 2018
[4] J. D. Stone, *Algorithms for Functional Programming*, Springer, 2018

SECONDARY LITERATURE:

[1] P. Billingsley, *Probability and Measure, 3rd Edition*, Willey, 2012
[2] T. Hutton, *Programming in Haskell, 2nd Edition*, Cambridge University Press, 2016
[3] A. Borodin, R. El-Yaniv, Online Computation and Competitive Analysis, Cambridge University Press, 1998

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

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