Załącznik nr 9
do Zarządzenia Rektora PŚk Nr 35/19
w brzmieniu ustalonym Zarządzeniem Nr 12/22

COURSE DESCRIPTION

Course code	full-time studies	
	part-time-studies	
Course name	**Analityka Big Data**	
Course name in English	**Big Data & Analytics**	
Valid from academic year	**2022/23**	

PLACEMENT IN THE TEACHING PROGRAM

Field of study	**Computer Science**
Level of education	**1st degree**
Studies profile	**General**
Form and method of teaching classes	**Full-time and part-time studies**
Specialization	**Information and communication technology**
Organizational unit responsible for the course	**Katedra Systemów Informatycznych**
Course coordinator	**dr hab. inż. Roman Deniziak, prof. PŚk** **mgr inż. Małgorzata Płaza**
Approved by	**Dean of the Faculty of Electrical Engineering, Automatic Control and Computer Science** **Roman Deniziak, KUT prof., DSc, PhD**

GENERAL CHARACTERISTIC OF THE COURSE

Course affiliation		**Speciality**
Course status		**obligatory**
Language		**English**
Semester	full-time studies	**Semester VI**
	part-time-studies	**Semester VI**
Requirements		**ernet of Things, Databases,** Scripting Languages
Exam (YES/NO)		**YES**
ECTS		**4**

Course form		**lecture**	**classes**	**laboratory**	**project**	**other**
Hours per semester	full-time studies	**30**		**30**		
	part-time-studies	**18**		**18**		

LEARNING RESULTS

Category	Result Symbol	Learning Results	References to the field of study results
Knowledge	W01	Students know and understand the solutions of technologies used in the area of Big Data.	INF1_W33
	W02	Students know and understand the challenges of analyzing large data sets.	INF1_W33
	W03	Students know and understand how data engineering shapes Big Data analytics issues.	INF1_W33
Skills	U01	Students are able to analyze data using basic statistical techniques and methods from Big Data analytics.	INF1_U33
	U02	Students are able to acquire data using IoT techniques and databases.	INF1_U33
	U03	Students are able to visualize and process the collected data.	
Social competence	K01	Students are able to assess the importance of Big Data and their impact on society.	INF1_K1 INF1_K2
	K02	The student is prepared to work in a group in the field involving the creation of Big Data solutions.	INF1_K1 INF1_K2

COURSE CONTENT

Course Form	Content
lecture	1. **Introduction to Big Data technology** 2. Hadoop technologies. MapReduce algorithm. HDFS distributed file system. 3. **NoSQL database models.** 4. **Python programming language in Big Data analysis.** 5. **Methods of data analysis. Problems encountered in Big Data techniques.** 6. **Methods used in inference analysis used in Big Data.** 7. **Supervised learning part.1.** 8. **Supervised learning part.2** 9. **Unsupervised learning part.1** 10. **Unsupervised learning part.2** 11. **Data visualization and processing in Big Data techniques.** 12. **Big Data Architecture.** 13. **Big Data processing using cloud computing part.1** 14. **Big Data processing using cloud computing part.2** 15. **Directions of development of Big Data technologies.**

laboratory	1. Limitations of popular spreadsheets in data analysis. 2. Use of the HDFS distributed file system and practical exercises. 3. MapReduce algorithm - practical exercises. 4. Use of PL-App application running on Raspberry Pi platform in data analysis. Configuration, principle of operation. 5. Python programming language in Big Data. 6. Python and SQLite 7. Big data analytics - real-time data generation. 8. Jupyter notebook - data retrieval and processing. 9. Jupyter notebook - advanced exercises. 10. Descriptive statistics in Python language. 11. Python in correlation analysis. 12. Linear regression in Python language. 13. Classification, decision trees in Phyton language. 14. Data visualization in Big Data techniques. 15. Raspberry Pi camera configuration, video data analysis. Image analytics methods - smile detection.

LEARNING RESULTS VERIFICATION METHODS

Result Symbol	Learning results verification methods					
	Oral Exam	Written Exam	Midterm	Project	Report	Other
W01		x				
W02		x				
W03		x				
U01			X			
U02			X			
U03			x			
K01		x	X			
K02		x	X			

ASSESSMENT FORMS AND CRITERIA

Course Form	Assessment Form	Assessment Criteria
lecture	pass with a grade	Obtaining at least 50% of the points during the exam.
laboratory	pass with a grade	Obtaining at least 50% of the points from the pass tests during the laboratory classes.

STUDENT'S VOLUME OF WORK

ECTS Balance												
No.	Activity Type	Student Involvement										Unit
		full-time studies					part-time-studies					
1.	Participation in classes according to the schedule	Lec	C	Lab	P	S	Lec	C	Lab	P	S	h
		30		30			18		18			
2.	Other (consultations, exams)	4		2			4		2			h
3.	**Total with the direct assist of an academic teacher**	**66**					**42**					h

4.	**Number of ECTS, that students obtains with the direct assist of an academic teacher**	**2,64**	**1,68**	ECTS
5.	**Hours of unassisted student work**	**34**	**58**	h
6.	**Number of ECTS that student obtains working unassisted**	**1,36**	**2,32**	ECTS
7.	**Practical classes volume of work**	**30**	**18**	h
8.	**Number of ECTS obtained by student at practical classes**			ECTS
9.	**Total student's volume of work expressed in hours**	**100**	**100**	h
10.	**ECTS**	**4**		

BIBLIOGRAPHY

1. Materials on the NetAcad platform available for students during laboratory.
2. Nathan Marz, James Warren,Big Data: Principles and best practices of scalable realtime data systems