

DESCRIPTION OF THE COURSE OF STUDY

Course code	0719-2ID-F55-IDwCH	
Name of the course in	Polish	<i>Inżynieria danych w chmurze</i>
	English	<i>Cloud Data Engineering</i>

1. LOCATION OF THE COURSE OF STUDY within the system of studies

1.1. Field of study	Data Engineering
1.2. Mode of study	Full-time
1.3. Level of study	First-cycle engineering studies
1.4. Profile of study*	General academic profile
1.5. Person/s preparing the course description	
1.6. Contact	

2. GENERAL CHARACTERISTICS OF THE course of study

2.1. Language of instruction	Polish
2.2. Prerequisites*	None

3. DETAILED CHARACTERISTICS OF THE COURSE OF STUDY

3.1. Form of classes	Lectures, laboratory classes, project.	
3.2. Place of classes	Classes in UJK teaching rooms	
3.3. Form of assessment	graded credit	
3.4. Teaching methods	Lecture – multimedia presentation, discussion; laboratory – problem solving, discussion	
3.5. Bibliography	Required reading	1. J. Reis, M. Housley, Inżynieria danych w praktyce. Kluczowe koncepcje i najlepsze technologie, Helios 2. M. Wilkins, Amazon Web Services. Podstawy korzystania z chmury AWS, Helion 3. V. Riscutia, Azure Data Engineering, Manning Publications
	Further reading	

4. OBJECTIVES, SYLLABUS CONTENT AND INTENDED LEARNING OUTCOMES

4.1 Course objectives (including form of classes)

Lecture, laboratory:

- C1. To introduce students to the architecture and operating principles of cloud environments in the context of data engineering.
 C2. To develop skills in designing and implementing data pipelines in a selected cloud platform.
 C3. To understand the security, cost, and scalability models of cloud-based data processing systems.
 C4. To develop practical skills in data integration, processing, and analysis using cloud tools.

4.2 Detailed syllabus (including form of classes)

Lecture

Introduction to cloud data engineering – service models (IaaS, PaaS, SaaS, Serverless). Data architectures in the cloud – Data Warehouse, Data Lake, Lakehouse. Cloud platforms: AWS, Azure, Google Cloud – comparison of capabilities. Data storage services: Amazon S3, Azure Data Lake, Google Cloud Storage. Data processing in the cloud – Spark, Dataflow, Databricks, BigQuery, Synapse. ETL/ELT tools and data pipeline orchestration (Airflow, Data Factory, Cloud Composer). Security and compliance – IAM, encryption, GDPR. Cost management and resource optimization in cloud environments. DevOps and DataOps in data engineering. Industrial use cases (case studies).

Laboratory classes

Configuration of a cloud account and environment (IAM, regions, resources). Building data processing pipelines in cloud services (ETL/ELT). Integrating data from multiple sources and loading it into a data warehouse. Data analysis using BigQuery / Synapse / Databricks. Monitoring, automation, and scheduling of tasks.

4.3 Intended learning outcomes

Code	A student, who passed the course	Relation to learning outcomes
within the scope of KNOWLEDGE:		
W01	knows the architecture of cloud systems and their applications in data engineering.	ID1A_W06, ID1A_W07
W02	knows the services and tools that support data storage, integration, and analysis in the cloud.	ID1A_W09, ID1A_W10

within the scope of ABILITIES:		
U01	is able to design and implement data processing pipelines in a selected cloud platform.	ID1A_U06, ID1A_U07
U02	is able to combine data from various sources, process, and analyze it in the cloud using ETL/ELT tools.	ID1A_U07, ID1A_U08
U03	is able to monitor, optimize, and present the results of teamwork on a cloud project.	ID1A_U09, ID1A_U13
within the scope of SOCIAL COMPETENCE:		
K01	understands the importance of security, compliance, and ethical data management in the cloud.	ID1A_K01

4.4. Methods of assessment of the intended learning outcomes

Teaching outcomes (code)		Method of assessment (+/-)																		Others* e.g. standardized test used in e-learning		
		Exam oral/written*			Test*			Project*			Effort in class*			Laboratory Reports			Group work*					
		Form of classes			Form of classes			Form of classes			Form of classes			Form of classes			Form of classes				Lecture, tutorial	
		L	C	P	L	C	P	L	C	P	L	C	P	L	C	P	L	C	P	L	C	P
W01				+	+					+				+								
W02				+	+					+				+								
U01					+				+		+			+								
U02					+				+		+			+								
U03					+				+		+			+								
K01									+		+			+								

*delete as appropriate

4.5. Criteria of assessment of the intended learning outcomes

Form of classes	Grade	Criterion of assessment
lecture (L) (including e-learning)	3	Achievement of <50-60)% of the requirements specified in the assessment methods
	3,5	Achievement of <60-70)% of the requirements specified in the assessment methods
	4	Achievement of <70-80)% of the requirements specified in the assessment methods
	4,5	Achievement of <80-90)% of the requirements specified in the assessment methods
	5	Achievement of <90-100)% of the requirements specified in the assessment methods
laboratory (C)* (including e-learning)	3	Achievement of <50-60)% of the requirements specified in the assessment methods
	3,5	Achievement of <60-70)% of the requirements specified in the assessment methods
	4	Achievement of <70-80)% of the requirements specified in the assessment methods
	4,5	Achievement of <80-90)% of the requirements specified in the assessment methods
	5	Achievement of <90-100)% of the requirements specified in the assessment methods
project (P)* (including e-learning)	3	Achievement of <50-60)% of the requirements specified in the assessment methods
	3,5	Achievement of <60-70)% of the requirements specified in the assessment methods
	4	Achievement of <70-80)% of the requirements specified in the assessment methods
	4,5	Achievement of <80-90)% of the requirements specified in the assessment methods
	5	Achievement of <90-100)% of the requirements specified in the assessment methods

5. BALANCE OF ECTS CREDITS – STUDENT'S WORK INPUT

Category	Student's workload	
	Full-time studies	Extramural studies
NUMBER OF HOURS WITH THE DIRECT PARTICIPATION OF THE TEACHER /CONTACT HOURS/	75	
Participation in lectures*	30	
Participation in classes, seminars, laboratories*	30	
Project	15	

INDEPENDENT WORK OF THE STUDENT/NON-CONTACT HOURS/	50	
Preparation for the lectures*	10	
Preparation for the classes, seminars, laboratories*	25	
Project	15	
TOTAL NUMBER OF HOURS	125	
ECTS credits for the course of study	5	

**delete as appropriate*

Accepted for execution (date and legible signatures of the teachers running the course in the given academic year)

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