

Module/Course Syllabus
Program: COMPUTER SCIENCE
 Full-time master degree program

Course:	Full-stack programming in the cloud
Type of the course:	Speciality
Course code:	I2S2.16
Year:	I
Semester:	2
Form of the degree program:	Full-time
Form of classes and number of hours per semester:	60
Lecture	30
Classes	0
Laboratory	30
Project	0
Number of ECTS credits:	3
Form of assessment:	course completion assessment
Course language:	English

Course objective (CO)	
CO1	Introduction to full-stack programming in the cloud.
CO2	Acquisition of practical skills in configuring a cloud environment and creating multi-layer applications operating in a computer cloud.

Prerequisites in terms of knowledge, skills and other competencies	
1	Knowledge of existing cloud computing solutions.
2	Knowledge of the following languages and tools: JavaScript, HTML, CSS, PHP, SQL, Java.
3	Knowledge of the basics of programming in algorithmic languages.

Learning outcomes (LO)	
	In terms of knowledge:
LO 1	He understands the role and importance of full-stack programming in cloud computing.
LO 2	He knows how to set up an environment for designing and implementing full-stack applications for cloud computing.
LO 3	He knows the techniques and methods of implementing full-stack applications in the cloud.
	In terms of skills:
LO 4	He can configure the environment to develop full-stack applications in the cloud.
LO 5	He can use the resources of the computer cloud to perform a multi-layer application.
LO 6	He can design and implement a full-stack application operating in the cloud.
	In terms of social competence:
LO 7	Is able to identify and solve dilemmas related to the programming of full-stack cloud applications, including those related to cooperation with the client.

Course content	
Form of classes – lectures (L)	
	Course content
L1	Levels of computer clouds used in application programming.

L2	Full-stack programming - introduction.
L3	Full-stack programming in the cloud.
L4	Cloud computing services available to full-stack developers.
L5	Declarative languages used for full-stack development.
L6	Kubernetes as a toolbox for full-stack applications.
L7	Defining Kubernetes system resources.
L8	Kubernetes and cloud databases.
L9	User and security management in applications developed in the cloud on the example of Kubernetes.
L10	Integration of other services with the cloud application.
Form of classes – laboratories (Lab)	
	Course content
Lab1	Configuration of the SaaS cloud environment using Docker and Kubernetes.
Lab2	Programming full-stack SPA type applications - simple examples.
Lab3	Full-stack programming of SPA-type applications - back-end.
Lab4	Full-stack programming of SPA-type applications - front-end.
Lab5	Implementation of a cloud database in an application made in full-stack technology.
Lab6	Creating full-stack cloud application users.
Lab7	Security management in an application made in full-stack technology.
Lab8	Integration of additional services in the application made in full-stack technology.

Didactic methods	
1	Conversational lecture with a multimedia presentation.
2	Thematic discussion.
3	Laboratory exercises: performing exercises.

Assessment methods and criteria		
Assessment method symbol	Assessment method description	Passing threshold
A1	Passing the lecture: written from the program content (questions concern each of the areas L1...L10 with a weight of 10% in the final grade).	51%
A2	Passing the laboratory: evaluation of the results of the work - the results of the laboratories, each laboratory must be passed at least 51%.	51%

Required textbooks and other course materials	
1	Douglas Come, The Cloud Computing Book: The Future of Computing Explained 1st Edition, CRC Press 2021
2	Valerio de Sanctis, ASP.NET Core 2 and Angular 5: Full-stack web development with .NET Core and Angular, Pact Publishing, 2017
3	Sean P. Kane, Karl Matthias, Docker. Docker: Up & Running. Shipping Reliable Containers in Production. 2nd Edition, O'Reiley
4	
5	
Recommended textbooks and other course materials	
1	Aneeta Sharma, Full-Stack Web Development with Vue.js and Node, Packt Publishing, 2018
2	Deepu K Sasidharan, Sendil Kumar N, Full Stack Development with JHipster, Packt Publishing, 2018

Student workload	
Form of activity	Average number of hours to complete the activity
Contact hours with the lecturer, including:	60
<i>participation in lectures</i>	30
<i>participation in laboratories</i>	30
Student's own work, including:	15
<i>preparation for the exam</i>	10
<i>preparation for the laboratory</i>	5
Total student workload	75
Total number of ECTS credits	3

Learning outcomes matrix					
Learning outcome	Reference to learning outcomes defined for the master's program	Course objectives	Course content	Didactic methods	Assessment methods
LO 1	I2A_W01 +++ I2A_W02 +++	CO1	L1 - L4	1, 2	A1
LO 2	I2A_W02 +++ I2A_W08 +++	CO1	L4 - L7	1, 2	A1
LO 3	I2A_W07 +++ I2A_W08 ++	CO1	L1, L8 - L10	1, 2, 3	A1
LO 4	I2A_U09 +++ I2A_U10 +++	CO2	Lab1 - Lab4	2, 3	A2
LO 5	I2A_U09 +++ I2A_U10 +++ I2A_U13 ++	CO2	Lab3 - Lab8	2, 3	A2
LO 6	I2A_U10 +++ I2A_U13 ++ I2A_U15 +++	CO2	Lab7, Lab8	2, 3	A2
LO 7	I2A_K02++ I2A_K04++	CO1, CO2	Lab2 - Lab8	2, 3	A2

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