



## Subject card

Subject name and code	Cloud Environment Management, PG_00048061						
Field of study	Informatics						
Date of commencement of studies	February 2023		Academic year of realisation of subject		2022/2023		
Education level	second-cycle studies		Subject group		Optional subject group Subject group related to scientific research in the field of study		
Mode of study	Full-time studies		Mode of delivery		at the university		
Year of study	1		Language of instruction		Polish		
Semester of study	1		ECTS credits		4.0		
Learning profile	general academic profile		Assessment form		assessment		
Conducting unit	Department of Computer Communications -> Faculty of Electronics, Telecommunications and Informatics						
Name and surname of lecturer (lecturers)	Subject supervisor		dr inż. Krzysztof Gierłowski				
	Teachers		dr inż. Krzysztof Gierłowski				
			dr inż. Michał Hoefft				
Lesson types and methods of instruction	Lesson type	Lecture	Tutorial	Laboratory	Project	Seminar	SUM
	Number of study hours	15.0	0.0	0.0	15.0	0.0	30
	E-learning hours included: 0.0						
Learning activity and number of study hours	Learning activity	Participation in didactic classes included in study plan		Participation in consultation hours		Self-study	SUM
	Number of study hours	30		8.0		62.0	100
Subject objectives	Public and private clouds are a very specific type of network computing systems, both in terms of offered functionality and involved mechanisms. Such type of system requires a specific knowledge and skills from its designer and administrator. The course aims to provide students with characteristics of cloud systems, their elements, architectures and services commonly provided, complete with their deployment modes. Additionally, management and maintenance and orchestration methods appropriate for a cloud environment will be addressed.						

Learning outcomes	Course outcome	Subject outcome	Method of verification
	[K7_K02] is ready to provide critical evaluation of received content and to acknowledge the importance of knowledge in solving cognitive and practical problems	1. Student evaluates the utility of cloud system in specific business cases. 2. Student evaluates the utility of specific management mechanisms in a specific cloud environment.	[SK5] Assessment of ability to solve problems that arise in practice
	[K7_U42] can solve engineering and research problems including design, assessment and maintenance of information systems and applications, using experimental methods and management techniques	1. Student evaluates implementation requirements of a cloud system in a specific deployment case. 2. Student designs management mechanisms for a specific cloud system deployment scenario.	[SU3] Assessment of ability to use knowledge gained from the subject
	[K7_U03] can design, according to required specifications, and make a complex device, facility, system or carry out a process, specific to the field of study, using suitable methods, techniques, tools and materials, following engineering standards and norms, applying technologies specific to the field of study and experience gained in the professional engineering environment	1. Student implements simple management mechanisms for a cloud system providing a specific service.	[SU4] Assessment of ability to use methods and tools
	[K7_W04] Knows and understands, to an advanced extent, the principles, methods and techniques of programming and the principles of computer software development or programming devices or controllers using microprocessors or programmable elements or systems specific to the field of study, and organisation of systems using computers or such devices	1. Student identifies characteristics of cloud systems including its advantages, drawbacks, and requirements it poses to devices and operating systems. 2. Student identifies basic building blocks of a cloud system. 3. Student describes interfaces between elements of a cloud system.	[SW1] Assessment of factual knowledge
	[K7_W41] Knows and understands, to an increased extent, the standards, production methods, life cycle and development trends of software as well as information systems and applications.	1. Student describes characteristics of cloud management solutions.	[SW1] Assessment of factual knowledge
Subject contents	<p>Introduction to cloud environment</p> <ol style="list-style-type: none"> <li>1. Definition of common terms,</li> <li>2. Basic characteristics,</li> <li>3. Deployment models,</li> <li>4. Service models,</li> <li>5. Enabling technologies,</li> <li>6. Infrastructure elements,</li> <li>7. Specialized cloud mechanisms,</li> <li>8. Basic architectures.</li> </ol> <p>Virtualization techniques</p> <ol style="list-style-type: none"> <li>1. Overview of virtualization types</li> <li>2. Containers and related mechanisms</li> </ol> <p>Management tools and mechanisms</p> <ol style="list-style-type: none"> <li>1. Vagrant – dynamic management of virtual machines,</li> <li>2. Docker – dynamic management of containers,</li> <li>3. Popular management and orchestration solutions: Puppet, Chef, Saltstack, Ansible</li> <li>4. OpenStack and its architectural elements</li> </ol> <p>Employment of SDN and OpenFlow in cloud environment.</p>		
Prerequisites and co-requisites	Theoretical knowledge and practical skills related to IP network configuration and management, as well as configuration and management of popular services deployed in their environment.		
Assessment methods and criteria	Subject passing criteria	Passing threshold	Percentage of the final grade
	Written test	50.0%	50.0%
	Practical project	50.0%	50.0%
Recommended reading	Basic literature	Lecture presentations.	

	Supplementary literature	Zaigham Mahmood, Thomas Erl, Ricardo Puttini, Cloud Computing: Concepts, Technology & Architecture, 2013
	eResources addresses	Adresy na platformie eNauczenie: Zarządzanie środowiskiem chmurowym (2023L) - Moodle ID: 28961 <a href="https://enauczenie.pg.edu.pl/moodle/course/view.php?id=28961">https://enauczenie.pg.edu.pl/moodle/course/view.php?id=28961</a>
Example issues/ example questions/ tasks being completed		
Work placement	Not applicable	