POZNAN UNIVERSITY OF TECHNOLOGY

EUROPEAN CREDIT TRANSFER AND ACCUMULATION SYSTEM (ECTS)

pl. M. Skłodowskiej-Curie 5, 60-965 Poznań

COURSE DESCRIPTION CARD - SYLLABUS

Course name

Distributed systems management

Course

Field of study	Year/Semester
Computing	1/ 2
Area of study (specialization)	Profile of study
Distributed systems	general academic
Level of study	Course offered in
Second-cycle studies	Polish
Form of study	Requirements
full-time	compulsory

Number of hours

Lecture	Laboratory classes	Other (e.g. online)
15	45	0
Tutorials	Projects/seminars	
0	0	

Number of credit points

4

Lecturers

Responsible for the course/lecturer:	Responsible for the course/lecturer:
dr inż. Michał Sajkowski, doc.	dr inż. Cezary Sobaniec
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Prerequisites

Learning outcomes from the first-cycle studies, defined in the resolution of PUT Senate, especially outcomes: K1_W1-2, K1_W6-15, verified in the process of recruitment to second-cycle studies - these outcomes are presented in the internet service of the department cat.put.poznan.pl.

Learning outcomes from the first-cycle studies, defined in the resolution of PUT Senate, especially outcomes K1_U1-2, K1_U4, K1_U7-8, K1_U14-20, K1_U22-23, K1_U26, verified in the process of recruitment to second-cycle studies - outcomes presented in internet service of the department cat.put.poznan.pl.

Learning outcomes from the first-cycle studies, defined in the resolution of PUT Senate, especially outcomes K1_K1-9, verified in the process of recruitment to second-cycle studies - outcomes presented in internet service of the department cat.put.poznan.pl.

In addition, in respect to the social skills the student should show attitudes as honesty, responsibility, perseverance, curiosity, creativity, manners, and respect for other people.

Course objective

1. Provide students with basic knowledge in the field of distributed systems management, automation of the processes of creating, launching and orchestrating virtualized systems in cloud computing

2. Developing students' skills in solving problems encountered by a cloud computing administrator and software designer for applications run in cloud computing.related to the use and configuration of computer networks.

Course-related learning outcomes

Knowledge

1. have advanced knowledge of distributed systems management, basic theoretical knowledge on systems management and on methods, tools and development environments used for implementation of distributed systems - [K2_W1]

2. have advanced detailed knowledge of selected issues from the field of distributed systems management - [K2_W3]

3. have advanced and detailed knowledge of the processes happening in the field of distributed systems management - [k2_W5]

Skills

1. is able to use information and communication techniques used in the implementation of projects in the area of distributed systems management - [K2_U2]

2. is able to utilize knowledge of distributed systems management (and, if necessary, other academic fields) to formulate and solve engineering problems - [K2_U5]

3. is able to make a critical analysis of the existing technical solutions in the area of distributed systems management and propose their improvements - [K2_U8]

4. Is able to assess the usefulness of methods and tools used to solve engineering task, in the area of distributed systems management, consisting of a process of building and evaluating an IT system and its components, including the limitations of these methods and tools - [K2_U9]

5. is able to cooperate in a team, which implements the task from the area of distributed systems management, accepting various roles in it - [K2_U15]

Social competences

1. understands that in the area of distributed systems management both knowledge and skills very quickly become outdated - [K2_K1]

2. is aware of the meaning of use the newest knowledge in the area of distributed systems management in order to solve research and practical problems - [K2_K2]

Methods for verifying learning outcomes and assessment criteria

Learning outcomes presented above are verified as follows:

Formative assessment:

a) lectures:

based on answers to questions on previous lectures,

b) laboratory classes:

evaluation of doing correctly assigned tasks,

Total assessment:

a) verification of assumed learning objectives related to lectures:

i. based on the sum of answers and the activity during lectures.

ii. evaluation of student's knowledge and skills obtained in lectures based on written exam, covering from 3 to 5 questions, or from 10 to 15 test questions. In order to obtain positive note, the student should obtain 50% of maximum number of points. During the exam, student cannot use any lecture notes, books, etc.

b) verification of assumed learning objectives related to laboratory classes:

i. evaluation of student's skills related to carrying out the lab tasks and configuration task,

ii. monitoring student's continuing activities during classes,

iii. evaluation of student's skills based on one or two tests, covering from 10 to 15 questions.

Programme content

The lecture should cover the following topics

1) Introduction (cloud and network managemsnt)

2) SNMP protocol (protocol entities, exchanged commands, management information base, protcol versions, protocol semantics)

3) Areas of the management of computer networks (accidents management, resource utilization management, configuration and naming management, performance management, security management)

4) NetFlow and sFLOW protocols

5) Microservices architecture and containers cluster management

The lab-classes should cover the following topics:

1) Basics of cloud computing (Microsoft Azure, Google Cloud, Amazon Web Services)

2) Virtual machines creation and management in public cloud

3) Operating system configuration orchestration (with and without agents)

4) Operating systems images instrumentation in clouds

5) Self-healing and autoscaling in public cloud

6) Push and pull-type monitoring systems

7) Processing monitoring data with timeseries databases

8) Event log monitoring with ELK

9) Application containers: design, development and management

10) Containers orchestration at scale: docker swarm and Kubernetes

11) Architecture patterns for containerized applications

12) Introduction to service mesh management

Teaching methods

Lectures: multimedia presentation, presentation illustrated with examples presented on blackboard.

Labs: solving tasks, practical exercises with use of network devices, discussion, teamwork, multimedia showcase.

Bibliography

Basic

1. Software Defined Networks, T.D. Nadeau, K. Gray, O'Reilly Media, 2013

2. SNMP, SNMPv2, SNMPv3, and RMONv1 and 2, 3rd edition, W. Stallings, Addison-Wesley, 1999

Additional

1. Network Analysis and Troubleshooting, J. Scott Haugdahl, Addison-Wesley, 1999

2. Software Defined Networking (SDN): Anatomy of OpenFlow, D. Marschke, J. Doyle, P. Moyer, Amazon

3. Software Defined Networking with OpenFlow, S. Azodomolky, Packt Publishing, 2013

Breakdown of average student's workload

	Hours	ECTS
Total workload	125	5,0
Classes requiring direct contact with the teacher	60	2,5
Student's own work (literature studies, preparation for laboratory classes/tutorials, preparation for tests/exam) [1]	65	2,5

[1] delete or add other activities as appropriate