COURSE DESCRIPTION CARD - SYLLABUS

Course name
Using SDN in cloud solution [S2Teleinf2-STRC>SDN]

Course

Field of study
Teleinformatics

Year/Semester
1/2

Area of study (specialization)
ICT networks and cloud solutions

Profile of study
general academic

Level of study
second-cycle

Course offered in
Polish

Form of study
full-time

Requirements
compulsory

Number of hours

Lecture
14

Laboratory classes
24

Other
14

Tutorials
0

Projects/seminars
0

Number of credit points

3,00

Coordinators

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Lecturers

Prerequisites

The student starting the course should have knowledge of computer network architecture and operation. In particular, they should be familiar with basic protocols that facilitate network communication (ARP, IPv4/IPv6, RIP, DHCP). They should also be proficient in programming tools. The student should also have basic skills in operating the Linux operating system.

Course objective

The aim of the course is to familiarize students with topics related to contemporary industrial solutions in SDN networks and their utilization in cloud-based solutions.

Course-related learning outcomes

Knowledge:
He/she has an expanded and in-depth knowledge in devices comprising teleinformatics systems [K2_W02]
Knows and understands algorithms used in teleinformatics systems within the specialization area [K2_W05]
Has knowledge of developmental trends and significant new achievements in the field of teleinformatics

[K2_W07]

Skills:
He/she is able to acquire information from literature, databases, and other sources; integrate the obtained information; interpret and critically evaluate it; draw conclusions; and formulate and thoroughly justify opinions [K2_U01]
Can plan and conduct research experiments, including testing, simulation, measurement of characteristics, parameter extraction, analysis and synthesis of secure ICT systems [K2_U07].

Social competences:
Is ready to recognize the significance of knowledge in solving cognitive and practical problems and to critically evaluate received content [K2_K01].

Methods for verifying learning outcomes and assessment criteria

Learning outcomes presented above are verified as follows:

The knowledge acquired during the lecture is assessed through written or oral exams. In the written form, students must answer 6 questions (multiple-choice and open-ended) with different point values. There are three point groups (1, 2, and 3 points). In the case of an oral exam, students randomly draw two questions from each point group. In the oral form, for each drawn question, students may receive an additional related question. The evaluation of a question (including the response to both the drawn question and the additional question) takes into account the scope of the answer and the depth of understanding of the topic. A total of 60 questions are prepared for each exam. The condition for passing the exam is to receive a minimum of 50% of the possible points.
Criteria for exam grading and passing: Points Grade
<=6 points 2.0
7-8 points 3.0
9 points 3.5
10 points 4.0
11 points 4.5
12 points 5.0
The skills acquired during the laboratory are assessed based on tasks performed during the course. Each task is given a grade, and the final grade is the average of all the grades. It is necessary for all tasks to receive a positive grade.

Programme content

1. Presentation of the structure and operation of SDN networks. Analogies to traditional networks.
2. Network Function Virtualization (NFV).
3. Examples of industrial solutions, e.g., IPFabric.
4. Cloud services.
5. Security of cloud services.
6. Security of SDN networks.
7. Visit to a large-scale data center.
8. Preparation of a custom SDN network implementation.

Course topics

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Teaching methods

Lectures: Depending on the topic and students' interests, the lecture is conducted in one of three forms: traditional lecture (multimedia presentation supplemented with examples given on the board),

problem-oriented lecture (discussion with the audience on solving a specific problem), or conversational lecture (engaging the audience in discussion, controlling the course of the lecture based on the responses given, etc.).
Laboratory exercises: The exercises are conducted in the computer laboratories of the Institute of Teleinformatics Networks. During the classes, students perform tasks presented by the instructor, which involve properly connecting devices (switches, routers, and computers) and configuring network devices and software according to the requirements of the exercise.

Bibliography

Basic:
1. SDN: Software Defined Networks Thomas D. Nadeau and Ken Gray O'Reilly Media 2013
2: SDN and NFV Security Rahamatullah Khondoker (editor) Springer 2018
3: Software Defined Networks A Comprehensive Approach Second Edition Paul Göransson Chuck Black Timothy Culve Morgan Kaufmann 2017
4: Software-Defined Cloud Centers Pethuru Raj Anupama Rama Springer Nature 2018.

Additional:
1. Network Function Virtualization Ken Gray Thomas D. Nadeau Morgan Kaufmann 2016
3: DATA CENTER HANDBOOK Plan, Design, Build, and Operations of a Smart Data Center HWAIYU GENG,
P.E. Willey 2021
3: Cloud Computing: Theory and Practice Dan C. Marinescu Morgan Kaufmann 2022

Breakdown of average student's workload

	Hours	ECTS
Total workload	78	3,00
Classes requiring direct contact with the teacher	38	1,50
Student's own work (literature studies, preparation for laboratory classes/ tutorials, preparation for tests/exam, project preparation)	40	1,50