COURSE DESCRIPTION CARD - SYLLABUS

Course name
Advanced computer networks

Course

Field of study
Computing

Year/Semester
2/ 3

Area of study (specialization)
Distributed systems

Profile of study
general academic

Level of study
Second-cycle studies

Course offered in
Polish

Form of study
full-time

Requirements
elective

Number of hours

Lecture	Laboratory classes	Other (e.g. online)
30	30	0
Tutorials	**Projects/seminars**	
0	0	

Number of credit points

4

Lecturers

Responsible for the course/lecturer:
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tel.

Poznan Supercomputing and Networking Center

ul. Jana Pawła II 10, 61-139 Poznań

Responsible for the course/lecturer:

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 advanced computer networks, in terms of of the presentation of theoretical and practical issues of the implementation optical network technologies and advanced networking services using optical computer networks.

2. Developing students' skills in solving problems encountered by a designer and user of multimedia services like VoIP and video streaming systems in the wide area computer networks.

Course-related learning outcomes

Knowledge

1. have advanced and in depth knowledge of advanced computer networks , theoretical basics of their building, and methods, tools and programming environments used for their implementation - [K2_W1]

2. have advanced detailed knowledge of selected issues from the field of advanced computer networks - [K2_W3]

3. have advanced and detailed knowledge of the hardware and software processes happening in the life cycle of advanced computer networks - [k2_W5]

4. knows advanced methods, techniques and tools used in the solving of complex engineering tasks and leading research works in advanced computer networks - [K2_W6]

Skills

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

2. is able to utilize knowledge of advanced computer systems (and, if necessary, other academic fields) to formulate and solve engineering problems and apply a systems approach considering also non-technical aspects - [K2_U5]

3. Is able to evaluate the usefulness and possibility of the use new achievements (methods and tools) and new computing products - [K2_U6]

4. is able to evaluate the usefulness of methods and tools used to solving engineering task, in the field of advanced computer networks, consisting of building or evaluation of computing system or its parts , and see limitations of these methods and tools - [K2_U9]

5. is able - according to given specification - in the field of advanced computer networks, considering non-technical aspects - design complex device, computing system or proces and implement this project -

at least in part - using appropriate methods, techniques and tools, also adapting existing tools and inventing new tools - [K2_U11]

Social competences

1. understands that in the area of advanced computer networks both knowledge and skills very quickly become outdated - [K2_K1]

2. is aware of the meaning of use the newest knowledge in the area advanced computer networks 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 a project, prepared partially at home. The note takes into account student's ability to cooperate in a team

iv. 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

1,2) New generation optical networks

3) Virtualization of netwok functions

4) Software defined networks (SDN)

5) Safety challenges in 5G networks

6) Service-hardware infrastructure to advanced vizualization and examples of its use

7) Advanced compression and display techniques for immersive visualization installations of high resolutions

8) New color spaces and transfer curves in multimedia

9) Internet of Things in terms of e-health

10) Remote cooperation platform in medicine - medVC

11) Network services of speech recogniton

The lab-classes should cover the following topics:

In the laboratory classes practical experiments are implemented. These experiments are strictly connected to the topics of lectures.

Teaching methods

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

Labs: solving tasks, practical exercises with use of most modern network technologies, discussion, teamwork, multimedia showcase, project implementation.

Bibliography

Basic

1. Software-Defined Networking, A Comprehensive Survey, D. Kreutz et al., proceedings of the IEEE, vol 103, no 1, pp 14-76, Jan. 2015

2. Network Vizualization, Cisco Guide

3. Verizo Approach to 5G Security (White paper), C. Sullivan, October 2019

4. Advanced Video Compression and rendering for Highly Immersive 8K Applications, M. Alvarez-Messa et al., IBC, 2019

5. Introduction to Ambisonics, D. Arteaga, Lecture notes, 2018

6. Display Gamut Metrology Using Chromaticity Diagram, K. Masaoka, IEEE Access, vol. 4, pp.3878-3886, 2016

7. A comprehensive Guide to 5G Security, M. Liyanage et al. John Wiley&Sons, 2018

8. Simple analytic Approximations to the CIE XYZ Color Matching Functions, C. Wyman, P. Pike-Sloan, P.Shirley

Additional

Breakdown of average student's workload

	Hours	ECTS
Total workload	100	4,0
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, project implementation) [1]	40	1,5

[1] delete or add other activities as appropriate