



COURSE DESCRIPTION CARD - SYLLABUS

Course name

Communication Networks

Course

Field of study

Electronics and Telecommunications

Area of study (specialization)

Level of study

Second-cycle studies

Form of study

full-time

Year/Semester

I/I

Profile of study

general academic

Course offered in

English

Requirements

elective

Number of hours

Lecture

30

Tutorials

0

Laboratory classes

30

Projects/seminars

0/0

Other (e.g. online)

Number of credit points

5

Lecturers

Responsible for the course/lecturer:

prof. dr hab. inż. Wojciech Kabaciński,
Wojciech.Kabacinski@put.poznan.pl

Responsible for the course/lecturer:

dr hab. inż. Remigiusz Rajewski,
Remigiusz.Rajewski@put.poznan.pl

Prerequisites

The student should have basic knowledge in transmission systems, probability theory, and graph theory. Should be able to obtain information from the literature, databases, and other sources in English, integrate the information, make their interpretation, draw conclusions, and justify opinions. Should also be able to communicate in English in a professional environment.



Course objective

To familiarize students with the fundamentals of the structures and operation of different kinds of telecommunication networks, the principles of their analysis, modeling, design, and services offered by them.

Course-related learning outcomes

Knowledge

1. He has a structured knowledge in the field of telecommunication network architectures.
2. He has knowledge about the standards concerning telecommunication networks.
3. He knows the directions of telecommunication network development.

Skills

1. He understands the basic requirements of the relevant international standards for basic telecommunication networks.
2. He can evaluate typical parameters indicating the proper operation of telecommunication networks.
3. He can choose the design of some elements and equipment for telecommunication networks.

Social competences

1. He knows the limits of his knowledge and skills and understands the need for ongoing education.
2. He has awareness of the importance of telecommunication networks in the functioning of society.

Methods for verifying learning outcomes and assessment criteria

Learning outcomes presented above are verified as follows:

Knowledge acquired during the lectures is verified at the final exam. This exam is in the oral or/written form, depending on the number of students. The oral exam consists of 5 questions; the answer to each question is marked in 0-5 points. The written exam consists of 45-60 questions of multiple choice type. Students get 1 point for the correct answer and 0 points for the wrong answer or lack of an answer. 50% of points are needed to pass the exam. In questionable cases, there is a possibility to correct the mark by answering some questions orally.

Skills mastered during laboratory classes are evaluated based on two colloquia, in the mid and at the end of the semester. To pass laboratories, both colloquia must be passed; the final mark depends on the sum of points of both colloquia: 5.0 from 93%; 4.5 from 85%; 4.0 from 76%; 3.5 from 65%; 3.0 from 50%; 2.0 below 50%.

Programme content

Lectures: The concept of telecommunication systems and networks. Network topologies, transfer modes, architectures, and communication models. Telecommunication networks evolution and classification. Telecommunication services: the concept of telecommunication services, classes, and attributes. Transmission media and protocols. Networks and network devices (routers, switches, etc.).



Network connections, connection setup models, and procedures. Protection in telecommunication networks. The basics of traffic theory: telecommunication traffic and traffic engineering models.

Laboratory: laboratory exercises cover subjects on network traffic analyses, router's basic configuration, routing protocols configuration, and exercises on network algorithms.

Teaching methods

Lectures: Lectures are conducted in the traditional form, with computer presentations that are available earlier to students. Some lectures, or their parts, are led as interactive or problem lectures, where students participate in solving some problems or examples, especially in proving some mathematical theorems.

Laboratory: laboratory classes use exercise methodology. Students have to realize practical exercises, according to provided descriptions, using different types of equipment (routers, switches, end devices) available in the laboratory and check if they operate correctly.

Bibliography

Basic

- [1] R. L. Freeman, Fundamentals of Telecommunications, 2nd ed. John Wiley & Sons, Inc., 2005. (available from PUT network: <https://onlinelibrary.wiley.com/doi/book/10.1002/0471720941>)
- [2] A. Valdar, Understanding telecommunications networks. The Institution of Engineering and Technology, 2006.
- [3] T. N. Saasawi, M. H. Ammar, and A. El Hakeem, Fundamendals of Telecommunication Networks. Wiley, 1994.
- [4] J. F. Kurose and K. W. Ross, COMPUTER NETWORKING A Top-Down Approach, Sixth. Pearshon, 2013.

Additional

- [1] H. Akimaru and K. Kawashima, Teletraffic. Theory and Applications. London Berlin Heidelberg New York Paris Tokyo Hong Kong Barcelona Budapest: Springer-Verlag, 1993.
- [2] N. Benvenuto and M. Zorzi, Principles of Communications Networks and Systems. John Wiley & Sons, Ltd, 2011.
- [3] H. J. Chao and B. Liu, High Performance Switches and Routers. John Wiley & Sons, Inc., 2007.
- [4] Y.-D. Lin, R.-H. Hwang, and F. Baker, Computer Networks. An Open Source Approach. McGraw-Hill, 2012.
- [5] L. L. Peterson and B. S. Davie, Computer Networks. A Systems Approach, 4th ed. Morgan Kaufmann, 2007.



Breakdown of average student's workload

	Hours	ECTS
Total workload	125	5,0
Classes requiring direct contact with the teacher	70	3,0
Student's own work (literature studies, preparation for laboratory classes, preparation for exam) ¹	55	2,0

¹ delete or add other activities as appropriate