



COURSE DESCRIPTION CARD - SYLLABUS

Course name

Telecommunication Network Design [N2EiT1>PSTelek]

Course

Field of study

Electronics and Telecommunications

Year/Semester

1/2

Area of study (specialization)

–

Profile of study

general academic

Level of study

second-cycle

Course offered in

polish

Form of study

part-time

Requirements

compulsory

Number of hours

Lecture

30

Laboratory classes

0

Other (e.g. online)

0

Tutorials

0

Projects/seminars

0

Number of credit points

4,00

Coordinators

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Lecturers

Prerequisites

A student starting the subject should have knowledge of the basics of probabilistic methods, in particular, know and understand the concepts of random variable and probability . He should also have the ability to obtain information from the indicated sources.

Course objective

To provide students with basic knowledge of mathematical methods of network modeling and analysis necessary for dimensioning and designing single and multi-service networks. During the course, students will learn methods for analyzing and dimensioning selected network elements, i.e. nodes or links.

Course-related learning outcomes

Knowledge:

1. has detailed knowledge of link modeling methods in single-service and multi-service networks
2. has knowledge of the methods of modeling systems with traffic overflow
3. has knowledge of how to model traffic management mechanisms used in networks ICT

Skills:

1. has the ability to dimension links supporting single and multi-service traffic
2. can use the known methods to dimension links in the network with traffic overflow

Social competence:

He understands that knowledge and skills regarding the design of ICT networks are constantly changing.

Methods for verifying learning outcomes and assessment criteria

Learning outcomes presented above are verified as follows:

The knowledge gained in the lecture is verified by an exam in written or oral form. The choice of form is determined by the size of the group (up to 10 people, the exam takes an oral form).

In the written form, students must answer 6 questions (test and open) variously scored, two from each scoring group. Three scoring groups are envisaged, in which 1, 2 or 3 points can be obtained for a correct answer to each question, respectively.

On the other hand, for the oral exam, the student draws two questions from each scoring group. In the oral form, for each question drawn, the student can receive an additional question (related to the drawn question).

The evaluation of the question includes the answer to both the drawn question and the additional question (in the case of an oral answer) and takes into account the breadth of the answer and the depth of understanding of the issue.

60 questions are prepared for each exam. The prerequisite for passing the exam is receiving a minimum of 50% of the points possible.

Criteria for evaluation of the exam:

number of 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

Programme content

The lecture topics include the following:

1. Basic concepts of traffic engineering.
2. Mathematical basis of modeling and optimization of traffic systems.
3. Modeling and dimensioning of single-service systems.
4. Overflow theory, dimensioning of hierarchical networks.
5. Mathematical foundations of modeling of multidimensional systems.
6. Modeling and dimensioning of multiservice systems.
7. Modeling and dimensioning of state-dependent multiservice systems.
8. Basic queuing models, delay analysis, basics of sizing queuing networks.
9. Equivalent bandwidth, sources of packet traffic, packet stream models.
10. Bandwidth discretization and dimensioning of the Internet links.

Teaching methods

Depending on the topic discussed and the interest of the students, the lecture is conducted in one of three forms: traditional lecture (multimedia presentation supplemented by examples given on the blackboard), problem lecture (discussion with the students on the solution of a given problem), or conversational lecture (involving the students in the discussion, controlling the course of the lecture depending on the answers given, etc.).

Bibliography

Basic:

1. Stasiak M., Glabowski M., Zwierzykowski P.: Modeling and Dimensioning of Mobile Networks: from GSM to LTE, John Wiley and sons Ltd., January 2011.

Supplementary

1. Iversen V.B., ed., Teletraffic Engineering, Handbook, ITU, Study Group 2, Question 16/2 Geneva, January 2005, published on-line

Breakdown of average student's workload

	Hours	ECTS
Total workload	80	4,00
Classes requiring direct contact with the teacher	40	2,00
Student's own work (literature studies, preparation for laboratory classes/ tutorials, preparation for tests/exam, project preparation)	40	2,00