COURSE DESCRIPTION CARD - SYLLABUS

Course name
Traffic Control

Course

Field of study
Electronics and Telecommunications

Year/Semester
II/IV

Area of study (specialization)

Profile of study
general academic

Level of study
Second-cycle studies

Course offered in
English

Form of study
full-time

Requirements
elective

Number of hours

Lecture
30

Laboratory classes
0

Other (e.g. online)

Tutorials
0

Projects/seminars
15 / -

Number of credit points

4

Lecturers

Responsible for the course/lecturer:
Dr. Mariusz Głąbowski

mariusz.glabowski@put.poznan.pl

phone: +48616653904

Responsible for the course/lecturer:
Prof. Maciej Stasiak

maciej.stasiak@put.pozna.pl

phone: +48616653905

Prerequisites

The student starting this subject should be familiar with the basics of traffic engineering, queue theory, networks services, network devices, network management systems, network protocols and telecommunications techniques that are used in telecommunications and computer networks. He/she should be able to solve basic problems in the field of telecommunications using a mathematical apparatus in the field of algebra and probability. He/she should also be aware of the need for a professional approach to solve technical problems and taking responsibility for the technical solutions he/she proposes.

Course objective

Providing students with knowledge about advanced solutions in the field of traffic control in packet networks and with methods used in dimensioning and design of communication networks with differentiated services.

Developing students' ability to solve problems related to modeling, designing and implementing wide area networks with differentiated service quality.

Course-related learning outcomes

Knowledge

1. A student has ordered and mathematically based knowledge of the teletraffic theory and engineering, parameterization, dimensioning and optimization of networks and network systems.

2. A student has ordered practical knowledge in the field of ICT network design.

3. A student has in-depth knowledge of the construction and operation of telecommunication systems built for the provision of multimedia services.

Skills

1. A student is able to analyze and design packet networks, ensuring that the designed solutions achieve the required technical parameters.

2. A student is able to prepare a scientific study and a presentation on the implementation of a requested task in the field of telecommunications. He/she is able to discuss/defend the proposed solution of the problem.

Social competences

1. A student knows the limits of own knowledge and skills, understands the need for further study/training.

2. A student is aware of the need for a professional approach to solve technical problems and taking responsibility for the technical solutions he/she proposes.

Methods for verifying learning outcomes and assessment criteria

Learning outcomes presented above are verified as follows:

The knowledge acquired as part of the lecture is verified during the written and / or oral exam. The exam consists of answers to 3-5 problem questions. Questions are asked by the teacher (in the case of a written exam) or randomly drawn (in the case of an oral exam). Regardless of the form of the exam (oral, written), the questions come from a collection of 20 issues known to students and passed on during the lecture. Each answer to a given question is rated on a scale of 2 to 5, and the final result is the average of the scores for individual answers.

Completion of the project consists in assessing the documentation of the developed software (containing the results of calculations and their analysis), necessary to parameterize the network system with a given traffic control mechanism, as well as the presentation and defence of the completed project. Each of the above elements, i.e. documentation, presentation and defence, are rated on a scale of 2 to 5. To pass the project, it is necessary that each of the listed elements to be assessed is rated at least satisfactory (3.0). After this condition is met, the final grade for the project is the arithmetic average of the grades obtained for: documentation, presentation, and defence.

Programme content

1. The following topics will be discussed as part of the lecture:

- Levels of packet network analysis;

- Resource models in multi-service networks;

- Streaming, elastic and adaptive traffic;

- Models of systems with thresholdless compression;

- Models of resource distribution/management;

- Models of multi-service systems with priorities, traffic preemption algorithms;

- Models of traffic distribution and overflow in multi-service systems;

- Models of load balancing in network systems;

- Models of virtualization of network resources;

- Mechanisms for traffic classification, marking, admission and shaping;

- Packet scheduling and buffer management mechanisms;

- TE (Traffic Engineering) mechanisms for MPLS and Carrier Ethernet networks.

2. As part of the project, students prepare software necessary to parameterize the network system with a given traffic control mechanism, as well as documentation with the results of calculations and their analysis.

Teaching methods

- a traditional lecture with elements of a problem lecture;

- a multi-phase project.

Bibliography

Basic

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

2. www.ietf.org (the number of required RFCs will be provided during lectures).

Additional

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	100	4,0
Classes requiring direct contact with the teacher	58	2,0
Student's own work (literature studies, preparation for an exam, project elaboration) [1]	42	2,0

[1] delete or add other activities as appropriate