COURSE DESCRIPTION CARD - SYLLABUS

Course name
Traffic engineering methods [S2EiT1-SKiTI>MIR]

Course

Field of study
Electronics and Telecommunications

Year/Semester
2/3

Area of study (specialization)
Computer Networks and Internet Technologies

Profile of study
general academic

Level of study
second-cycle

Course offered in
Polish

Form of study
full-time

Requirements
elective

Number of hours

Lecture
30

Laboratory classes
0

Other
0

Tutorials
0

Projects/seminars
15

Number of credit points

4,00

Coordinators

prof. dr hab. inż. Mariusz Głąbowski
mariusz.glabowski@put.poznan.pl

Lecturers

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 models and methods of traffic engineering, advanced methods of traffic management and network design methods with varying quality of service. Developing students' skills in solving problems arising in modeling and designing wide-area networks with differentiated service quality.

Course-related learning outcomes

none

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

- Resource models of multi-service networks;
- Fixed point methodology in node analysis;
- Methods for simulating networks and network systems;
- Methods of analyzing switching systems;
- Methods of increasing network reliability and security;
- Traffic flow optimization methods;
- Mechanisms for managing resource allocation in multi-service packet networks.

Course topics

1. The lecture will cover the following issues:
- Resource models of multi-service networks;
- Fixed point methodology in node analysis;
- Methods of network protocol analysis;
- Methods for simulating networks and network systems;
- Methods of analyzing switching systems;
- Methods of increasing network reliability and security;
- Traffic flow optimization methods;
- Mechanisms for managing resource allocation in multi-service packet networks.
2. As part of the project, students prepare the software necessary for the parameterization of the network system with a given traffic management mechanism, and 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

1. Stasiak M., Głąbowski M., Zwierzykowski P.: Modelowanie i wymiarowanie ruchomych sieci bezprzewodowych. Wydawnictwo Komunikacji i Łączności, Warszawa 2009.

Additional
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. 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	4,00
Classes requiring direct contact with the teacher	58	2,00
Student's own work (literature studies, preparation for laboratory classes/ tutorials, preparation for tests/exam, project preparation)	42	2,00