STUDY MODULE DESCRIPTION FORM

Name of the module/subject **Traffic Control**		Code **1010802131010823521**
Field of study **Electronics and Telecommunications**	Profile of study (general academic, practical) **general academic**	Year /Semester **2 / 3**
Elective path/specialty **Information and Communication**	Subject offered in: **English**	Course (compulsory, elective) **elective**
Cycle of study: **Second-cycle studies**	Form of study (full-time,part-time) **full-time**	

No. of hours				No. of credits
Lecture: **2** Classes: **-** Laboratory: **-** Project/seminars: **1**				**3**

Status of the course in the study program (Basic, major, other) **major**	(university-wide, from another field) **from field**

Education areas and fields of science and art	ECTS distribution (number and %**)**

technical sciences
       Technical sciences
	3 100%
	       3 100%

Responsible for subject / lecturer:	Responsible for subject / lecturer:
prof. dr hab. inż. Maciej Stasiak email: stasiak@et.put.poznan.pl tel. +48 61 665 39 06 Wydział Elektroniki i Telekomunikacji ul. Piotrowo 3A 60-965 Poznań	prof. dr hab. inż. Maciej Stasiak email: stasiak@et.put.poznan.pl tel. +48 61 665 39 06 Wydział Elektroniki i Telekomunikacji ul. Piotrowo 3A 60-965 Poznań

Prerequisites in terms of knowledge, skills and social competencies:

1	**Knowledge**	Knows the basics of traffic engineering, queuing theory, services, devices, management systems, network protocols and telecommunication techniques used in telecommunication and computer networks [K1_W22].
2	**Skills**	Is able to use known mathematical analysis, algebra and theory of probability concepts to solve basic problems in electronics and telecommunication [K1_U07]. Is able to solve standard/typical problems related to traffic engineering and parametrization of network elements [K1_U26].
3	**Social competencies**	Demonstrates responsibility and professionalism in solving technical problems [K1_K02].

Assumptions and objectives of the course:

The aim of the course is to familiarize students with advanced traffic management mechanisms, and network design methods for varying parameters of quality of service.

Study outcomes and reference to the educational results for a field of study

Knowledge:

1. Has a systematic knowledge, with necessary mathematical background, of traffic theory and traffic engineering; of design, dimensioning and optimization of networks and network systems. - [K2_W11]

2. Has a systematic practical knowledge of designing ICT networks - [K2_W14]

3. Has in-depth knowledge of construction and operation of communication systems used to provide multimedia services. - [K2_W01]

Skills:

1. Is able to analyze, design, construct and exploit advanced telecommunications systems and various networks and devices which are part of them, ensuring that the designed systems and networks will have required technical parameters.   - [K2_U16]

2. Is able to prepare a scientific paper or technical report and give a presentation (in English or in Polish) on solving a problem in the area of telecommunication; is able to participate in a discussion related to the presented problem.   - [K2_U02]

Social competencies:

1. Is aware of the limitations of his/her current knowledge and skills; is committed to lifelong learning. - [K2_K04]

2. Is aware of the necessity to approach solving technical problems with responsibility and professionalism. - [K2_K05]

Assessment methods of study outcomes
Final written exam.
Credit of the project.

Course description
1. Models of resources in multi-service networks.
2. Stream traffic, elastic and adaptive traffic.
3. Models of product-form state-dependent systems.
4. Models of threshold management (reservation systems, single-threshold systems, multi-threshold systems, systems with hysteresis)
5. Management models of thresholdless compression.
6. Mechanisms of traffic pushing out, traffic limitations, priorities.
7. Management models of distribution and overflow of multi-service traffic.
8. Modeling of multi-service queuing systems.
9. Project: parameterization of the system with an assumed management mechanism.

Basic bibliography:

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

Additional bibliography:

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

2. Akimuru H., Kawashima K.: Teletraffic. Theory and Applications, Springer, NY, 1993.

Result of average student's workload	
Activity	**Time (working hours)**
1. Lectures	30
2. Project	15
3. Preparation of the project	20
4. Preparation for the exam	10
5. Consultations	3
6. Exam	2
7. Discussion of the results of the exam	2

Student's workload		
Source of workload	**hours**	**ECTS**
Total workload	80	3
Contact hours	50	2
Practical activities	35	1