

FACULTY OF PURE AND APPLIED MATHEMATICS

SUBJECT CARD**Name of subject in Polish: TEORIA KOLEJEK I SIECI KOMUNIKACYJNE****Name of subject in English: Queues and Communication Networks****Main field of study (if applicable): Applied Mathematics****Specialization (if applicable): MODELLING, SIMULATION, OPTIMIZATION****Profile: academic / practical*****Level and form of studies: 2nd level/ full-time /****Kind of subject: optional****Subject code MAT001583****Group of courses YES**

	Lecture	Classes	Laboratory	Project	Seminar
Number of hours of organized classes in University (ZZU)	30	30			
Number of hours of total student workload (CNPS)	90	60			
Form of crediting	Examination				
For group of courses mark (X) final course	X				
Number of ECTS points	3	2			
including number of ECTS points for practical classes (P)	2	2			
including number of ECTS points corresponding to classes that require direct participation of lecturers and other academics (BU)	1,5	1,5			

*delete as not necessary

PREREQUISITES RELATING TO KNOWLEDGE, SKILLS AND OTHER COMPETENCES

1. Student has an elementary knowledge of probability theory.

SUBJECT OBJECTIVES

C1 Learning and mastery of key concepts and methods in the field of queueing theory and communication networks

SUBJECT EDUCATIONAL EFFECTS

relating to knowledge:

PEU_W01 knows the most important theorems and hypotheses of queueing theory

PEU_W02 knows the basics of stochastic modeling of stochastic networks with applications to biology, physics, economics etc.

relating to skills:

PEU_U01 can construct queueing models used in various applications

relating to social competences:

PEU_K01 can by himself/herself search for information in the literature, even in foreign languages

PROGRAMME CONTENT

Lecture		Number of hours
Lec 1	Basic concepts from Markov processes theory	2
Lec 2	An outline of the theory of point processes	2
Lec 3	Steady state analysis of Markovian queues	4
Lec 4	Erlang Loss System	2
Lec 5	Open Jackson network and Gordon-Newel network	6
Lec 6	Multi-class Queue	4
Lec 7	Multiserver queus and various queue disciplines	4
Lec 8	Queues with feedback and loss systems	4
Lec 9	Transient analysis of Markovian queues	2
	Total hours	30

Classes		Number of hours
Cl 1	Illustration of all models.. Analytical and computer methods. Examples of queuing models.	30
	Total hours	30

TEACHING TOOLS USED
N1. Lecture problem - traditional method. N2. Problem and counting exercises. N3. Consultations. N4. Student's self work - preparation for exercises.

EVALUATION OF SUBJECT LEARNING OUTCOMES ACHIEVEMENT

Evaluation (F – forming (during semester), P – concluding (at semester end))	Educational effect number	Way of evaluating educational effect achievement
F1	PEK_W01 PEK_W02 PEK_K01	exam
F2	PEK_U01 PEK_K01	oral responses, tests, small tests
$P=0.5*F1+0.5*F2$		

PRIMARY AND SECONDARY LITERATURE

PRIMARY LITERATURE:

[1] Asmussen, S. (2003) Applied Probability and Queues, Springer.

SECONDARY LITERATURE:

[1] Cohen, J.W. (1969) The Single Server Queue North, Holland.

[2] Takacs, L. (1962) Introduction to the Theory of Queues Oxford University Press.

SUBJECT SUPERVISOR (NAME AND SURNAME, E-MAIL ADDRESS)

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