Zał. nr 4 do ZW 64/2012

FACULTY OF PURE AND APPLIED MATHEMATICS
SUBJECT CARD

Name in Polish: TEORIA KOLEJEK I SIECI KOMUNIKACYJNE
Name in English: Queues and Communication Networks
Main field of study (if applicable): APPLIED MATHEMATICS
Specialization (if applicable): MODELLING, SIMULATION, OPTIMIZATION
Level and form of studies: ~~1st~~/ 2nd* level, full-time ~~/ part-time~~*
Kind of subject: ~~obligatory~~ / optional / ~~university-wide~~*
Subject code MAT001583
Group of courses YES /~~NO~~*

	Lecture	Classes	Laboratory	Project	Seminar
Number of hours of organized classes in University (ZZU)	30	30			
Number of hours of total student workload (CNPS)	150				
Form of crediting	Examination / ~~crediting with grade~~*	Examination / crediting with grade*	Examination / crediting with grade*	Examination / crediting with grade*	Examination / crediting with grade*
For group of courses mark (X) final course	X				
Number of ECTS points	5				
including number of ECTS points for practical (P) classes	2	2			
including number of ECTS points for direct teacher-student contact (BK) classes	1,5	1,5			

*delete as applicable

PREREQUISITES RELATING TO KNOWLEDGE, SKILLS AND OTHER COMPETENCES

1. Student has an elementary knowledge of probability theory.

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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:
PEK_W01 knows the most important theorems and hypotheses of queuing theory
PEK_W02 knows the basics of stochastic modeling of stochastic networks with applications to biology, physics, economics etc.
relating to skills:
PEK_U01 can construct queuing models used in various applications
relating to social competences:
PEK_K01 can by himself/herself search for information in the literature, even in foreign languages

PROGRAMME CONTENT		
Form of classes - 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

Form of classes - class		**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 EDUCATIONAL EFFECTS 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:

[2] Cohen, J.W. (1969) The Single Server Queue North, Holland.
[3] Takacs, L. (1962) Introduction to the Theory of Queues Oxford University Press.

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

Prof. dr hab. Zbigniew Palmowski (Zbigniew.Palmowski@pwr.edu.pl)

MATRIX OF CORRELATION BETWEEN EDUCATIONAL EFFECTS FOR SUBJECT **QUEUES AND COMMUNICATION NETWORKS MAT001583** AND EDUCATIONAL EFFECTS FOR MAIN FIELD OF STUDY **APPLIED APPLIED MATHEMATICS** AND SPECIALIZATION **MODELLING, SIMULATION, OPTIMIZATION**

Subject educational effect	**Correlation between subject educational effect and educational effects defined for main field of study and specialization (if applicable)****	**Subject objectives*****	**Programme content*****	**Teaching tool number*****
PEK_W01 (knowledge)	K2MST_W03 K2MST_mso_W01	C1	Lec 1-Lec 10	1, 3
PEK_W02	K2MST_W09 K2MST_mso_W02 K2MST_mso_W03	C1	Lec 1-Lec 10	1, 3
PEK_U01 (skills)	K2MST_U15 K2MST_U24 K2MST_U25 K2MST_mso_U01 K2MST_mso_U02 K2MST_mso_U03	C1	Cl 1	2, 3, 4
PEK_K01 (competences)	K2MST_K06 K2MST_mso_K01 K2MST_mso_K02	C1	Lec 1-Lec 10, Cl 1	1, 2, 3, 4

** - enter symbols for main-field-of-study/specialization educational effects

*** - from table above