(*faculty stamp*)

COURSE DESCRIPTION

1.Course title: Introduction to queueing theory	**2. Course code:** WM2
3. Validity of course description: 2017-18	
4. Level of studies: 1st cycle of higher education	
5. Mode of studies: intramural studies	
6. Field of study: COMPUTER SCIENCE	(RMS)
7. Profile of studies: general academic	
8. Programme: all programmes	
9. Semester: 5	
10. Faculty teaching the course: Institute of Mathematics	
11. Course instructor: dr hab. inż. Wojciech Kempa	
12. Course classification: course of limited choice	
13. Course status: monographic	
14. Language of instruction: English	

15. Pre-requisite qualifications:

Basics of probability theory, algebra and calculus.

16. Course objectives:

The purpose of the course is to familiarize the students with main queueing models, methods for their analysis and practical applications in computer science. The course is given in English.

17. Description of learning outcomes:

Student who has completed the subject:

Nr	Learning outcomes description	Method of assessment	Teaching methods	Learning outcomes reference code
1.	W01: knows main queueing models and their basic characteristics;	test, report	lecture, class	T1A_W04 K1A_W06
2.	W02: knows basic mathematical methods using in queueing theory;	test, report	lecture, class	T1A_W04 K1A_W06
3.	U01: can find information on queueing systems and their applications from the English-language literature, data bases and other sources;	test, report	lecture, class	T1A_U01
6.	K01: understands the need for lifelong learning; can inspire and organize the learning process of others.	test, report	lecture, class	T1A_K01

18. Teaching modes and hours

Lecture	Class	Laboratory	Projekt	Seminar
30	30			

19. Syllabus description:

Lecture: Poisson process and its properties; discrete-time Markov chain; classification of states and ergodic distribution; queueing systems and their main stochastic characteristics; Kendall's classification of queueing systems; M/M/1-type queueing system and its main characteristics; queueing models with priorities; M/G/1-type queueing system; Pollaczek-Khintchine formulae and Lindley's equation; chosen models of queueing systems with limited access to server; applications of queueing models in computer science;
Class/laboratory: practical realization of the issues presented during the lectures.

20. Examination: No

21. Primary sources:

1. S. Asmussen: *Applied probability and queues*, Springer, 2003.

2. J. N. Daigle: *Queueing theory with applications to packet telecommunication*, Springer, 2005.

3. G. Giambene: *Queuing theory and telecommunications. Networks and applications*, Springer, 2005.

4. M. Harchol-Balter: *Performance modeling and design of computer systems. Queueing theory in action*, Cambridge University Press, 2013.

22. Secondary sources:

1. W.M. Kempa: *Queueing models with limited access to server*, Wydawnictwo Politechniki Śląskiej, 2013.

2. L. Lakatos, Szeidl, M. Telek*: Introduction to queueing systems with telecommunication applications*, Springer, 2013.

3. J. Medhi: *Stochastic models in queueing theory*, Academic Press, 2003.

4. T.G. Robertazzi*: Computer networks and systems. Queueing theory and performance evaluation*, Springer, 2000.

5. S. Ross: *Introduction to probability models*, Academic Press, 2010.

23. Total workload required to achieve learning outcomes

Lp.	Teaching mode :	Contact hours / Student workload hours
1	Lecture	30/30
2	Classes	30/30
3	Laboratory	/
4	Project	/
5	BA/ MA Seminar	/
6	Other	/
	Total number of hours	**60/60**

24. Total hours: 120

25. Number of ECTS credits: 4

26. Number of ECTS credits allocated for contact hours: 4

27. Number of ECTS credits allocated for in-practice hours (laboratory classes, projects): 2

26. Comments:

The assessment rules: class test: 60 pts, report (presentation): 40 pts

For passing the course it is required to accumulate 41 pts. The grade will be given according to the following scale:

41-55 p.: sufficient (3.0)

56-70 p.: plus sufficient (3.5)

71-80 p.: good (4.0)

81-90 p.: plus good (4.5)

91-100 p.: very good (5.0)

Approved:

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(date, Instructor's signature)

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(*date , the Director of the Faculty Unit signature)*