

COURSE DESCRIPTION

1. Course title: MODELLING OF TRANSPORT PROCESSES		2. Course code MK2_7		
3. Validity of course description: 2015/2016				
4. Level of studies: BA, BSc programme / MA, MSc programme lub 1 st cycle / 2 nd cycle of higher education				
5. Mode of studies: intramural studies / extramural studies				
6. Field of study: Transport (RT)		(FACULTY SYMBOL)		
7. Profile of studies: general academic				
8. Programme:				
9. Semester: 1				
10. Faculty teaching the course: Faculty of Transport / Department of Traffic Engineering				
11. Course instructor: Grzegorz Sierpiński, PhD Eng				
12. Course classification: common courses				
13. Course status: compulsory / elective				
14. Language of instruction: English				
15. Pre-requisite qualifications: transportation infrastructure, transportation systems and processes, basis of traffic engineering, optimization of transportation network, knowledge of a general of computer applications.				
16. Course objectives: Modelling skill of transport systems and processes. Knowledge about prediction of traffic. Analysis skill of transport processes.				
17. Description of learning outcomes:				
Nr	Learning outcomes description	Method of assessment	Teaching methods	Learning outcomes reference code
1	The student knows the importance of traffic models when considering future modernization of transportation systems and processes of managing traffic flows. He also has knowledge about the description of transport processes.	exam (oral report)	lecture (cases and discuss)	K_W07(++) K_W12(++) K_W14(+) K_W21(++) K_U04(+) K_U05(+) K_U06(+) K_U07(+) K_U14(++) K_U15(+++) K_U19(++) K_K02(+++)
2	The student identifies the relationship between transportation systems and the environment and knows the trends and development of transportation systems (including alternative transportation).	exam (oral report)	lecture (case studies)	K_W12(++) K_W13(+++) K_W17(+++) K_U20(++) K_K02(+++)
3	The student is able to estimate the traffic volume according to the GDDKiA guidelines for planning and design purposes.	exam (oral report)	lecture (case studies)	K_U03(++) K_U12(+)
4	The student is able to identify queuing systems according to the Kendall classification and evaluate their effectiveness.	exam (oral report)	lecture (cases and discuss)	K_W07(++) K_W21(++) K_U03(++) K_U14(++) K_U15(+++)

18. Teaching modes and hours

Lecture / BA/MA Seminar / Class / Project / Laboratory

Lecture - 30 h

19. Syllabus description:

Lecture: Review of real transport processes. Modelling of transport systems (static, dynamic, stochastic, deterministic models). Models of transport system environment – dependences and demand of transport. Time delay models. Sustainable development and directions of transportation infrastructure and systems development and transportation policy. Alternative modes of transportation. Transportation accessibility. Queuing theory – basis queuing systems (Kendall classification., Little's formulas etc.). Forecasting rules of traffic flow. Simulation of transport processes.

20. Examination: yes**21. Primary sources:**

1. Daganzo C. F.: Fundamentals of transportation and traffic operations. Elsevier Science Ltd, Oxford 1997.
2. Gartner N., Messer C. J., Rathi A. K.: Traffic Flow Theory A State-of-the-Art Report. Transportation Research Board, Washington 2001.
3. Kleinrock L.: Queuing systems. Volume I: Theory. A Wiley-Interscience Publication. Canada 1975.
4. Leszczyński J.: Modelowanie systemów i procesów transportowych. OWPW. Warszawa 1999.
5. Kuwahara M., Horiguchi R., Yoshii T.: Standard verification process for traffic flow simulation model. Version 2, Traffic Simulation Committee, Japan Society of Traffic Engineers, 2002.
6. Gaca S., Suchorzewski W., Tracz M.: Inżynieria ruchu drogowego. Teoria i praktyka. WKiŁ. Warszawa 2008.
7. Metoda obliczania przepustowości skrzyżowań z sygnalizacją świetlną. GDDKiA, Warszawa 2004. (metodologia aktualnie zalecana do stosowanie w Polsce)
8. Zasady prognozowania ruchu drogowego, GDDKiA Warszawa. (z uwzględnieniem zmian wprowadzonych 15.03.2007r.) (metodologia aktualnie zalecana do stosowanie w Polsce)

22. Secondary sources:

1. Sabra Z., Wallace Ch. E., Lin F.: Traffic analysis software tools. Transportation Research Board / National Research Council, Circular No E-CO14, September 2000.
2. Gutenbaum J.: Modelowanie matematyczne systemów. PAN Instytut Badań systemowych. Akademicka Oficyna Wydawnicza EXIT, Warszawa 2003.
3. Szymczak M.: Logistyka miejska. Wydawnictwo Akademii Ekonomicznej w Poznaniu, Poznań 2008.
4. Szołtysek J.: Podstawy logistyki miejskiej. Wydawnictwo Akademii Ekonomicznej w Katowicach, Katowice 2007.
5. Tundys B.: Logistyka miejska. Koncepcje. Systemy. Rozwiązania. Difin, Warszawa 2008.

23. Total workload required to achieve learning outcomes

Lp.	Teaching mode :	Contact hours / Student workload hours
1	Lecture	30/15
2	Classes	/
3	Laboratory	/
4	Project	/
5	BA/ MA Seminar	/
6	Other	/
	Total number of hours	30/15

24. Total hours: 45**25. Number of ECTS credits:** 2**26. Number of ECTS credits allocated for contact hours:** 1**27. Number of ECTS credits allocated for in-practice hours (laboratory classes, projects):** 0**28. Comments:**