

STUDY MODULE DESCRIPTION FORM		
Name of the module/subject Modeling of Transportation Systems and Processes		Code 1010621211010612254
Field of study Transport	Profile of study (general academic, practical) (brak)	Year /Semester 1 / 1
Elective path/specialty Aircraft Transport	Subject offered in: Polish	Course (compulsory, elective) obligatory
Cycle of study: Second-cycle studies	Form of study (full-time, part-time) full-time	
No. of hours Lecture: 2 Classes: 1 Laboratory: 1 Project/seminars: -		No. of credits 4
Status of the course in the study program (Basic, major, other) (brak)		(university-wide, from another field) (brak)
Education areas and fields of science and art technical sciences		ECTS distribution (number and %) 4 100%
Responsible for subject / lecturer: Marcin Kiciński, Eng. PhD email: marcin.kicinski@put.poznan.pl tel. 61 665 21 29 Faculty of Working Machines and Transportation 3 Piotrowo street 60-965 Poznań		Responsible for subject / lecturer: Szymon Fierek, M. Sc (Eng.) email: szymon.fierek@put.poznan.pl tel. 61 665 27 16 Faculty of Working Machines and Transportation 3 Piotrowo street 60-965 Poznań
Prerequisites in terms of knowledge, skills and social competencies:		
1	Knowledge	The student has a basic general knowledge: processes, modelling, systems and relationships. The student knows and understands a basic general methods and practical tools in the field of transportation processes and systems. The student knows the main task of systems, such as: transport and logistics companies.
2	Skills	The student is able to use the concepts and methods in the description of processes and systems. Students can use their knowledge to analyze transport systems and processes. Student is able to identify specific problems in transportation systems.
3	Social competencies	Student is able to do a literature research and knows the rules of work group and discussion. The student has self-reliance in solving problems.
Assumptions and objectives of the course: Acquiring of the knowledge about modelling of transport processes and systems and skills needed to perform a traffic and different models of transportation systems.		
Study outcomes and reference to the educational results for a field of study		
Knowledge:		
1. Has a detailed knowledge of the transport systems modeling, models of transport systems, the distribution of streams in transport networks, transportation system environment, forecasting the development of transport systems, the dynamics of transport processes - [[K2A_W10]]		
2. Has a structured, theoretically founded knowledge in the field of transport economics: economic importance and functions of transport - the location of production and settlement, elements of microeconomics, costs of transport and their structure, economic balance in the transport, nature and function of the transport market, competition in the transport market, prices of services - [[K2A_W11]]		
Skills:		
1. Is able to obtain information from the literature, internet, databases and other sources in Polish and English. Can integrate the information to interpret and learn from them, create and justify opinions - [[K2A_U01]]		
2. Is able to communicate using a variety of techniques in a professional environment and other environments using the formal record of the design, technical drawings, concepts and definitions in the scope of the study area - [[K2A_U02]]		
3. Has the ability to self-educate using modern teaching tools such as remote lectures, webpages and databases, educational software, electronic editions - [[K2A_U06]]		
Social competencies:		

1. Understands the need and knows the possibilities of lifelong learning, knows the need for acquiring new knowledge for professional development - [[K2A_K01]]
2. Is aware of and understands the importance and impact of non-technical aspects of mechanical engineering activities and its impact on the environment and responsibility for own decisions in short and long-term aspect - [[K2A_K02]]
3. Is able to identify and resolve the dilemmas associated with the profession, among others problems at the technology/environment level - [[K2A_K06]]

Assessment methods of study outcomes		
Colloquium/exam		
Course description		
Introduction to modelling of transport processes and systems, traffic modelling in various towns (Poland / world), demand models (FSM, ABM, LM); model of supply (transportation networks, models for public transport), modal split (model calibration, individual and public transport), forecast, transportation studies, traffic simulation, software (tools) for the modelling and traffic simulation.		
Basic bibliography:		
1. Hensher D.A., Button K., J. (eds.): Handbook of Transport Modelling. Elsevier, Oxford, 2007		
2. Jacyna M.: Wybrane zagadnienia modelowania systemów transportowych, Oficyna Wydawnicza Politechniki Warszawskiej, 2009 (in polish).		
3. Ortuzar J., Willumsen L.G.: Modelling Transport. John Wiley & Sons, New York, 2011 (in polish)		
Additional bibliography:		
1. Leszczyński J.: Modelowanie systemów i procesów transportowych, Oficyna wydawnicza. Politechniki Warszawskiej, 1999 (in polish).		
2. Sivakumar A.: Modelling Transport: A Synthesis of Transport Modelling Methodologies, Imperial College, London 2007.		
Result of average student's workload		
Activity	Time (working hours)	
1. Preparing for classes	14	
2. Lectures	60	
3. Consultation	5	
4. Preparation for the colloquium/exam	18	
5. Colloquium/exam	3	
Student's workload		
Source of workload	hours	ECTS
Total workload	100	4
Contact hours	68	0
Practical activities	0	0