GDAŃSK UNIVERSITY OF TECHNOLOGY

Subject card

Subject name and code	Transport systems and processes, PG_00064277		
Field of study	Transport		
Date of commencement of studies	October 2024	Academic year of realisation of subject	2026/2027
Education level	first-cycle studies	Subject group	Optional subject group Subject group related to scientific research in the field of study
Mode of study	Full-time studies	Mode of delivery	at the university
Year of study	3	Language of instruction	Polish
Semester of study	5	ECTS credits	4.0
Learning profile	general academic profile	Assessment form	assessment
Conducting unit	Department of Transportation Engineering -> Faculty of Civil and Environmental Engineering -> Faculties of Gdańsk University of Technology		
Name and surname of lecturer (lecturers)	Subject supervisor	dr inż. Krystian Birr	
	Teachers	dr inż. Krystian Birr mgr inż. Patrycja Jerzyło dr hab. inż. Kazimierz Jamroz dr inż. Sławomir Grulkowski dr hab. inż. Marek Pszczoła	

Lesson types							
	Lesson type	Lecture	Tutorial	Laboratory	Project	Seminar	SUM
	Number of study hours	30.0	0.0	30.0	0.0	0.0	60
	E-learning hours included: 0.0						

Learning activity and number of study hours					
	Learning activity	Participation in didactic classes included in study plan	Participation in consultation hours	Self-study	SUM
	Number of study hours	60	5.0	35.0	100

Subject objectives	
	The aim of the course is to provide increased knowledge in the field of transport systems and processes . Students gain knowledge of the theoretical basis of the transport system , rules and methods for modeling transport subsystems or components and subsystems of the organization and management of transport. In addition, students gain the skills to construct a transport model for the selected area (city, county) .

Learning outcomes

Course outcome	Subject outcome	Method of verification
[K6_W06] has knowledge to understand transportation development planning considering economic, spatial, ecological, and social conditions and the consequences of transportation activities	The student describes the structure and operating principles of transport systems and processes. The student knows the spatial, economic, social and environmental factors influencing their development and understands the impacts of transport operations on various areas of human activity.	[SW1] Assessment of factual knowledge
[K6_K02] understands the need to formulate and communicate to the public information and opinions on the achievements of environmental engineering and other aspects of work of a sanitary industry engineer; is aware of the importance of and understands non-technical aspects and consequences of engineering; takes steps to communicate such information and opinions in a comprehensible manner and present different points of view	The student understands the need to reliably present and communicate information on the functioning of transport systems and processes and their impact on the economy, society and the environment. The student is ready to consider different perspectives when evaluating transport solutions.	[SK2] Assessment of progress of work
[K6_U09] able to select tools and methods, carry out assessments and simple tests of transport systems to an extent required of the specialty / learning profile	The student is able to select and apply appropriate methods and tools to analyse and evaluate the functioning of transport systems and processes, identify their basic parameters, and interpret the results to assess transport performance and efficiency.	[SU4] Assessment of ability to use methods and tools

Subject contents

Course content – lecture

Transport systems - synthesis . Transport models - general characteristics . Transport models - practical applications , the program VISUM . Theoretical basis of operation of transportation systems. Transport systems modeling elements . Measurement and evaluation of the functioning of the transport systems and its components. Modeling of the transport network. Organization and management of road traffic. Organization and management of rail transport . Organization and logistics management . Organization and management of air transport. Systems for urban and regional transport . Characterization and modeling of the transport system and its environment. Characterization and modeling of traffic organization and transport process . Characterization and modeling of the development of transport systems .

Course content – laboratory

During the class the student develops transport model of the selected area .

Prerequisites and co-requisites

Students should complete the following courses : Fundamentals of Transport Systems .

Assessment methods and criteria

Subject passing criteria	Passing threshold	Percentage of the final grade
Lectures	60.0%	50.0%
Laboratory	50.0%	50.0%

Recommended reading

Basic literature

- Leszczyński J.: Modelowanie systemów i procesów transportowych. Oficyna Wydawnicza PW, Warszawa 1999 r.
- Rydzkowski W. Wojewódzka-Król K.: Transport, PWN, 2007 r.
- Jacyna M.: Modelowanie i ocena systemów transportowych. Oficyna Wydawnicza PW, Warszawa 2009 r.
- Dorosiewicz S.: Potoki ładunków w sieciach transportowych. ITS Warszawa 2010.

Supplementary literature

1. Najder J.: Transport międzynarodowy PWE 2008.
2. Grzywacz W. i inni: Polityka transportowa WUG 2000.
3. Czasopismo: Transport Miejski i Regionalny
4. Transport samochodowy ładunków. ITS Warszawa 2009.

eResources addresses

Example issues/ example questions/ tasks being completed	1. Define transport needs, including their classification and the characteristics of different types of trips. 2. Describe and explain methods for evaluating the efficiency of transport process organisation. 3. Describe the procedure for planning and designing transport systems. 4. Explain the three-zone concept and discuss its application to a metropolitan area and a city with a population of 50,000–100,000 inhabitants. 5. What is the relationship between theories and models? List the theories used to describe transport systems. 6. Describe the four-step transport model – explain its principles, components, advantages and disadvantages. What data are required to perform trip distribution in its basic form? 7. Define the following terms: train, trip, mobility, motorisation rate, transport performance (passenger-kilometres/tonne-kilometres), and vehicle-kilometres operated. 8. Discuss the classification of models. Provide a general mathematical description of a transport system. 9. Describe the process of modelling transport system development. 10. Describe models for the optimal allocation of resources and tasks within a transport network. 11. Characterise urban development models. Describe the linear (corridor-based) model of urban development. 12. Characterise the Transit-Oriented Development (TOD) approach to urban spatial planning. Provide examples. 13. Describe the model of a transport system's environment. Characterise the role of the political decision-making centre in transport system management. 14. Describe air transport systems from geographical and operational perspectives. 15. Discuss the factors influencing demand for air transport services.
Practical activites within the subject	Not applicable

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