GDAŃSK UNIVERSITY OF TECHNOLOGY

Subject card

Subject name and code	Advanced transportation systems, PG_00064989		
Field of study	Transport and Logistics		
Date of commencement of studies	February 2026	Academic year of realisation of subject	2026/2027
Education level	second-cycle studies	Subject group	Specialty 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	1	Language of instruction	Polish
Semester of study	2	ECTS credits	3.0
Learning profile	general academic profile	Assessment form	assessment
Conducting unit	Division of Marine Auxiliary Machinery -> Institute of Naval Architecture -> Faculty of Mechanical Engineering and Ship Technology -> Faculties of Gdańsk University of Technology		
Name and surname of lecturer (lecturers)	Subject supervisor	dr inż. Jacek Nakielski	
	Teachers	dr inż. Jacek Nakielski	

Lesson types

Lesson type	Lecture	Tutorial	Laboratory	Project	Seminar	SUM
Number of study hours	15.0	0.0	0.0	30.0	0.0	45

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	45	4.0	26.0	75

Subject objectives

The aim of the course is to:
Familiarize students with modern transport systems and technologies;
Present the operating principles of intelligent transport systems;
Analyze the impact of innovation on transport efficiency and sustainability;
Develop skills in designing transport systems.

Learning outcomes

Course outcome	Subject outcome	Method of verification
[K7_U01] utilizes acquired methods, tools and mathematical models for analysis and evaluation of transport systems and processes	The student is able to apply systems analysis methods, digital tools, and mathematical models to evaluate the efficiency and interoperability of modern transport systems, including autonomous and multimodal systems.	[SU1] Assessment of task fulfilment
[K7_W04] demonstrates knowledge encompassing selected issues in the field of advanced detailed knowledge, particularly in the scope of methods, techniques and tools specific to Transport and Logistics	The student understands the principles of designing modern transport systems and is able to synthesize them, taking into account technical, environmental, and organizational aspects.	[SW3] Assessment of knowledge contained in written work and projects
[K7_W03] demonstrates structured and theory supported knowledge encompassing key issues in the field of Transport and Logistics, enabling developement and synthesis of transport systems and processes	The student possesses in-depth knowledge of modern technologies and tools used in intelligent transport systems, including traffic management systems, the digitalization of logistics processes, and transport automation.	[SW1] Assessment of factual knowledge
[K7_U03] identifies and formulates task specifications in the scope of transport systems and processes design, including non-standard problems and taking into consideration their non-technical aspects	The student is able to identify design problems in the field of transport and formulate specifications for design tasks, taking into account social, environmental, and economic aspects.	[SU1] Assessment of task fulfilment [SU5] Assessment of ability to present the results of task

<table>
<tr><td>Subject contents</td><td>Course content – lecture

Możliwe tematy prac projektowych:
- Koncepcja nowoczesnego węzła intermodalnego dla przewozu ładunków masowych i zjednostkowanych łączących transport
drogowy, kolejowy i rzeczny na Odrze.
- Zrównoważony system transportu dla wybranego kampusu akademickiego.
- Koncepcja autonomicznego statku wraz z infrastrukturą dla ładunków masowych transportowanych lokalnie.
- Stacja PKM Kowale jako nowoczesny węzeł integracyjny dla podróżnych aglomeracji gdańskiej.

Course content – project

Possible project topics:
- Concept for a modern intermodal hub for bulk and unitized cargo, integrating road, rail, and river transport on the Oder.
- Sustainable transport system for a selected university campus.
- Concept for an autonomous vessel and associated infrastructure for locally transported bulk cargo.
- PKM Kowale station as a modern integration hub for travelers in the Gdańsk metropolitan area.</td></tr>
<tr><td>Prerequisites and co-requisites</td><td></td></tr>
<tr><td>Assessment methods and criteria</td><td>
<table>
<tr><th>Subject passing criteria</th><th>Passing threshold</th><th>Percentage of the final grade</th></tr>
<tr><td>oral assessment for the lecture course</td><td>51.0%</td><td>50.0%</td></tr>
<tr><td>evaluation of the project report and presentation</td><td>51.0%</td><td>50.0%</td></tr>
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<tr><td>Recommended reading</td><td>
<table>
<tr><td>Basic literature</td><td>Gucma L., Transport i logistyka · wybrane zagadnienia, Wydawnictwo Akademii Morskiej
Woxenius J., Intermodal Freight Transport, Springer
Dokumenty strategiczne UE dotyczące ITS</td></tr>
<tr><td>Supplementary literature</td><td>Artykuły naukowe z czasopism: Transport Research Part C, Journal of Intelligent Transportation Systems
Raporty branżowe: OECD, ITF, Komisja Europejska
Materiały z konferencji: ITS World Congress, Transport Research Arena</td></tr>
<tr><td>eResources addresses</td><td></td></tr>
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<tr><td>Example issues/ example questions/ tasks being completed</td><td>• multimodal hubs
• autonomous vessels
• sustainable development
• Big Data, AI, and IoT in transport systems</td></tr>
<tr><td>Practical activites within the subject</td><td>Not applicable</td></tr>
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