GDAŃSK UNIVERSITY OF TECHNOLOGY

Subject card

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| Subject name and code | Transport safety, PG_00064276 | | |
| 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 | Obligatory subject group in the field of study<br>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<br>Polish |
| Semester of study | 5 | ECTS credits | 3.0 |
| 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. Joanna Wachnicka | |
| | Teachers | dr inż. Anna Gobis<br>dr inż. Joanna Wachnicka | |

| Lesson types | Lesson type | Lecture | Tutorial | Laboratory | Project | Seminar | SUM |
|---|---|---|---|---|---|---|---|
| | Number of study hours | 15.0 | 15.0 | 0.0 | 15.0 | 0.0 | 45 |
| | E-learning hours included: 0.0 | | | | | | |
| | eNauczanie source address: https://enauczanie.pg.edu.pl/2025/course/view.php?id=8761 | | | | | | |

| 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 | 5.0 | 25.0 | 75 |

| Subject objectives | The aim of the course on transport safety is to provide a foundation in the following areas:<br>road, maritime, inland waterway, rail and air transport.<br>Basic knowledge of the state of safety in these sectors at various geographical scales, as well as the institutions responsible for overseeing the safe and efficient operation of all modes of transport. |
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## Learning outcomes

| Course outcome | Subject outcome | Method of verification |
|---|---|---|
| [K6_W05] has knowledge in the field of traffic engineering, methods, algorithms, and technologies for traffic control, as well as safety and reliability in transportation | The student is familiar with the basic risks, factors affecting safety and methods for assessing safety conditions in road, rail, air and water transport. | [SW1] Assessment of factual knowledge<br>[SW3] Assessment of knowledge contained in written work and projects |
| [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 is able to present and justify the results of transport safety analyses, taking into account their significance for users of transport systems and society. | [SK4] Assessment of communication skills, including language correctness<br>[SK1] Assessment of group work skills |
| [K6_U07] able to identify the influence of management mechanisms, technological progress, spatial policy, environmental protection, and safety on the functioning and development of transportation and to incorporate it into the process of planning, designing, construction, and operation of transportation infrastructure and systems. | The student is able to identify risks, analyse basic data relating to transport incidents, assess safety levels and propose measures to improve them. | [SU1] Assessment of task fulfilment<br>[SU3] Assessment of ability to use knowledge gained from the subject |

## Subject contents

Course content – exercises

Podstawowe pojęcia dotyczące bezpieczeństwa transportu, rodzaje zagrożeń oraz czynniki wpływające na powstawanie wypadków i incydentów. Znaczenie czynnika ludzkiego, infrastruktury, środków transportu i warunków środowiskowych. Charakterystyka bezpieczeństwa w transporcie drogowym, kolejowym, lotniczym, morskim i wodnym śródlądowym. Rodzaje zdarzeń transportowych, ich przyczyny i skutki. Podstawowe zasady zarządzania bezpieczeństwem, systemy nadzoru i instytucje odpowiedzialne za bezpieczeństwo w poszczególnych gałęziach transportu. Rozwiązania techniczne i organizacyjne ograniczające zagrożenia, w tym zabezpieczenia przejazdów kolejowo-drogowych i systemy sterowania ruchem kolejowym.

Ćwiczenia: pozyskiwanie i interpretacja danych o zdarzeniach drogowych z dostępnych baz; wyznaczanie i graficzna prezentacja bezwzględnych i względnych miar bezpieczeństwa ruchu drogowego; identyfikacja zagrożeń w infrastrukturze transportowej; inwentaryzacja terenowa i dokumentowanie obserwacji; podstawowe obliczenia widoczności z perspektywy pieszego i kierującego.

Projekt: analiza zmian stanu bezpieczeństwa ruchu drogowego na wybranym obszarze na podstawie danych statystycznych, porównanie jednostek terytorialnych i klasyfikacja ryzyka. Ocena bezpieczeństwa wybranego przejścia dla pieszych z wykorzystaniem obserwacji terenowych, materiałów kartograficznych i wytycznych projektowych. Analiza geometrii, profilu podłużnego i warunków widoczności; wyznaczanie trójkątów widoczności również na przykładzie przejazdu kolejowego lub tramwajowego. Opracowanie wyników, wskazanie zagrożeń, sformułowanie propozycji poprawy bezpieczeństwa i prezentacja rezultatów.

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Course content – project

Basic concepts relating to transport safety, types of hazards and factors contributing to accidents and incidents. The significance of the human factor, infrastructure, modes of transport and environmental conditions. Characteristics of safety in road, rail, air, maritime and inland waterway transport. Types of transport incidents, their causes and consequences. Basic principles of safety management, supervision systems and the bodies responsible for safety in the various modes of transport. Technical and organisational measures to mitigate risks, including safety measures at level crossings and railway traffic control systems.

Exercises: collecting and interpreting data on road incidents from available databases; calculating and graphically presenting absolute and relative measures of road safety; identifying hazards in transport infrastructure; conducting field surveys and documenting observations; basic visibility calculations from the perspective of a pedestrian and a driver.
Project: analysis of changes in road safety conditions in a selected area based on statistical data, comparison of territorial units and risk classification. Safety assessment of a selected pedestrian crossing using field observations, cartographic materials and design guidelines. Analysis of geometry, longitudinal profile and visibility conditions; determination of sight triangles, including examples involving railway or tram crossings. Compilation of results, identification of hazards, formulation of proposals to improve safety and presentation of findings.

## Prerequisites and co-requisites

A basic understanding of mathematical statistics.

<table>
<tr><td>Assessment methods and criteria</td><td colspan="2"><table>
<tr><th>Subject passing criteria</th><th>Passing threshold</th><th>Percentage of the final grade</th></tr>
<tr><td>lecture</td><td>51.0%</td><td>50.0%</td></tr>
<tr><td>exercises and a project</td><td>51.0%</td><td>50.0%</td></tr>
</table></td></tr>
<tr><td rowspan="3">Recommended reading</td><td>Basic literature</td><td>• Gaca, S., Suchorzewski, W., Tracz, M. (2008). Inżynieria ruchu drogowego. Teoria i praktyka. Warszawa: Wydawnictwa Komunikacji i Łączności.<br>• Krystek, R. (red.). (2009). Zintegrowany system bezpieczeństwa transportu. Tom 1: Diagnoza bezpieczeństwa transportu w Polsce. Warszawa–Gdańsk: Wydawnictwa Komunikacji i Łączności, Politechnika Gdańska.<br>• Chruzik, K. (2016). Inżynieria bezpieczeństwa w transporcie. Gliwice: Wydawnictwo Politechniki Śląskiej.<br>• Komenda Główna Policji. (2026). Wypadki drogowe w Polsce w 2025 roku. Warszawa: Komenda Główna Policji.</td></tr>
<tr><td>Supplementary literature</td><td>• Urząd Transportu Kolejowego. (2025). Raport w sprawie bezpieczeństwa 2024. Warszawa: Urząd Transportu Kolejowego.<br>• Urząd Lotnictwa Cywilnego. (2026). Sprawozdanie o stanie bezpieczeństwa lotnictwa cywilnego za rok 2025. Warszawa: Urząd Lotnictwa Cywilnego.<br>• Państwowa Komisja Badania Wypadków Morskich. (2026). Roczna analiza WIM 2025. Państwowa Komisja Badania Wypadków Morskich.<br>• Komenda Główna Policji. Wypadki drogowe w Polsce – raporty roczne z lat poprzednich. Warszawa: Komenda Główna Policji.<br>• Państwowa Komisja Badania Wypadków Morskich. Raporty z badań wypadków i incydentów morskich. Państwowa Komisja Badania Wypadków Morskich.</td></tr>
<tr><td>eResources addresses</td><td></td></tr>
<tr><td>Example issues/ example questions/ tasks being completed</td><td colspan="2">What factors influence the level of transport safety: road, maritime, inland waterway, rail and air transport.<br>What relative and absolute measures of road safety are you familiar with?<br>Define a road traffic accident, a seriously injured victim and a fatality.<br>What types of level crossings are you familiar with?<br>What is the ILS system in aviation? Explain how it works.</td></tr>
<tr><td>Practical activites within the subject</td><td colspan="2">Field exercises</td></tr>
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