



## COURSE DESCRIPTION CARD - SYLLABUS

Course name

Transportation Systems [S1Trans1>ST]

### Course

Field of study

Transport

Year/Semester

2/3

Area of study (specialization)

–

Profile of study

general academic

Level of study

first-cycle

Course offered in

Polish

Form of study

full-time

Requirements

compulsory

### Number of hours

Lecture

30

Laboratory classes

0

Other (e.g. online)

0

Tutorials

0

Projects/seminars

15

### Number of credit points

5,00

### Coordinators

dr inż. Grzegorz Gramza

grzegorz.gramza@put.poznan.pl

### Lecturers

### Prerequisites

Knowledge: The student has a basic knowledge about transportation in the economy and social life, in the system of sciences and the relationship with other areas of knowledge. The student knows the main tasks in the operation of the systems and economic development of enterprises and the state. Skills: Student is able to use the acquired knowledge to the analysis of specific phenomena and processes in traffic objects. The student is able to solve specific problems in technical systems. Social competencies:

### Course objective

The student is able to work in a group. Student is able to prioritize the tasks. Student is self-reliant in solving problems, acquire and improve their knowledge and skills.

### Course-related learning outcomes

Knowledge:

1. has a structured, theoretically founded general knowledge in the field of technology, transport systems and various means of transport

2. has a structured and theoretically founded general knowledge in the field of key issues of technology and detailed knowledge in the field of selected guesses of this discipline in transport engineering

### Skills:

1. can make a critical analysis of the functioning of transport systems and other technical solutions and evaluate these solutions, including: can effectively participate in technical inspection and assess the transport task from the point of view of non-functional requirements, has the ability to systematically perform functional tests

### Social competences:

1. is aware of the importance of knowledge in solving engineering problems and knows examples and understands the reasons for malfunctioning transport systems that led to serious financial and social losses or to serious health and even life

### Methods for verifying learning outcomes and assessment criteria

Learning outcomes presented above are verified as follows:

Learning outcomes presented above are verified as follows:

The written examination, the project

### Programme content

The role of transport and transport systems in meeting social and economic needs, elements of modeling transport systems, the impact of transport systems on the environment.

### Course topics

sources and characteristics of transport needs, the division of vertical and horizontal transport functions in the management of transport systems and their classification system and transport process, ownership of the systems, the mapping of the characteristics of the transport system in the models, modeling transport systems, network configuration relational mapping a chosen transport network, the traffic routed and free, traffic congestion and random traffic stream mapping models of transport systems, the intensity and density of the traffic stream, the linear model and nonlinear distribution of the stream of traffic in the transport network, the distribution of minimally - cost stream of traffic and distribution of equilibrium, criteria and limit the implementation of the modal total cost of the tasks of traffic, the average unit costs, marginal costs, the cost of transport referred to the elements of the road transport system, the distribution of minimally - cost stream of traffic and distribution of equilibrium, criteria and limitations of implementing modal transport system development models, systems transport: car, rail, air, transmission, inland waterway, maritime and intermodal transport operations impact on the environment and human external costs of transport

### Teaching methods

Lecture with multimedia presentation

### Bibliography

#### Basic

1. Bąk Cz.: Systemy transportowe. Wprowadzenie do transportu. Wydawnictwo Politechniki Krakowskiej, 1989.
2. Jacyna M.: Modelowanie i ocena systemów transportowych. Oficyna Wydawnicza Politechniki Warszawskiej, 2009.
3. Jacyna M.: Wybrane zagadnienia modelowania systemów transportowych. Oficyna Wydawnicza Politechniki Warszawskiej, 2009.
4. Leszczyński J.: Modelowanie systemów i procesów transportowych. Oficyna Wydawnicza Politechniki Warszawskiej, 1999.

#### Additional

1. Skoczyński L., Szczepanik I.: Modelowanie procesów transportowych. Ćwiczenia projektowe i laboratoryjne. Wydawnictwa Politechniki Warszawskiej, Warszawa, 1991.
2. Stajniak M. i in.: Transport i spedycja. ILiM, seria Biblioteka Logistyka, Poznań 2008.
3. Rydzkowski W., Wojewódzka-Król K. (red.): Transport. PWN, Warszawa 2009.
4. Zeigler B.P., Teoria modelowania i symulacji. PWN, Warszawa, 1984.

### Breakdown of average student's workload

	Hours	ECTS
Total workload	100	5,00
Classes requiring direct contact with the teacher	45	3,00
Student's own work (literature studies, preparation for laboratory classes/ tutorials, preparation for tests/exam, project preparation)	55	2,00