STUDY MODULE DESCRIPTION FORM

Name of the module/subject		Code
Transportation Systems		**1010604231010620454**

Field of study	Profile of study (general academic, practical)	Year /Semester
Transport	**(brak)**	**2 / 3**
Elective path/specialty	**Subject offered in:**	**Course (compulsory, elective)**
-	**Polish**	**obligatory**

Cycle of study:	Form of study (full-time,part-time)
First-cycle studies	**part-time**

No. of hours					No. of credits
Lecture: **19**	Classes: **-**	Laboratory: **-**	Project/seminars: **10**		**6**

Status of the course in the study program (Basic, major, other)	(university-wide, from another field)
(brak)	**(brak)**

Education areas and fields of science and art	ECTS distribution (number and %)
technical sciences	**6 100%**
Technical sciences	**6 100%**

Responsible for subject / lecturer:

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Responsible for subject / lecturer:

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Prerequisites in terms of knowledge, skills and social competencies:

1	**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.
2	**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.
3	**Social competencies**	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.

Assumptions and objectives of the course:

The aim of the course is to provide students with information relating to transport systems, definitions and concepts. Students gain knowledge and skills in the operation of transport systems in the different modes of transport, intermodal transport and learn the elements of the systems modeling and transport processes.

Study outcomes and reference to the educational results for a field of study

Knowledge:

1. Has a detailed knowledge of the transport systems, including: the importance of transport in the socio-economic system of the country, region and city, forecasting the movement of people and goods - [K1A_W10]
2. Has a structured, theoretically founded knowledge in the area of transport infrastructure, including: transport networks, the overall characterization and classification of transport infrastructure - [K1A_W12]

Skills:

1. Is able to obtain information from the literature, internet, databases and other sources in Polish and foreign languages - [K1A_U01]
2. Is able to communicate using a variety of techniques in a professional environment and other environments using the formal model transport systems, concepts and definitions - [K1A_U02]
3. Is able to organize and manage the transport process in field of study, especially in the chosen specialization - [K1A_U16]
4. Is able to use acquired mathematical theories to create and analyze simple models of transport systems - [K1A_U18]

Social competencies:

1. Understands the need and knows the possibilities of lifelong learning, knows the need for acquiring new knowledge for professional development - [K1A_K01]
2. Is able to think and act in an entrepreneurial manner, make decisions, work for the development of the employer and the society - [K1A _K07]
3. Is aware of the transfer of knowledge to society, takes steps to ensure that the information is understandable - [K1A _K08]

Assessment methods of study outcomes

The written examination, final test, the project

Course description

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

Basic bibliography:

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 bibliography:

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.

Result of average student's workload

Activity	Time (working hours)
1. Preparation for lectures	5
2. Participation in the lecture	30
3. Studying the lecture	10
4. Consultation lecture	6
5. Exam Preparation	20
6. Participation in the exam	1
7. Preparation for design classes	15
8. Participation in the project activities	15
9. Preparation of the draft	15
10. Consultations to design classes	10
11. Preparing to pass	10
12. Participation in completing	1

Student's workload

Source of workload	hours	ECTS
Total workload	138	6
Contact hours	63	3
Practical activities	0	0