

STUDY MODULE DESCRIPTION FORM		
Name of the module/subject Transportation infrastructure		Code 1010601241010622092
Field of study Transport	Profile of study (general academic, practical) (brak)	Year /Semester 2 / 4
Elective path/specialty -	Subject offered in: Polish	Course (compulsory, elective) obligatory
Cycle of study: First-cycle studies	Form of study (full-time, part-time) full-time	
No. of hours Lecture: 2 Classes: - Laboratory: - Project/seminars: -		No. of credits 2
Status of the course in the study program (Basic, major, other) (brak)		(university-wide, from another field) (brak)
Education areas and fields of science and art technical sciences		ECTS distribution (number and %) 2 100%
Responsible for subject / lecturer: dr inż. Marek Wałigórski email: marek.waligorski@put.poznan.pl tel. 61 665 20 49 Maszyn Roboczych i Transportu ul. Piotrowo 3, 60-965 Poznań		
Prerequisites in terms of knowledge, skills and social competencies:		
1	Knowledge	The student has a basic knowledge on a topic of design, building and exploitation of a transport infrastructure, including its different forms, dependently on a transport type. The student has a knowledge from the area of a system of transport-infrastructure-national economy, social-economic relations, technical and communicational relations between considered system structure elements. Student knows law and technical requirements for tracing and design of transport infrastructure elements in the aspect of law regulations changes.
2	Skills	The student can integrate obtained information, interprets it, draw conclusions from it, form and justify opinions, to use learned part of knowledge in practice and give it to other people. The student can also match learned part of knowledge with issues of other topics connected with transport knowledge, using it when a new models are built and during scientific and research work.
3	Social competencies	The student is conscious of importance of the learned technical part of knowledge and understands off-technical aspects and results of transport activity in the aspect of transport infrastructure.
Assumptions and objectives of the course: to equip students with knowledge and abilities from the technical transport infrastructure knowledge, taking into consideration different types of transport activity.		
Study outcomes and reference to the educational results for a field of study		
Knowledge:		
1. The student knows definitions connected with transport infrastructure and their interpretations - [K1A_W12]		
2. The student knows features of transport infrastructure and its role in the transport branch and national economy development - [K1A_W12]		
3. The student knows roles of a transport and its infrastructure in the management proces and factors of its development - [K1A_W10]		
4. The student knows relations in the transport process and the role of an infrastructure in the transport structure - [K1A_W10]		
5. The student knows basics of a transport politics in the range of systems and infrastructure of transport, law and technical regulations that regulate their rising, design and servicing. - [K1A_W21]		
6. The student knows transport elements according to different division criteria, depending on transport systems - [K1A_W23]		
Skills:		

<ol style="list-style-type: none"> 1. The student can interpret and use in practice learned knowledge from the range of transport infrastructure - [K1A_U01] 2. The student can analyze more important factors of transport politics creation in the area of infrastructural issues, taking into consideration law instruments, also with executive ones that influence on transport and its back-up facilities. - [K1A_U01] 3. The student can point at elements and tools considered by forming of basics to realize proper transport net and its infrastructure - [K1A_U04] 4. The student can point at specified infrastructure elements and characterize them, depending on type and features of a transport branch - [K1A_U04] 5. The student can do the assessment of infrastructural solutions and relations between their element, and because of that to obtain an optimal solution with inclusion of different criteria and optimization conditions - [K1A_U09] 6. The student can use learned part of knowledge and use it to other areas of social-industrial activity, to influence actively on a form and particular solutions of the transport infrastructure knowledge. - [K1A_U08]
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<p>Social competencies:</p> <ol style="list-style-type: none"> 1. The student is conscious of the scientific problem importance for the social-industrial development in the micro and macro scales, relation between entities of a transport process and an infrastructure - [K1A_K02] 2. The student can point at more important social factors that influence on a form and directions of national and international infrastructure development, and form conclusions concerning changes taking place in it, also these that influence on different forms of social activity in the range of transport services. - [K1A_K03] 3. The student can analyze in a quality and quantity way appeared scientific and technical problem in the considered knowledge area and find theoretical and practical solution. The student can assess results of taken thinking process and their possibilities to use them in practice. - [K1A_K06] 4. The student can develop the knowledge in the area of transport engineering, taking into consideration its infrastructure (different depiction of a scientific problem) - [K1A_K01]

Assessment methods of study outcomes

<p>Current verification of pieces of information absorbing about understanding of each topic part realized for a lecture subject Writing examination that verifies degree of absorbing the taught knowledge for transport infrastructure lectures.</p>

Course description

Transport and infrastructure etymology, definitions, object and a range of influence, problem interpretation and its importance, relation between infrastructure and transport, terminology, quality and quantity measures and a quality of solutions in the area of infrastructure, transport functions and its infrastructure in management, development factors, infrastructure features according to different assessment criteria, problem importance in the aspect of economic development and state functions and its units, relations between economic development and transport, and infrastructure development, placement of infrastructure in connections structure regarding transport development, politics of transport development including its infrastructure.

Features of a road transport, road net structure and its elements, road net in Europe and in Poland, line and point infrastructures of a road transport, designing, building and servicing of a road infrastructure, norms and law regulations for forming of infrastructure, infrastructure and economy of road net solutions, infrastructure and environment influence, management of infrastructure and movement in the area of using of a road net potential, infrastructure elements versus building technology.

Rail net and its elements, net elements categorization, types according their functions, qualification factors of rail infrastructure elements, rail types and their technical qualification, operating points and technical posts, rail track systems, division and particular characteristics of a rail road elements, consideration of a clearance gauge, rail road profiles and its geometrical and functional features, traction and srk devices, road pavement, rails fasten and their design, subgrade and its design, turnouts and crossing, rail buildings, modern rail infrastructure solutions and their technical and social-industrial importance, infrastructure of high speed railway lines, economy of infrastructural solutions, environment impact of technical solutions

Development of water transport in Europe and in Poland in the point of view of its features and social-industrial changes, law and technical changes and competition, sailing division according to different criteria, present state and navigation development and its importance for goods and passenger transport, division of transport tasks according to type of transported goods and their influence on navigation net of each country. Water-ways and factors forming their development, relation net for water-ways, infrastructural investments, water-ways canalization, navigability, complexity as a water-ways feature, navigation conditions, infrastructure elements and devices for navigation process assistance, water area of harbor and water-ways, factors and barriers of development, water transport infrastructure and transport economy and technical solutions, design and building and servicing of infrastructure elements and water-ways net in Poland and Europe.

Placement of air transport in the national and international transport systems, features of such transport branch, importance of transport for goods and passenger transport in the technical and economic aspects, including social development factors, relations between air traffic and a state and development national economy, factors and development barriers, forming of systems for site planning, air transport and infrastructure versus international and European Union norms and regulations changes, including national specification, functioning areas of air transport agencies and importance of air transport infrastructure, means of an air transport in the aspect of used features of point and line infrastructure, profits from systems development and air transport infrastructure, infrastructure features and its division with technical, law and economical specifications, infrastructure functions and its design and technology choice of investment, management of the air traffic in the aspect of using of the infrastructure potential, classification of point and line elements, net of airways and assessment of their forming principles, flying phases and design features of line elements, qualification factors of airport, design of airfield and its elements.

Verification of absorbing and understanding degree of knowledge for transport infrastructure

Basic bibliography:

1. Rydzkowski W., Wojewódzka-Król K.: Transport, PWN, Warszawa 2008
2. Wojewódzka-Król K.: Rozwój infrastruktury transportu, UG, Gdańsk 2002
3. Basiewicz T., Gołaszewski A., Rudziński L.: Infrastruktura transportu, Oficyna Wydawnicza Politechniki Warszawskiej, Warszawa 2007
4. Towpik K., Gołaszewski A., Kukulski J.: Infrastruktura transportu samochodowego, Oficyna Wydawnicza Politechniki Warszawskiej, Warszawa 2006
5. Towpik K.: Infrastruktura transportu kolejowego. Oficyna Wydawnicza Politechniki Warszawskiej, Warszawa 2009
6. Markusik S.: Infrastruktura logistyczna w transporcie. Wydawnictwo Politechniki Śląskiej, 2009
7. Mendyk E., Ekonomika i organizacja transportu, WSL, Poznań 2002
8. Koźlak A.: Ekonomika transportu. Teoria i praktyka gospodarcza. Wydawnictwo Uniwersytetu Gdańskiego. Gdańsk 2007
9. Liberadzki B.: Liberalizacja i deregulacja transportu w Unii Europejskiej. Biblioteka Logistyka, Warszawa Poznań 2007
10. Wojewódzka-Król K., Rolbiecki R., Rydzkowski W.: Transport wodny śródlądowy. Wydawnictwo Uniwersytetu Gdańskiego, 2007

Additional bibliography:

1. Dyduch J.: Innowacyjne systemy sterowania ruchem. Wydawnictwo Politechniki Radomskiej, 2010
2. Dyduch J., Moczarski J.: Podstawy eksploatacji systemów sterowania ruchem kolejowym. Wydawnictwo Politechniki Radomskiej, 2009
3. Tomanek R.: Funkcjonowanie transportu, AE, Katowice 2004
4. Burnewicz J.: Innovative perspective of transport and logistics. Wydawnictwo Uniwersytetu Gdańskiego. Gdańsk 2009
5. Ruciński A., Planowanie i lokalizacja sieci regionalnych portów lotniczych, Wydawnictwo Uniwersytetu Gdańskiego, Gdańsk 1986
6. Grzelakowski A.S.: Formy i metody finansowania infrastruktury transportu w Polsce. Problemy optymalizacji systemu finansowania infrastruktury transportu. Wydawnictwo Akademii Morskiej w Gdyni. Gdynia 2005
7. Stypułkowski B.: Zagadnienia utrzymania i modernizacji dróg i ulic, WKiŁ, Warszawa 2000
8. Basiewicz T., Rudziński L., Jacyna M.: Linie kolejowe. Oficyna Wydawnicza Politechniki Warszawskiej, 2003

Result of average student's workload

Activity	Time (working hours)
1. Udział w wykładzie	30
2. Utrwalanie treści wykładu	6
3. Konsultacje	5
4. Przygotowanie do egzaminu	5
5. Udział w egzaminie	2

Student's workload

Source of workload	hours	ECTS
Total workload	48	2
Contact hours	43	2
Practical activities	5	0