

<b>STUDY MODULE DESCRIPTION FORM</b>		
Name of the module/subject <b>Sustainable transport</b>		Code <b>1010101151010129338</b>
Field of study <b>Sustainable Building Engineering First-cycle</b>	Profile of study (general academic, practical) <b>general academic</b>	Year /Semester <b>3 / 5</b>
Elective path/specialty <b>-</b>	Subject offered in: <b>Polish</b>	Course (compulsory, elective) <b>elective</b>
Cycle of study: <b>First-cycle studies</b>	Form of study (full-time, part-time) <b>full-time</b>	
No. of hours Lecture: <b>15</b> Classes: <b>-</b> Laboratory: <b>-</b> Project/seminars: <b>15</b>		No. of credits <b>2</b>
Status of the course in the study program (Basic, major, other) <b>basic</b>		(university-wide, from another field) <b>university-wide</b>
Education areas and fields of science and art <b>technical sciences</b> <b>Technical sciences</b>		ECTS distribution (number and %) <b>2 100%</b> <b>2 100%</b>
<b>Responsible for subject / lecturer:</b>  DSc Eng. Jeremi Rychlewski email: jeremi.rychlewski@put.poznan.pl tel. 61 647 5816 Faculty of Civil and Environmental Engineering ul. Piotrowo 5 60-965 Poznań		
<b>Prerequisites in terms of knowledge, skills and social competencies:</b>		
<b>1</b>	<b>Knowledge</b>	- knowledge from mathematics and physics; - knowledge from basics of transport education, including traffic rules; - knowledge about ecological rules and environment protection, - knowledge from the course Theory and planning of cities, - knowledge from the course Architectural design.
<b>2</b>	<b>Skills</b>	- utilisation of accesible sources of information; - proceeding with mathematical and physical calculations; - reading of maps and plans; - logical thinking, including synthesising facts to gain conclusions; - problem analisys with differentiated needs of game players.
<b>3</b>	<b>Social competencies</b>	- understanding an idea of common value; - understanding of a need to care for natural and antropogenic environment; - understanding of basic ecological interdependencies - based on previous courses; - responsibility for own decisions and actions; - awarness of a need to raise own professional and personal competencies.
<b>Assumptions and objectives of the course:</b> Acqusition of knowledge and skills within chosen aspects of sustainable reshaping of transport network and behaviour.		
<b>Study outcomes and reference to the educational results for a field of study</b>		
<b>Knowledge:</b>		
1. Knows rules for construction and analysis of sustainable road (car road, railroad, other land road types) transport - [KSB_W10]		
2. Has basic knowledge about designing road (car road, railroad, pedestrian road, other land road types) infrastructure to meet sustainable transport rules - [KSB_W11]		
3. Has basic knowledge about influence of construction investment on built up sustainable environment - [KSB_W17]		
4. Knows rules governing sustainable transport policy - [KSB_W24]		
<b>Skills:</b>		

1. Has an ability to notice complex and nontechnical aspects of sustainable development - [KSB\_U04]
2. Can justify road (pedestrian, car, rail, other) classification - [KSB\_U05]
3. Can analyse urban and transport needs of a developer according to sustainable development / building / transport rules - [KSB\_U26]

**Social competencies:**

1. Is conscious about a need to raise own professional and personal competencies, understands a need for life long learning - [KSB\_K05]
2. Understands a need to pass technical knowledge about sustainable building and transport to the society, knows how to deliver this knowledge in an understandable way - [KSB\_K07]

**Assessment methods of study outcomes**

Knowledge will be checked by a written colloquium in a form of a multiple choice test with penalties, supplemented by "list" type questions. Correction and supplement colloquiums may be oral.

Skills and social competencies will be checked by project preparation, defending and transfer.

**Course description**

Lectures:

1. Idea of sustainable transport, external costs in transport.
2. Road hierarchy and classification.
3. Modal (transport mode) choice in transport.
4. Universal design: noticing needs of disabled people.
5. Shared or separated road space depending on road class and function.
6. Priority for chosen transport modes, including priority at traffic lights
7. Sustainable transport provision depending on spatial terrain characteristics.
8. Passenger and freight intermodal transport.

Projekty:

Projekt sygnalizacji świetlnej obejmujący obliczenie strat czasu poszczególnych użytkowników, podstawy koordynacji sygnalizacji, płynności ruchu i realizacji wybranych priorytetów, szacowanie przepustowości.

**Basic bibliography:**

1. Manual on Uniform Traffic Control Devices, U.S. Dept of Transportation 2010.
2. Podoski J.: Transport w miastach. WKiŁ. 1988.
3. Rychlewski J.: Street network design for a sustainable mobility system. Transport Research Procedia 14 / 2016, str. 528-537.
4. Tolley R., Tolley R. S.: Sustainable transport. Cambridge 2003.
5. Wesołowski J.: Miasto w ruchu: przewodnik po dobrych praktykach w organizowaniu transportu miejskiego. ISO Łódź 2008.
6. Ieda H., Okata J.: Sustainable Urban Transport in an Asian Context. Springer 2010.
7. Manual on Uniform Traffic Control Devices, U.S. Dept of Transportation 2010.
8. Podoski J.: Transport w miastach. WKiŁ. 1988.
9. Rychlewski J.: Street network design for a sustainable mobility system. Transport Research Procedia 14 / 2016, str. 528-537.
10. Tolley R., Tolley R. S.: Sustainable transport. Cambridge 2003.
11. Wesołowski J.: Miasto w ruchu: przewodnik po dobrych praktykach w organizowaniu transportu miejskiego. ISO Łódź 2008.

**Additional bibliography:**

1. Bul R., Gadziński J., Rychlewski J.: Kierunki i standardy planowania metropolitalnego systemu transport. w: Mięka Ł.: Integracja planowania przestrzennego w Metropolii Poznań ? problemy, metody , osiągnięcia. Bogucki, Poznań 2016, str. 25-44.1. Olszewski P., Suchorzewski W.: Samochód w śródmieściu. WKiŁ. 1983.
2. Dell R. et al.: Towards sustainable road transport. Academic Press.
3. Gaca S., Suchorzewski W., Tracz M.: Inżynieria Ruchu. WKiŁ. 2009 i późniejsze.
4. Materiały konferencji naukowych ?Problemy komunikacyjne miast w warunkach zatłoczenia motoryzacyjnego?.
5. Rychlewski J.: Priorytet tramwajowy w Poznaniu. Archiwum Instytutu Inżynierii Lądowej 12/2012, str. 33-60.
6. Rychlewski J.: Street classification problems w: Modelling of change in transportation subsystems pod red. R. Janecki, S. Krawiec, Wyd. Politechniki Śląskiej, Gliwice 2011, str. 245-254.
7. Rychlewski J.: Experience of 17 years of public transport priority in Poznań, Poland. Proceedings of the 16th International IEEE Annual Conference on Intelligent Transportation Systems (ITSC 2013), The Hague, The Netherlands, October 6-9, 2013, str. 1882-1887.
8. Szczuraszek T.: Bezpieczeństwo ruchu miejskiego. WKiŁ. 2005.
9. Tracz M., Allsop R. E., Tarko A.: Skrzyżowania z sygnalizacją świetlną. WKiŁ. 1990.
10. Bul R., Gadziński J., Rychlewski J.: Kierunki i standardy planowania metropolitalnego systemu transport. w: Mięka Ł.: Integracja planowania przestrzennego w Metropolii Poznań ? problemy, metody , osiągnięcia. Bogucki, Poznań 2016, str. 25-44.1. Olszewski P., Suchorzewski W.: Samochód w śródmieściu. WKiŁ. 1983.
11. Dell R. et al.: Towards sustainable road transport. Academic Press.
12. Gaca S., Suchorzewski W., Tracz M.: Inżynieria Ruchu. WKiŁ. 2009 i późniejsze.
13. Materiały konferencji naukowych ?Problemy komunikacyjne miast w warunkach zatłoczenia motoryzacyjnego?.
14. Rychlewski J.: Priorytet tramwajowy w Poznaniu. Archiwum Instytutu Inżynierii Lądowej 12/2012, str. 33-60.
15. Rychlewski J.: Street classification problems w: Modelling of change in transportation subsystems pod red. R. Janecki, S. Krawiec, Wyd. Politechniki Śląskiej, Gliwice 2011, str. 245-254.
16. Rychlewski J.: Experience of 17 years of public transport priority in Poznań, Poland. Proceedings of the 16th International IEEE Annual Conference on Intelligent Transportation Systems (ITSC 2013), The Hague, The Netherlands, October 6-9, 2013, str. 1882-1887.
17. Szczuraszek T.: Bezpieczeństwo ruchu miejskiego. WKiŁ. 2005.
18. Tracz M., Allsop R. E., Tarko A.: Skrzyżowania z sygnalizacją świetlną. WKiŁ. 1990.

**Result of average student's workload**

<b>Activity</b>	<b>Time (working hours)</b>
1. Attending lectures	15
2. Attending project classes	15
3. Consulting projects	10
4. Preparation to the colloquium	5
5. Individual project design / preparation	10
6. Literature study	5

**Student's workload**

<b>Source of workload</b>	<b>hours</b>	<b>ECTS</b>
Total workload	60	2
Contact hours	40	2
Practical activities	25	1