Description of course	
Code of course	**1160-TRTSEM-MSA-0112**
Name of course	***Maintenance and Management of Urban and Regional Infrastructure***
Version of course	2021/22
A. *Place of the course in system of studies*	
Level of education	*Second-cycle degree*
Form and mode of studies	*Full-time studies*
Field of studies	*Transport*
Profile of studies	*General academic profile*
Specialization	*Transport systems engineering and management*
Place of teaching of course	*Warsaw University of Technology, Faculty of Transport, Division of Traffic Control and Transport Infrastructure*
Place of realization of course	*Not applicable*
Coordinator of course	*Piotr Woznica, Ph.D., Division of Traffic Control and Transport Infrastructure, Warsaw University of Technology, Faculty of Transport*
B. *General characteristic of the course*	
Group/*Block of courses*	*Specialization subject*
Level of course	*Intermediate level*
Type of course	*Compulsory subject*
Language of course	*English*
Location of the course in the study plan – nominal semester	1
Location of the course in the academic year	*Winter semester*
Preliminary requirements - formal	*None.*
Limit of students	*Lecture: 100, project: 18*
C. *Effects of education and manner of teaching*	
Purpose of course	*Knowledge and skills necessary for efficient management of transport infrastructure.*

Effects of education with reference to the learning outcomes for the area and field of study

No. effect	***Description of the effect***	***Reference to the characteristics of learning outcomes***	***Reference to the learning outcomes in the program***
Assumed learning outcomes in terms of knowledge			
W01	*has theoretical knowledge related to the management of road, rail and urban transport infrastructure networks, both linear and point-based*	I.P7S_WG.o I.P7S_WK	Tr2A_W09 Tr2A_W12
W02	*Has knowledge of the maintenance of transport infrastructure, types of repairs of this infrastructure, as well as ways to increase its durability and has knowledge of diagnostics of transport infrastructure, measurement methods and equipment used for this.*	I.P7S_WG.o III.P7S_WG	Tr2A_W08 Tr2A_W09 Tr2A_W10
W03	*Has knowledge of forecasting the condition of infrastructure and planning repairs and renovations of transport infrastructure and its reconstruction.*	I.P7S_WG.o III.P7S_WG I.P7S_WK	Tr2A_W08 Tr2A_W09 Tr2A_W12
Assumed learning outcomes in terms of skills			
U01	*Is proficient in the maintenance and management of municipal and regional infrastructure.*	I.P7S_UW.o III.P7S_UW.o I.P7S_UO	Tr2A_U08 Tr2A_U13 Tr2A_U20
U02	*Can perform technical analysis regarding the maintenance of roads.*	I.P7S_UW.o III.P7S_UW.o	Tr2A_U08 Tr2A_U15
Assumed learning outcomes in the field of social competences			
KS01	*Is ready to work in companies managing transport infrastructure.*	I.P7S_KK I.P7S_KO	Tr2A_K02 Tr2A_K03

Form of didactic studies and number of hours	*Lecture*	*Exercise*	*Laboratory*	*Project*	*Other*
On a weekly plan	1	0	0	1	0
Throughout the semester	15	0	0	15	0

Contents of education - separately for each form of didactic studies	*Lecture*: *Types of urban and regional transport infrastructure - public roads, railway lines, Fast Urban Railway systems, tram lines, metro and their managers. Maintenance of transport infrastructure, types of repairs, ways of increasing durability. Diagnostics of transport infrastructure, measurement methods and equipment used. Forecasting infrastructure status and planning repairs. Renovation of transport infrastructure, reconstruction of infrastructure. Transport infrastructure management systems.* *Project*: *Calculation of the estimated life time of the asphalt pavement. Analysis of the sensitivity of the railway track on the features of the geometric layout of the track system.*
Teaching methods	*Lecture*: *The computer presentation.* *Project*: *Realization of the project tasks.*

Methods of verification of effects of education

No. effect	***Methods of verification***
	Assumed learning outcomes in terms of knowledge
W01	*During the written test, test and open questions (1/3 of all questions) concerning the issues described in the W01 effect are possible. Passing takes place, when the student gives at least 50% of correct answers.*
W02	*During the written test, test and open questions (1/3 of all questions) concerning the issues described in the W02 effect are possible. Passing takes place, when the student gives at least 50% of correct answers.*
W03	*During the written test, test and open questions (1/3 of all questions) concerning the issues described in the W03 effect are possible. Passing takes place, when the student gives at least 50% of correct answers.*
	Assumed learning outcomes in terms of skills
U01	*During the written test, questions concerning the issues described in the U01 effect are possible. Passing takes place, when the student gives correct answers.*
U02	*Na obronie projektu przede wszystkim sprawdzana jest poprawność jego wykonania. Zaliczenie projektu ma miejsce, gdy student w 100% poprawnie wykona projekt. During the project defence, the correctness of the project is checking. Passing takes place, when the student makes project correctly in 100%.*
	Assumed learning outcomes in the field of social competences
KS01	*Oral discussion.*

Methods of evaluation	*Lecture*: *Completion is carried out in the form of a test, for each correct answer on the test, the student receives one point. To pass, needed to get over 50% of the points.* *Project*: Assessment *of the correctness of the implementation of the project and its defense.* *Integrated degree:* *The final grade is the average of the test and project grades.*
Exam	*No*
Literature	*Basic literature*: 1) Modern railway track, Coenraad Esveld, 2001. 2) Railway management and engineering, V. A. Profillidis, An Ashgate Book, 2014. 3) Railway engineering, S. Chandra, M. M. Agarwal, Oxford University Press, 2013. 4) Highway engineering, Martin Rogers, Bernard Enright, Wiley Blackwell, 2016. 5) Highway engineering, Paul H. Wright, Karen K. Dixon, Wiley, 2009. 6) Highway engineering: pavements, materials and control of quality, A. Nikolaides, CRC Press, 2014. 7) Traffic and highway engineering, Nicholas J. Garber, Lester A. Hoel, Cengage Learning, 2014. 8) The handbook of highway engineering, T. F. Fwa (Ed.), Taylor & Francis, 2006.

	9) Highway engineering handbook, Roger L. Brockenbrough, McGraw Hill, 2009. 10) Principles of highway engineering and traffic analysis, Fred L. Mannering, Scott S. Washburn, Wiley, 2016.
Website of the course	–
D. ***Student's activity***	
Number of ECTS credits	3
Number of hours of student's work to achieve effects of education	*88 hours, including: work on lectures 15 hours, work on design exercises 15 hours, getting acquainted with the literature related to the lecture 15 hours, preparation to pass a test 8 hours, preparation of project documentation in the form of calculations and drawings 30 hours, consultations 3 hours (including consultations for project design 2 hours), defense of a project work 2 hours.*
Number of ECTS credits on the course with direct participation of academic teacher	*1,5 ECTS (35 hours, including: work on lectures 15 hours, work on design exercises 15 hours, consultations 3 hours, defense of a project work 2 hours)*
Number of ECTS credits on practical activities on the course	*2,0 ECTS (49 hours, including: work on design exercises 15 hours,, preparation of project documentation in the form of calculations and drawings 30 hours, consultations for project design 2 hours, defense of a project work 2 hours)*
E. ***Additional information***	
Notes	*As long as it does not cause changes in the relationship of a given subject with the directional effects in the content of education, changes may be introduced on an ongoing basis, taking into account the latest scientific achievements.*
Date of last edition	2021-02-12 17:20