

Description of course					
Code of course	1160-TRTSEM-MSA-0211				
Name of course	<i>Design of Transport Systems</i>				
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	Jacek Kukulski, Ph.D., DSc., 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	2				
Location of the course in the academic year	Summer semester				
Preliminary requirements - formal	None.				
Limit of students	Project: 18				
C. Effects of education and manner of teaching					
Purpose of course	To transfer and systematize skills in the field of technical, functional design of linear and point communication systems.				
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					
–	–	–		–	
Assumed learning outcomes in terms of skills					
U01	Can design a section of a railway line, taking into account its geometry, earthworks and longitudinal profile.	I.P7S_UW.o III.P7S_UW.o		Tr2A_U01 Tr2A_U16 Tr2A_U17	
U02	Is able to design a simple track system, taking into account the selection of railway turnouts, station tracks, and perform analytical calculations of the coordinates of the location of railway turnouts	I.P7S_UW.o III.P7S_UW.o		Tr2A_U01 Tr2A_U15 Tr2A_U16 Tr2A_U17	
Assumed learning outcomes in the field of social competences					
KS01	Understands the need for lifelong learning, primarily in order to improve their professional and personal competences.	I.P7S_KK		Tr2A_K01 Tr2A_K02	
Form of didactic studies and number of hours	Lecture	Exercise	Laboratory	Project	Other
On a weekly plan	0	0	0	4	0
Throughout the semester	0	0	0	60	0
Contents of education - separately for each form of didactic studies	Project: Design of a section of a railway line and a design of a simple station communication system. It includes the following:				

	<ul style="list-style-type: none"> • analytical calculations; • tracing of the railway line; • selection of the geometry of the railway line section; • analysis and calculation of kinematic parameters; • selection of turnouts in the track system; • selection of interstitial widening; • track connection with turnouts; • arc radius optimization; • preparation of project documentation and calculations.
Teaching methods	<p>Project: Classes using a CAD computer application used, among others to support the design of railway infrastructure and communication systems.</p>
Methods of verification of effects of education	
No. effect	Methods of verification
Assumed learning outcomes in terms of knowledge	
–	–
Assumed learning outcomes in terms of skills	
U01	Assessment based on correctly made two projects and an oral answer to 3 out of 5 questions.
U02	Assessment based on correctly made two projects and an oral answer to 3 out of 5 questions.
Assumed learning outcomes in the field of social competences	
KS01	Oral conversation during the project completion.
Methods of evaluation	<p>Project: Implementation of both projects and oral answer to 3 out of 5 questions.</p>
Exam	No
Literature	<p>Basic literature:</p> <ol style="list-style-type: none"> 1) Id-1 (D-1) Warunki techniczne utrzymania nawierzchni na liniach kolejowych - PKP Polskie Linie Kolejowe S.A., Warszawa 2005 (ze zmianami z dnia 30.04.2015). 2) EN 13803-1- Railway applications – Track alignment design parameters – Track gauges 1435 mm and wider – Part 1: Plain line, 2017. 3) Chandra S., Agarwal M.M.: Railway engineering, ed. 1, New Delhi 2011. 4) Esveld Coenraad: Modern Railway Track, MRT-Productions; 4th edition (April 26, 2015). 5) Mundrey J.S.: Railway Track Engineering, Fourth Edition, 2009. McGraw Hill Education (India) Private Limited 6) COMMISSION REGULATION (EU) No 1300/2014 of 18 November 2014 On the technical specifications for interoperability relating to accessibility of the Union's rail system for persons with disabilities and persons with reduced mobility. 7) COMMISSION REGULATION (EU) No 1299/2014 of 18 November 2014 on the technical specifications for interoperability relating to the ‘infrastructure’ subsystem of the rail system in the European Union.
Website of the course	–
D. Student's activity	
Number of ECTS credits	5
Number of hours of student's work to achieve effects of education	134 hours, including: work on design exercises 60 hours, reading the indicated literature on the project 30 hours, preparation of project documentation in the form of calculations and drawings 40 hours, consultations 3 hours, defense of the project work 1 hour.
Number of ECTS credits on the course with direct participation of academic teacher	2,5 ECTS (64 hours, including: work on project exercises 60 hours, consultations 3 hours, defense of a project work 1 hour)
Number of ECTS credits on practical activities on the course	5,0 ECTS (134 hours, including: work on design exercises 60 hours, reading the indicated literature on the project 30 hours, preparation of project documentation in the form of calculations and drawings 40 hours, consultations 3 hours, defense of the project work 1 hour.)

E. Additional information	
<i>Notes</i>	<i>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.</i>
<i>Date of last edition</i>	2021-02-15 15:10