Description of course	
Code of course	**1160-TRTSEM-MSA-0110**
Name of course	***Measurements and Forecasting of Traffic and Transport***
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 Transportation Systems Engineering and Logistics*
Place of realization of course	*Not applicable*
Coordinator of course	*Izdebski Mariusz, Ph.D., DSc., Assoc. Prof., Division of Transportation Systems Engineering and Logistics, Faculty of Transport, Warsaw University of Technology*
B. *General characteristic of the course*	
Group/*Block of courses*	*Specialization subject*
Level of course	*Basic 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,* exercise*: 24*
C. *Effects of education and manner of teaching*	
Purpose of course	*Gaining by the student the knowledge and skills necessary to construct forecasts and make conclusions based on them.*

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	*He knows the forecast methods and tools of traffic.*	I.P7S_WG.o	Tr2A_W10
W02	*He has knowledge regarding the quality assessment of the prepared forecast.*	I.P7S_WG.o I.P7S_WK	Tr2A_W10 Tr2A_W12
	Assumed learning outcomes in terms of skills		
U01	*He is able to develop traffic forecasts for both passenger and freight transport in an analytical manner using forecasting methods.*	I.P7S_UW.o III.P7S_UW.o	Tr2A_U14 Tr2A_U15 Tr2A_U16
U02	*He can determine the base data for the development of traffic forecasts and can analyze the factors affecting the size of the forecast traffic flow.*	I.P7S_UW.o III.P7S_UW.o	Tr2A_U07 Tr2A_U14
	Assumed learning outcomes in the field of social competences		
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Form of didactic studies and number of hours	*Lecture*	*Exercise*	*Laboratory*	*Project*	*Other*
On a weekly plan	1	1	0	0	0
Throughout the semester	15	15	0	0	0

Contents of education - separately for each form of didactic studies	*Lecture*: *Introduction to the subject - definition of forecast. Forecasting methods: theoretical model of moving average and weighted moving average with application in transport - example, theoretical model of exponential smoothing applied in transport - example,*

	theoretical model of time series with trend applied in transport - example, theoretical model of exponential smoothing using Holt in transport - example, Brown's theoretical model with application in transport - example, Calculation of measures assessing the quality of the forecast: coefficient of random variation, coefficient of convergence, determination. Calculating the forecast error *Exercise:* *Computational tasks concerning known forecasting methods.*
Teaching methods	*Lecture*: *Lecture with the use of MS PowerPoint multimedia presentations, with computational examples.* *Exercise*: *Exercises with the use of MS PowerPoint multimedia presentations, with calculation examples.*

Methods of verification of effects of education

No. effect	***Methods of verification***
Assumed learning outcomes in terms of knowledge	
W01	*Lecture: written test in the form of open questions. It is required to answer at least 51% of the questions asked about this educational effect.*
W02	*Lecture: written test in the form of open questions. It is required to answer at least 51% of the questions asked about this educational effect.*
Assumed learning outcomes in terms of skills	
U01	*Exercises: written test in the form of computational tasks. It is required to solve at least 51% of the computational tasks related to a given educational effect.*
U02	*Exercises: written test in the form of computational tasks. It is required to solve at least 51% of the computational tasks related to a given educational effect.*
Assumed learning outcomes in the field of social competences	
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Methods of evaluation	*Lecture:* *Written test in the form of open questions. An answer to at least 51% of the questions asked is required.* *Exercises:* *Written test in the form of computational tasks. It is required to solve at least 51% of the computational tasks.* *Integrated degree:* *Average of partial grades.*
Exam	*No*
Literature	*Basic literature*: 1) Juan de Dios Ortúzar, Willumsen L.G.: Modelling Transport, 4th Edition, 2011 2) Pande A., Wolshon B.: Traffic Engineering Handbook: Institute of Transportation Engineers, Seventh Edition, 2016. 3) Boyce D.E., Williams H.C.W.L: Forecasting Urban Travel Past, Present and Future, 2016.
Website of the course	–
D. ***Student's activity***	
Number of ECTS credits	2
Number of hours of student's work to achieve effects of education	*60 hours, including: 15 hours of lectures,15 hours of work in auditoriums, studying the literature of the subject 15 hours, consultations 3 hours, preparation for colloquiums 12 hours*
Number of ECTS credits on the course with direct participation of academic teacher	*1.5 ECTS points (33 hours, including: work on lectures 15 hours, work on exercises auditoriums 15 hours, consultations 3 hours)*
Number of ECTS credits on practical activities on the course	0

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.*
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