Cracow University of Technology

Course syllabus

binding for the doctoral students of the CUT Doctoral School commencing their studies in the academic year 2022/2023

Information on the course

Name of the course in Polish	Metody badań i analiz w inżynierii ruchu drogowego
Name of the course in English	Research and analysis methods in traffic engineering
Number of the ECTS points	2
Language of instruction	Polish
Category of the course	Choosable
Field of education	Engineering and Technology
Discipline of education	Civil Engineering and Transport
Person responsible for the course Contact	prof. Stanisław Gaca PhD Eng. stanislaw.gaca@pk.edu.pl

Type of course, number of hours in the study programme curriculum

Semester	Credit type (G / NG)*	Lecture	Practical classes	Laboratory	Computer Lab	Project Class	Seminar
2, 3, 4, 5	G	18	0	12	0	0	0

*G – graded credit, NG – non-graded credit

Course objectives

Code	Objective description
Objective 1	Expanding knowledge about modern methods and techniques of conducting research and traffic analysis with the use of various traffic models
Objective 2	Acquisition of skills in planning and carrying out research works in road traffic engineering and building traffic models

Learning Outcomes

Code	Description of the learning outcome adjusted to the specific characteristics of the discipline	Learning outcome symbol in the CUT SD	Methods of verification
OUTCOMES RELATED TO KNOWLEDGE			
EUW1	A PhD student knows and understands the methodology of empirical and simulation research involving road traffic processes	E_W01, E_W02	Involvement in class activities
EUW2	A PhD student knows and understands the principles of building traffic models and their applications	E_W03	Involvement in class activities
OUTCOMES RELATED TO SKILLS			

EUU1	A PhD student is able to choose the appropriate methods and techniques for studying road traffic processes and correctly analyse and evaluate the obtained results.	E_U01	Involvement in class activities, evaluation of the presentation of the work done during the laboratory classes
EUU2	A PhD student is able to build statistical and analytical road traffic models and use the available models in the analysis of traffic efficiency and its impact on the environment	E_U01 E_U02	Involvement in class activities, evaluation of the presentation of the work done during the laboratory classes
OUTCOMES RELATED TO SOCIAL COMPETENCES			
EUK1	A PhD student has the ability to critically evaluate the research methods and techniques used and to interpret the works described in the literature related to the subject of their own research	E_K01	Involvement in class activities, a discussion
EUK2	A PhD student is aware of the importance of road traffic efficiency and safety as one of the factors influencing the quality of the functioning of the society	E_K03	Involvement in class activities, a discussion

Course outline

No.	Contents	Learning outcomes for the course	No. of hours
LECTURE			
W1	Modern techniques of road traffic research and data processing for applications in road traffic engineering	EUW1, EUU1	2
W2	Traffic models and their use in the analysis of capacity and the assessment of traffic conditions of various elements of the road infrastructure	EUW2, EUU2, EUK2	6
W3	Application of microsimulation techniques in road traffic engineering	EUW2, EUU2, EUK1	2
W4	Research and modelling of emissions and spread of road noise and other pollutants	EUW1, EUW2, EUU2, EUK2	4
W5	Road safety measures used in the description of road safety and their forecasting	EUU2, EUK2	2
W6	Indirect measures in road traffic safety analyses	EUW1, EUU1	2

LABORATORY			
L1	Methods of obtaining and analysing traffic data, presentation of measurement techniques	EUU1	3
L2	Statistical and probabilistic modelling in road traffic engineering - tasks	EUU2	3
L3	The use of microsimulation models in road traffic engineering - solving given problems	EUU2, EUK2	6

The ECTS points statement

WORKING HOURS SETTLEMENT

Type of activity	Average number of hours (45 min.) dedicated to the completion of an activity type
SCHEDULED CONTACT HOURS WITH AN ACADEMIC TEACHER	
Hours allotted in the syllabus	30
Consultations	4
Examination / course credit assignment	2
HOURS WITHOUT THE PARTICIPATION OF AN ACADEMIC TEACHER	
Independent study of the course contents	12
Preparation of a paper, a report, a project, a presentation, a discussion	6
ECTS POINTS STATEMENT	
Total number of hours	54
The ECTS points number	2

Preliminary requirements

No.	Requirements
1	Not specified

Course credit assignment conditions / method of the final grade calculation

No.	Description
COURSE CREDIT ASSIGNMENT CONDITIONS	
1	75% attendance with active participation in class.
	Oral credit for a written dissertation prepared by a doctoral student presenting the results of the work during laboratory classes on the construction of models and the use of road traffic microsimulation, related to the subject of the doctoral dissertation
METHOD OF THE FINAL GRADE CALCULATION	
Assessment of a presented work, taking into account attendance	

Additional information

Not specified

The course reading list

1	Szydłowski H. *Teoria pomiarów*, PWN, 1974
2	Gaca S., Suchorzewski W., Tracz M. *Inżynieria ruchu drogowego – teoria i praktyka*, Wydawnictwa Komunikacji i Łączności, 2008
3	*Highway Capacity Manual 7th edition*, Transportation Research Board, Washington, D.C., 2022
4	*Highway Safety Manual*, AASHTO, Washington, D.C., 2010
5	*PTV VISSIM 10 User Manual,* PTV AG, Germany, 2018