COURSE DESCRIPTION CARD - SYLLABUS

Course name
Traffic and transportation modeling [S2TIIZM1E>MRDiT]

Course

Field of study
Information Technology for Smart and Sustainable Mobility

Year/Semester
1/1

Area of study (specialization)
–

Profile of study
general academic

Level of study
second-cycle

Course offered in
English

Form of study
full-time

Requirements
compulsory

Number of hours

Lecture
30

Laboratory classes
30

Other
0

Tutorials
0

Projects/seminars
0

Number of credit points

4,00

Coordinators

dr inż. Szymon Fierek
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Lecturers

Prerequisites

Basic knowledge about statistics and probablity, methodology and theory for discrete simulation, Traffc Infrastructure and Optimization

Course objective

The purpose of the course is to give fundamental theoretic and practical knowledge about traffic theory and traffic simulation models

Course-related learning outcomes

Knowledge:
The student possesses advanced and in-depth knowledge of traffic engineering, including theoretical foundations, tools, and means used for modeling and simulation of transport systems, in particular knows the principles and techniques of microscopic and mesoscopic traffic modeling.
The student has well-structured and theoretically grounded general knowledge related to key issues in traffic flow modeling.

Skills:
The student is able to use IT tools for microscopic and mesoscopic traffic simulation.
The student is able to plan and conduct traffic simulations, interpret the obtained results, draw conclusions, and formulate and verify hypotheses related to engineering problems and simple research problems concerning flows in transport systems.
The student is able-in accordance with a given specification that includes non-technical aspects-to design a system model and implement it in a selected software, including collecting data for building and calibrating traffic models, using appropriate methods and tools.
The student is able to collaborate in a team, taking on various roles, including leading the team's work.

Social competences:
The student understands the importance of using the latest knowledge in transport modelling to solve research and practical problems.

Methods for verifying learning outcomes and assessment criteria

Learning outcomes presented above are verified as follows:

Written exam
Oral exam
Multiple choice test
Practical work
Group project by course

Programme content

Transport demand and supply. Traffic micro-simulation. Dynamic traffic modeling

Course topics

Foundations of Advanced Traffic Flow Modeling
Microsimulation Modeling Principles and Techniques
Mesoscopic Modeling Principles and Applications
Data Collection for the Model Development and Calibration
Traffic Signal Optimization and Control
Evaluating ITS Deployments and Strategies
Data Visualization and Reporting

Teaching methods

The course is conducted remotely (online) in a synchronous format. Classes may also be held in person.

Bibliography

Basic:
Barcelo J.: Fundamentals of Traffic Simulation. ISOR, volume 145, Springer New York, NY, 2012
May D.: Traffic Flow Fundamentals. Prentice-Hall, Inc., Englewood Cliffs, 1990.

Additional:
Treiber M., Kesting A.: Traffic Flow Dynamics. Data, Models and Simulation. Springer New York, NY, 2013

Breakdown of average student's workload

	Hours	ECTS
Total workload	100	4,00
Classes requiring direct contact with the teacher	60	2,50
Student's own work (literature studies, preparation for laboratory classes/ tutorials, preparation for tests/exam, project preparation)	40	1,50