



COURSE DESCRIPTION CARD - SYLLABUS

Course name

Transportation System Management

Course

Field of study

Year/Semester

Civil Engineering

I/I

Area of study (specialization)

Profile of study

Construction Engineering and Management

general academic

Level of study

Course offered in

Second-cycle studies

English

Form of study

Requirements

full-time

Number of hours

Lecture

Laboratory classes

Other (e.g. online)

30

Tutorials

Projects/seminars

15

Number of credit points

2

Lecturers

Responsible for the course/lecturer:

dr inż. Hanna Sawicka

email: hanna.sawicka@put.poznan.pl

tel. (61) 665 22 49

Faculty of Civil and Transport Engineering

ul. Piotrowo 3, 60-965 Poznań

Responsible for the course/lecturer:

dr inż. Szymon Fierek

email: szymon.fierek@put.poznan.pl

tel. (61) 665 27 16

Faculty of Civil and Transport Engineering

ul. Piotrowo 3, 60-965 Poznań

Prerequisites

Students have elementary knowledge about transport systems, principles of planning, operating and management.

Student can solve particular problems occurring in transport systems using optimization and simulation methods.

Student can cooperate in a group and define priorities important for solving appointed problems.

Course objective

The main goal of the subject is to get students acquainted with theoretical and practical problems occurred in transportation systems, as well as methods to solve these problems.



Course-related learning outcomes

Knowledge

- have detailed knowledge in the field of operation algorithms of selected software supporting the analysis and design of building facilities, which are also useful to plan and manage construction projects, including Building Information Modelling (BIM);
- know in detail the principles of analysing, constructing and dimensioning elements and connections in selected building structures.

Skills

- utilizing the obtained knowledge, they can select appropriate (analytical, numerical, simulation, experimental) methods and tools to solve technical problems;
- use advanced specialized tools in order to search for useful information, communication and in order to obtain software supporting the designer and organizer of building engineering works.

Social competences

- can realize that it is necessary to improve professional and personal competence; are ready to critically evaluate the knowledge and received content
- understand the need to transfer to the society the knowledge about building engineering, transfer the knowledge in a clear and easily comprehensible manner

Methods for verifying learning outcomes and assessment criteria

Learning outcomes presented above are verified as follows:

Written test

Assessment of assignments

Programme content

Lectures and projects are based on two major methodological approaches, i.e. optimization and simulation. The optimization part is composed of the following elements:

- Introduction to Transportation System Management. Mathematical model construction and its implementation in Solver.
- Linear programming and graphical method.
- Transportation problem: assumptions, algorithm and examples.
- Assignment method: assumptions, algorithm and examples.

Transport modeling and traffic simulation is such as:

- Basic concepts of modeling.
- Four stage approach.
- Fundamental Principles of Traffic Flow, fundamental diagram.
- Introduction to microscopic simulation using PTV Vissim software.
- Data collection - traffic surveys.



- Scenario management.

Teaching methods

Lecturing, Classroom discussion, Project-Organized Problem-Based Learning, Case studies.

Bibliography

Basic

1. Barcelo J.: Fundamentals of Traffic Simulation. Springer-Verlag, New York, 2010
2. Hall R.W. (ed.): Handbook of Transportation Science. Kluwer Academic Publishers, New York, 2003
3. Hillier F.S., Lieberman G.J.: Introduction to Operations Research. Mc-Graw Hill, New York, 2001
4. Meyer M.D.: Transportation Planning Handbook. John Wiley & Sons, Hoboken, 2016
5. Ortuzar J., Willumsen L.G.: Modelling Transport. John Wiley & Sons, New York, 2001

Additional

1. Cooke W.P.: Quantitative Methods for Management Decisions. Mc-Graw Hill, New York, 1985
2. Lotfi V., Pegels C.C.: Decision Support Systems for Management Science/ Operations Research. Irwin, Homewood, 1989

Breakdown of average student's workload

| | Hours | ECTS |
|---|-------|------|
| Total workload | 60 | 2 |
| Classes requiring direct contact with the teacher | 45 | 1,5 |
| Student's own work (literature studies, preparation for laboratory classes/tutorials, preparation for tests/exam, project preparation) ¹ | 15 | 0,5 |

¹ delete or add other activities as appropriate