



## COURSE DESCRIPTION CARD - SYLLABUS

Course name

Road and Motorway Design

### Course

Field of study

Building Engineering

Area of study (specialization)

Road, bridge and railway engineering

Level of study

Second-cycle studies

Form of study

full-time

Year/Semester

1/1

Profile of study

general academic

Course offered in

polish

Requirements

compulsory

### Number of hours

Lecture

45

Laboratory classes

15

Other (e.g. online)

0

Tutorials

0

Projects/seminars

30

### Number of credit points

6

### Lecturers

Responsible for the course/lecturer:

dr inż. Agnieszka Płatkiewicz

email: agnieszka.platkiewicz@put.poznan.pl

tel. 61 6653484

Faculty of Civil and Transport Engineering

ul. Piotrowo 5, 60-965 Poznań

Responsible for the course/lecturer:

dr hab. inż. Mieczysław Słowik, prof. PP

email: mieczyslaw.slowik@put.poznan.pl

tel. 61 6652478

Faculty of Civil and Transport Engineering

ul. Piotrowo 5, 60-965 Poznań

### Prerequisites

Knowledge: basic knowledge of design, construction, maintenance and operation of road.

Skills: the ability to acquire information from literature, databases and other sources and to integrate obtained data. The ability to interpret and draw conclusions. The ability to critically analyze and to evaluate of existing road construction technologies.

Social competencies: The ability to work independently and in a team. To understand the need to transfer to the society the knowledge about road engineering. To realise that it is necessary to improve professional and personal competence entire life.



### Course objective

The aim of the course is to introduce students to the detailed issues of road and motorway design.

The objective of the course is to introduce the students with identification and resolving problems connected with design of roads and motorways.

The aim of the course is to gain the ability of independent studying new problems and to solve them while conducting research work.

### Course-related learning outcomes

#### Knowledge

Student knows in detail the rules of road design.

Student knows the principles of constructing and dimensioning elements in road building structures.

Student has advanced and detailed knowledge of the theoretical principles of structure analysis and optimization as well as road design.

Student knows in detail the Act of Building Law, standards and recommendations for road design.

#### Skills

Student is able to prepare a road design and technical documentation in the environment of selected CAD software.

Student can dimension complex construction road details.

#### Social competences

Student takes responsibility for the reliability of working results and their interpretation.

Student is ready to autonomously complete and broaden (extend) knowledge in the field of modern processes and technologies of building engineering.

Student is aware how important is sustainable development in building engineering.

### Methods for verifying learning outcomes and assessment criteria

Learning outcomes presented above are verified as follows:

Lectures: students' knowledge is assessed on the basis of a written exam which takes place during the exam session.

Projects and laboratories: students' skills are assessed on the basis of a projects which must be handed on last classes (according to schedule). The projects must be done according to the topic assigned during the first classes. The projects are assessed in terms of content and aesthetics.

### Programme content

Lectures:



Road and motorway desing - legal framework, scope of design documentation, legal-administrative legalities;

Materials and outgoing data to road and motorway desing;

Rules of roads location; geometrical elements in horizontal alignment;

Rules of vertical alignment design, geometrical elements in vertical alignment;

Coordination the road in the vertical and horizontal alignment;

Requirements concerning visibility on the roads;

Rules of choosing the type of cross-section; elements of road in cross-section;

Systems of road drainage; the basics of dimensionings of surface drainage elements;

Determination of earthwork volume;

Methods of analysis of road investments variants;

Environmental conditions of road design;

The development of motorways and expressways in Poland and over the world;

Directional system of motorways and expressways in Poland;

Technical rules concerning construction of toll motorways;

Elements of a road lane of motorway;

Technical Equipment of motorways;

Service areas;

Toll systems;

Systems for collecting paid on toll Motorways.

Projects:

Part I - Conceptional project of section of public road.

Part II - Chosen elements of construction project of public road.

Laboratories:

Computer support of designing the section of public road using chosen program.

### Teaching methods

Lecture: informational lecture/problematic lecture/multimedia presentation lecture



Project: case study

Laboratory: presentation method

## Bibliography

### Basic

1. Rozporządzenie Ministra Transportu i Gospodarki Morskiej z dnia 2 marca 1999 roku w sprawie warunków technicznych, jakim powinny odpowiadać drogi publiczne i ich usytuowanie, tekst jednolity Dz. U. z 2016 r. poz. 124 ze zmianami
2. Rozporządzenie Ministra Infrastruktury z dnia 16 stycznia 2002 roku w sprawie przepisów techniczno-budowlanych dotyczących autostrad płatnych, Dz. U. Nr 12, poz. 116 ze zmianami
3. PN-S-02205:1998 Drogi samochodowe - Roboty ziemne - Wymagania i badania
4. Datka S., Lenczewski S., Drogowe roboty ziemne, wyd. I, Wydawnictwa Komunikacji i Łączności, Warszawa 1979, s.543.
5. PN-S-02204:1997 Drogi samochodowe - Odwodnienie dróg
6. Edel R., Odwodnienie dróg, wyd. 4, Wydawnictwa Komunikacji i Łączności, Warszawa 2008, s. 412, ISBN 978-83-206- 1717-7.

### Additional

1. Sandecki T. i inni, Komentarz do warunków technicznych, jakim powinny odpowiadać drogi publiczne i ich usytuowanie - Część I: wprowadzenie, Biuro Projektowo-Badawcze Dróg i Mostów
2. Sandecki T. i inni, Komentarz do warunków technicznych, jakim powinny odpowiadać drogi publiczne i ich usytuowanie - Część II: zagadnienia techniczne, Biuro Projektowo-Badawcze Dróg i Mostów
3. Szling Z., Pacześniak E., Odwodnienia budowli komunikacyjnych, Oficyna Wydawnicza Politechniki Wrocławskiej, Wrocław 2004, s. 225, ISBN 83-7085-777-9.
4. Praca zbiorowa: Zasady uspokajania ruchu na drogach za pomocą fizycznych środków technicznych, Biuro Ekspertyz i Projektów Budownictwa Komunikacyjnego, EKKOM Sp. z o.o., 2008

## Breakdown of average student's workload

	Hours	ECTS
Total workload	180	6,0
Classes requiring direct contact with the teacher	96	3,0
Student's own work (literature studies, preparation for laboratory classes/tutorials, preparation for tests/exam, project preparation) <sup>1</sup>	84	3,0

<sup>1</sup> delete or add other activities as appropriate