# STUDY MODULE DESCRIPTION FORM

| Name of the module/subject | | Code |
|---|---|---|
| **Junctions and road interchanges** | | **1010102121010120277** |

| Field of study | Profile of study (general academic, practical) | Year /Semester |
|---|---|---|
| **Civil Engineering Second-cycle Studies** | **(brak)** | **1 / 2** |
| Elective path/specialty | Subject offered in: | Course (compulsory, elective) |
| **Roads and Airfields** | **Polish** | **obligatory** |

| Cycle of study: | Form of study (full-time,part-time) |
|---|---|
| **Second-cycle studies** | **full-time** |

| No. of hours | | | | No. of credits |
|---|---|---|---|---|
| Lecture: **2** | Classes: **-** | Laboratory: **-** | Project/seminars: **2** | **5** |

| Status of the course in the study program (Basic, major, other) | (university-wide, from another field) |
|---|---|
| **(brak)** | **(brak)** |

| Education areas and fields of science and art | ECTS distribution (number and %) |
|---|---|
| **technical sciences** | **5 100%** |

**Responsible for subject / lecturer:**

dr inż. Jarosław Wilanowicz
email: jaroslaw.wilanowicz@put.poznan.pl
tel. 61-665-24-86
Faculty of Civil and Environmental Engineering
Piotrowo street, 5

**Responsible for subject / lecturer:**

dr inż. Andrzej Plamowski
email: andrzej.plamowski@put.poznan.pl
tel. 61 665 24 89
Faculty of Civil and Environmental Engineering
Piotrowo street, 5

## Prerequisites in terms of knowledge, skills and social competencies:

| | | |
|---|---|---|
| 1 | **Knowledge** | K_W06. Student has knowledge of road design guidelines and related technical conditions.<br>K_W07 i K_W09. Student knows the rules of the design and construction of road earthworks.<br>K_W10. Student has a basic knowledge of the design of road infrastructure. |
| 2 | **Skills** | K_U01. Student is able to classify the elements of road.<br>K_U08. Student knows how to dimension the basic elements of the road.<br>K_U14. Student can execute a road project documentation at the preliminary design. |
| 3 | **Social competencies** | K_K01. Student can work independently.<br>K_K06. Student is aware of the need to improve his professional skills.<br>K_K10. Student follows the rules of ethics. |

## Assumptions and objectives of the course:

1) Transfer of knowledge in the scope of analysis, design and operation of road intersections and grade separated junctions.

2) Development of skills concerning to identify and solve important problems in the design of the grade junctions and the grade separated interchanges.

3) Acquiring the ability of self-study of new issues and development trends in the design and operation of road facilities as above.

## Study outcomes and reference to the educational results for a field of study

### Knowledge:

1. The student knows the rules of the analysis, construction, dimensioning and designing of geometric elements of road intersections and grade separated junctions. - [K_W02 i K_W16 ]

2. The student knows the guidelines and the technical requirements concerning designing of road intersections and grade separated junctions and their components. - [K_W14]

3. The student knows the in-depth features and functionality of various geometric shapes of cross-roads and grade separated junctions (examples and development trends in the world and in Poland). - [-]

4. The student knows the principles of space forming of geometric elements of cross-roads and grade separated junctions (collision, traffic safety, traffic flow, visibility, aesthetics solutions). - [-]

### Skills:

1. The student is able to make a detailed classification of road intersections and grade separated junctions. - [K_U02]

2. The student knows how to dimension the specific geometric and structural components of road intersections and grade separated junctions. - [K_U09 ]

3. The student can choose analytical methods to solve the tasks associated with the designing of road intersections and grade separated junctions (eg. the method of assessment of the traffic capacity in regard to cross-roads and junction). - [K_U13 ]

http://www.put.poznan.pl/

| **Social competencies:** |
|---|
| 1. The student can work independently. - [K_K01 ] |
| 2. The student is aware of the need to improve his professional skills. - [K_K06 ] |
| 3. The student follows the rules of ethics. - [K_K10 ] |

## Assessment methods of study outcomes

Student's knowledge is assessed based on a written exam, which takes place at a examination session after the end of semester.

The exam consists of three questions and takes 45 minutes.

Information about the form of the test and its duration shall be provided to students during the first lecture in the semester, and the exam date is set with the students at the end of the semester.

Student's skills are evaluated on the basis of performed project, and its qualitative assessment is based on essential and aesthetic performing of drawing and computational exercises (the subject and content of the project is given on the theme card).

Completion date of the project is the last design tutorial in the winter semester.

## Course description

Detailed description and functionality of various geometric shapes of the junctions and the road interchanges (one-, two- and multi-level crossing). Examples and development trends in the world and in Poland. Street sections.

The types of traffic maneuvers at the grade junctions and the grade separated interchanges, their impact on the collision and traffic safety.

Principles of spatial geometric formation of details of the road intersections and the grade separated junctions (safety, traffic flow, visibility, aesthetics solutions).

Methods for calculating the traffic capacity of intersections.

The selection criteria of design variants of the road intersection and the grade separated junction for the implementation (the bases of multi-criteria optimization).

Objectives, measures and methods used in traffic management systems.

## Basic bibliography:

1. Rozporządzenie Ministra Transportu i Gospodarki Morskiej z dnia 2 marca 1999r. w sprawie warunków technicznych, jakim powinny odpowiadać drogi publiczne i ich usytuowanie, Dz. U. Nr 43 (poz. 430), Warszawa, 14 maja 1999r.

2. Rozporządzenie Ministra Infrastruktury z dnia 16 stycznia 2002r. w sprawie przepisów techniczno-budowlanych dotyczących autostrad płatnych, Dz. U. Nr 12 (poz. 116), Warszawa, 15 lutego 2002r.

3. Wytyczne projektowania skrzyżowań drogowych. Generalna Dyrekcja Dróg Publicznych, Warszawa 2001.

4. Krystek Ryszard (praca zbiorowa). Węzły drogowe i autostradowe. Wydawnictwo Komunikacji i Łączności, Warszawa 1998.

## Additional bibliography:

1. ?Bartoszewski J. Węzły drogowe i uliczne. PWK, Warszawa 1970.

2. ?Chrostowski H., Rolla ST., Wrześniowski ST. Autostrady ? projektowanie, budowa, ekonomika. WKiŁ, Warszawa 1975.

3. ?Szczuraszek T. Bezpieczeństwo ruchu miejskiego. WKiŁ, Warszawa 2006.

4. ?Tracz M., Allsop R.E. Skrzyżowania z sygnalizacją świetlną. WKiŁ, Warszawa 1990.

## Result of average student's workload

| Activity | Time (working hours) |
|---|---|
| 1. Direct participation of the student in the lectures. | 30 |
| 2. Direct participation of the student in the design classes. | 30 |
| 3. Additional consultation with the teacher. | 3 |
| 4. Independent execution of the project. | 46 |
| 5. Teaching student to prepare himself to pass the exam. | 30 |
| 6. Direct participation of the student in the writing exam. | 1 |

## Student's workload

| Source of workload | hours | ECTS |
|---|---|---|
| Total workload | 140 | 5 |
| Contact hours | 60 | 2 |
| Practical activities | 30 | 1 |

http://www.put.poznan.pl/