



## COURSE DESCRIPTION CARD - SYLLABUS

Course name

Railway construction I

		Course
Field of study		Year/Semester
Civil Engineering		4 / 8
Area of study (specialization)		Profile of study
		general academic
Level of study		Course offered in
First-cycle studies		polish
Form of study		Requirements
part-time		compulsory

		Number of hours
Lecture	Laboratory classes	Other (e.g. online)
18	0	0
Tutorials	Projects/seminars	
10	18	
<b>Number of credit points</b>		
5		

		Lecturers
Responsible for the course/lecturer:		Responsible for the course/lecturer:
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**Prerequisites**

KNOWLEDGE: student has knowledge of mathematics and physics useful in solving tasks connected with railway construction;

student knows rules governing drawing and reading geodesic maps;

student has knowledge on theoretical mechanics, strength of materials and soil mechanics;

student has knowledge on appropriate use, properties and investigations of construction materials;

student has basic information about history of railways in the world and in Poland.

SKILLS: student can analyse, synthetize and interpret acquired information;



student has an ability to independently learn and acquire knowledge;

student can adjust tools appropriate for given design tasks.

**SOCIAL COMPETENCIES:** student is conscious about a need to work for a common good, to reach goals both individual and social;

student is able to work individually and in a group on a given task.

student can realise that it is necessary to improve professional and personal competence;

student applies rules of culture and social cohabitation, notices other people's needs. student is ready to cooperate with other students and with the lecturer, knows it is necessary to avoid actions disrupting other student's learning;

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### **Course objective**

Passing to the students general knowledge and skills in the field of railways necessary to design a section of a railroad. Passing to the students preliminary knowledge on construction and exploitation of railroads and on shaping of railway networks and track layout of small stations.

### **Course-related learning outcomes**

#### Knowledge

1. Knows rules for construction and analysis of railroads and railroad elements;
2. Has basis knowledge about design of railway infrastructure objects; has preliminary knowledge about execution, maintenance and diagnostics of railway infrastructure objects;
3. Has basic knowledge about influence of railway investments on environment and understands a need to meet goals of sustainable development.

#### Skills

1. Can categorise a railway and classify railroad tracks;
2. Can design a railroad in plane and in profile, including track layout of a small station;
3. Can read topographic maps and prepare graphic documentation in the environment of selected CAD software.

#### Social competences

1. Can define criteria and priorities for performing a given task defined by themselves and other people, acting in the public interest and with regard to the goals of sustainable development;



2. Takes responsibility for the accuracy and reliability of working results and their interpretation;
3. Is ready to critically evaluate acquired knowledge and presented data, and also critically evaluate results of own work.

### **Methods for verifying learning outcomes and assessment criteria**

Learning outcomes presented above are verified as follows:

The acquired knowledge from the lectures is verified by a written colloquium done on the last lecture. The form of the colloquium will be presented by the lecturer during the first class. With a small number of students the form may be changed into an oral colloquium - details should be given at the first lecture. To pass the colloquium, students should acquire at least 50% of points. Activity during the lectures may be taken into account during the colloquium's score evaluation.

Skills acquired during tutorials are used in the project, but also tested by a colloquium on the last tutorial. To pass the colloquium, students should acquire at least 50% of points. Activity and competency during the tutorials may be taken into account during the colloquium's score evaluation.

Skills and competencies from projects are tested by quality evaluation of the presented project, social competencies presented during consultations, systematic work (notices on consultancy card and presence during classes) and a possible defence of the presented project (written or oral).

Grade scale: 50-60% 3,0; 60-70% 3,5; 70-80% 4,0; 80-90% 4,5; 90-100% 5,0.

### **Programme content**

Lecture:

1. Presentation of railway network and categorisation of railway lines;
2. Presentation of rules governing railroad design in plane and profile; discussion on equation describing train's motion;
3. Acquainting with basic elements of railroad superstructure, classical and non-classical, and subgrade;
4. Discussion on rules governing design of railroad's cross-sections, methods for constructing embankments and excavations, ways to drain water from the subgrade;
5. Preliminary presentation of basic railroad work's technology, of railroad maintenance, exploitations and diagnosis;
6. Presentation of railway's exploitation points, including small station's track layout and manoeuvring technology.

Tutorials:

1. Tracing of a railway line, railroad in plane and profile;
2. Methods of making drawings required in the project;



3. Calculations and graph of earth works;

4. Track layout of a small station.

Project: A preliminary design of a railroad's fragment in plane and profile, including small station's track layout.

### Teaching methods

An informative lecture utilising a multimedia presentation with an occasional use of a blackboard. A choice of films available on the Internet.

Tutorials utilising tutorial method with some films on University's cloud

Project – design method.

### Bibliography

Basic

1. Bałuch. H., Bałuch M.: Układy geometryczne toru i ich deformacje. KOW, Warszawa 2010.
2. Basiewicz T., Gołaszewski A., Rudziński L.: Infrastruktura transportu. Politechnika Warszawska, Warszawa 2002.
3. Bogdaniuk B., Towpik K.: Budowa, modernizacja i naprawy dróg kolejowych. KOW, Warszawa 2010.
4. Cieślakowski S.: Stacje kolejowe. WKiŁ, Warszawa 1992.
5. Id-1. Warunki techniczne utrzymania nawierzchni na liniach kolejowych. PKP Polskie Linie Kolejowe S.A., Warszawa 2005.
6. Id-3. Warunki techniczne utrzymania podtorza kolejowego. PKP Polskie Linie Kolejowe S.A., Warszawa 2009.
7. Kędra Z.: Technologia robót kolejowych. Politechnika Gdańska, Gdańsk 2017.
8. Rozporządzenie w sprawie warunków technicznych jakim powinny odpowiadać budowle kolejowe i ich usytuowanie.
9. Sancewicz S.: Nawierzchnia kolejowa. KOW, Warszawa 2010.
10. Standardy techniczne - szczegółowe warunki techniczne dla modernizacji lub budowy linii kolejowych. PKP PLK.
11. Sysak J. (red.): Drogi kolejowe. PWN, Warszawa 1986.
12. Towpik K.: Utrzymanie nawierzchni kolejowej. WKiŁ, Warszawa 1990.

Additional

1. Batko M.: Budowa i utrzymanie dróg kolejowych. WKiŁ, Warszawa 1985.



2. Kiewlicz S., Łączyński J., Pelc S.: Nawierzchnia kolejowa typu S60, S49, S42. WKiŁ, Warszawa 1974.
3. Semrau A., Zamięcki H.: Budowa i utrzymanie dróg kolejowych, tom II. WKiŁ, Warszawa 1975.
4. WiFun Z.: Zarys geotechniki: WKiŁ, Warszawa 2005.
5. Transport Miejski i Regionalny, Stowarzyszenie Inżynierów i Techników Komunikacji Rzeczpospolitej Polskiej, Warszawa.
6. Infrastruktura Transportu, ELAMED, Katowice.
7. Przegląd Komunikacyjny, Stowarzyszenie Inżynierów i Techników Komunikacji Rzeczpospolitej Polskiej, Warszawa.
8. Technika Transportu Szynowego, EMI-PRESS, Łódź.

#### **Breakdown of average student's workload**

	Hours	ECTS
Total workload	150	5,0
Classes requiring direct contact with the teacher	60	2,0
Student's own work (literature studies, preparation for tutorials, preparation for colloquium, project preparation) <sup>1</sup>	90	3,0

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