



## COURSE DESCRIPTION CARD - SYLLABUS

Course name

Railway construction I [S1Bud1>BKo1]

### Course

Field of study

Civil Engineering

Year/Semester

2/4

Area of study (specialization)

–

Profile of study

general academic

Level of study

first-cycle

Course offered in

Polish

Form of study

full-time

Requirements

compulsory

### Number of hours

Lecture

30

Laboratory classes

15

Other

0

Tutorials

15

Projects/seminars

30

### Number of credit points

5,00

### Coordinators

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### Lecturers

### Prerequisites

**KNOWLEDGE:** Student beginning this course should: 1. Have knowledge of mathematics and physics useful in solving tasks connected with railway construction; 2. Know rules governing drawing and reading geodesic maps; 3. Have knowledge on theoretical mechanics, strength of materials and soil mechanics; 4. Have knowledge on appropriate use, properties and investigations of construction materials; 5. Have basic information about history of railways in the world and in Poland. **SKILLS:** Student should be able to: 1. Analyse, synthesize and interpret acquired information; 2. Independently learn and acquire knowledge; 3. Adjust tools appropriate for given design tasks. **SOCIAL COMPETENCIES:** Student should: 1. Be conscious about a need to work for a common good, to reach goals, both individual and social; 2. Be able to work individually and in a group on a given task. 3. Realise a necessity to improve professional and personal competence; 4. Apply rules of culture and social cohabitation, notice other people's needs.

## 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, exploitation and diagnostics of railroads and on shaping of railway networks and track layout of small stations.

## Course-related learning outcomes

KNOWLEDGE: Student:

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: Student:

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

SOCIAL COMPETENCES: Student:

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:

LECTURE: 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.

LABORATORY: Skills acquired in laboratorium will be used for drawing elements of the project: for the grade from laboratorium the drawings will be checked. Activity and competencies during the classes may improve the evaluation.

TUTORIALS: Skills and competencies from tutorials are tested by a written colloquium at the last class. Activity and competencies during the classes may improve the evaluation.

PROJECT: 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

The module's programme covers:

- lectures on design, construction, exploitation and diagnostics of railway lines;
- designing elements of a preliminary railway line project in plane, profile and cross-section.

## Course topics

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.

LABORATORY: learning to use AutoCad Civil to create drawings needed for the preliminary railway project.

TUTORIALS:

1. Designing railway's path;
2. Calculations and drawings used in the project;
3. Elements of design of a small station.

PROJECT: A preliminary design of a railroad's fragment in plane, profile and cross-section.

## Teaching methods

An informative lecture including elements of a conversation lecture, utilising a multimedia presentation with an occasional use of a blackboard. A choice of films available on the Internet, some of them presented during lecture with comments.

Laboratory - using Civil programme to create drawings.

Tutorials - in class practise

Project - design method.

## Bibliography

Podstawowa:

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.

Uzupełniająca:

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. Wiłun 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	137	5,00
Classes requiring direct contact with the teacher	92	3,50
Student's own work (literature studies, preparation for laboratory classes/ tutorials, preparation for tests/exam, project preparation)	45	1,50