



COURSE DESCRIPTION CARD - SYLLABUS

Course name

Railway construction II [S1Bud1>BK2]

Course

Field of study

Civil Engineering

Year/Semester

4/7

Area of study (specialization)

–

Profile of study

general academic

Level of study

first-cycle

Course offered in

Polish

Form of study

full-time

Requirements

elective

Number of hours

Lecture

20

Laboratory classes

0

Other

0

Tutorials

0

Projects/seminars

30

Number of credit points

6,00

Coordinators

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Lecturers

Prerequisites

KNOWLEDGE: Student beginning this course should know rules: - governing construction and analysis of railway construction objects; - of track geometric layout. SKILLS: Student should be able to: - obtain information from literature, databases and other properly selected sources; - integrate obtained information and evaluate it, make conclusions and discuss these conclusions. SOCIAL COMPETENCIES: Student should be prepared to individually supplement and expand own knowledge of modern solutions and technologies in railway construction.

Course objective

Acquainting students with construction and operation of a railway track, basic terms and processes taking place in an operated railway track. Identification of the main sources of risks in railway track related to its operation and discussion of possible actions and possible preventive measures. Acquainting students with systems of urban rail transport, including elements of railway stations and traffic management. Propagation of an attitude for life-long learning.

Course-related learning outcomes

KNOWLEDGE: Student:

1. Has basic general knowledge of railroad design and maintenance;
2. Knows basic knowledge on designing railway objects; has preliminary knowledge on construction, maintenance and diagnostics of railway objects;
3. Has basic knowledge on influence of railway investments on environment and understands a need to implement sustainable development rules.

SKILLS: Student:

1. Is able to dimension basic structural elements of linear railway construction;
2. Can work individually or in a team.

SOCIAL COMPETENCIES: Student:

1. Is conscious about a need to increase professional and personal competences, understands the need and knows the possibilities of the life-long learning (second and third degree studies, postgraduate studies, courses).

Methods for verifying learning outcomes and assessment criteria

Learning outcomes presented above are verified as follows:

Learning outcomes presented above are verified as follows:

- for discussion, current preparation and activity in class;
- written colloquium from lectures - students should acquire at least 50% of points;
- obligatory execution of design exercises;
- final colloquium for design class.

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:

- advantages and disadvantages of different railroad superstructures;
- loads influencing work of railroad superstructure;
- preliminary information on urban rail transport systems;
- preliminary information on train traffic management.

Course topics

LECTURE:

1. Types of railway track structure and discussion about importance and role of its elements; a problem of choosing proper railroad superstructure;
2. Influence of temperature in a jointless railway track and work of such railway track elements (force and thermal stress); railway track displacements;
3. Transfer of loads from a rail vehicle's wheel to the subgrade; soil compaction and subgrade strengthening;
4. Necessary innovations in railways;
5. Urban rail transport systems;
6. Introduction to railway stations and knots;
7. Train control system.

PROJECT: Computational projects covering strength and maintenance of railroad's superstructure and subgrade.

Teaching methods

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

Project – design method.

Bibliography

Basic

1. Bałuch M.: Podstawy dróg kolejowych. Politechnika Radomska, Radom 2001.
2. Czyżuła Wł.: Tor bezстыkowy. Wydawnictwo Politechniki Krakowskiej, Kraków 2002.
3. Grulkowski S., Kędra Z., Koc Wł., Nowakowski M. J.: Drogi szynowe. Wydawnictwo Politechniki

Gdańskiej, Gdańsk 2013.

4. Praca zbiorowa pod red. J. Sysak: Drogi Kolejowe. PWN, Warszawa 1986.

5. Podoski J.: Transport w miastach. WKiŁ, Warszawa 1977.

6. Sancewicz S.: Nawierzchnia kolejowa. Wojskowa Akademia Techniczna, Warszawa 2010.

7. Żurkowski A., Pawlik M.: Ruch i przewozy kolejowe, sterowanie ruchem. KOW, Warszawa 2010.

Additional

1. Bogdaniuk B., Towpik K.: Budowa, modernizacja i naprawy dróg kolejowych. PKP Polskie Linie Kolejowe S.A., Warszawa 2010.

2. Czyżuła W., Towpik K.: Problemy modelowania oraz identyfikacji modeli toru bezstykowego. Problemy Kolejnictwa, z. 128, 1998, s. 67–97.

3. Esveld C.: Modern Railway track. Second Edition. Delft, 2001.

4. Łoś M.: Wpływ temperatury na pracę bezstykowego toru kolejowego. WKiŁ, Warszawa 1987.

5. Ostaszewicz J., Rataj M.: Szybka komunikacja miejska. WKiŁ, Warszawa 1979.

6. Puzavac L., Popović Z., Lazarević L.: Influence of track stiffness on track behaviour under vertical load. Traffic&Transportation, Vol. 24, 2012, No. 5.

7. Szczesniak W.: Statyka, dynamika i stateczność nawierzchni i podtorza kolejowego. Przegląd podstawowych pozycji literatury. Prace Naukowe Politechniki Warszawskiej, seria Budownictwo, z. 129, 1995.

8. Szczuraszek T.: Bezpieczeństwo ruchu miejskiego. WKiŁ, Warszawa 2005.

9. Towpik K.: Infrastruktura drogi kolejowej. Obciążenia i trwałość nawierzchni. Biblioteka Problemów Eksploatacji, Warszawa-Radom 2006

10. Tracz M., Allsop R. E.: Skrzyżowania z sygnalizacją świetlną. WKiŁ, Warszawa 1990.

Breakdown of average student's workload

	Hours	ECTS
Total workload	150	6,00
Classes requiring direct contact with the teacher	50	2,00
Student's own work (literature studies, preparation for laboratory classes/ tutorials, preparation for tests/exam, project preparation)	100	4,00