COURSE DESCRIPTION CARD - SYLLABUS

Course name
Railway construction I [N1Bud1>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
part-time

Requirements
compulsory

Number of hours

Lecture
20

Laboratory classes
10

Other
0

Tutorials
10

Projects/seminars
20

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, synthetize 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 and exploitation of railroads.

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;
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.
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.
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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	62	2,50
Student's own work (literature studies, preparation for laboratory classes/ tutorials, preparation for tests/exam, project preparation)	75	2,50