



COURSE DESCRIPTION CARD - SYLLABUS

Course name

Railway transportation Environmental Hazards

Course

Field of study

Year/Semester

Transport

5/2

Area of study (specialization)

Profile of study

Railway Transport

general academic

Level of study

Course offered in

Second-cycle studies

polish

Form of study

Requirements

full-time

elective

Number of hours

Lecture

Laboratory classes

Other (e.g. online)

15

Tutorials

Projects/seminars

15

Number of credit points

3

Lecturers

Responsible for the course/lecturer:

Responsible for the course/lecturer:

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Prerequisites

KNOWLEDGE: The student has an orderly and theoretically founded knowledge in the field of operation of rail means of transport, knows the general characteristics of the functional properties and basic technical and operational parameters of rail means of transport, and has a basic knowledge of issues related to environmental hazards caused by transport.

SKILLS: The student is able to use the acquired knowledge to solve simple problems related to determining the impact of transport on the environment.

SOCIAL COMPETENCES: The student shows independence in solving problems, gaining and improving the acquired knowledge and skills, is aware of the importance and understands the non-technical aspects and effects of rail transport on the environment.



Course objective

To acquaint students with the basic concepts of environmental protection, the existing threats resulting from the operation of rolling stock and the necessary actions leading to the reduction of the negative impact of rail transport on the environment and people in the vehicle.

Course-related learning outcomes

Knowledge

Student has advanced detailed knowledge of selected issues in the field of transport engineering

Student knows advanced methods, techniques and tools used in solving complex engineering tasks and conducting research in a selected area of transport

Skills

Student is able to obtain information from literature, databases and other sources (in Polish and English), integrate them, interpret and critically evaluate them, draw conclusions and formulate and exhaustively justify opinions

Student is able to plan and conduct experiments, including measurements and simulations, interpret the obtained results and draw conclusions as well as formulate and verify hypotheses related to complex engineering problems and simple research problems

Student is able - when formulating and solving engineering tasks - to integrate knowledge from various areas of transport (and, if necessary, also knowledge from other scientific disciplines) and apply a systemic approach, also taking into account non-technical aspects

Social competences

Student understands the importance of using the latest knowledge in the field of transport engineering in solving research and practical problems

Student understands the importance of popularizing the latest achievements in the field of transport engineering

Student is aware of the need to develop professional achievements and to observe the rules of professional ethics

Methods for verifying learning outcomes and assessment criteria

Learning outcomes presented above are verified as follows:

For discussion, ongoing preparation and activity in class. Written credit. Final credit for classes.

Programme content

Introduction to environmental protection issues in transport, trends in the development of rail transport in Poland, characteristics of environmental hazards caused by rail means of transport, identification of the main sources of noise and vibrations in rail vehicles, measurement methods and criteria for the evaluation of vibroacoustic phenomena occurring in rail vehicles and their impact on man and the environment, methods of reducing noise and vibrations in rail transport, selected problems of the



impact of hazardous materials transported by rail on the environment, methods of conduct in the event of leakage of petroleum products into the ground.

Teaching methods

1. lecture with a multimedia presentation.
2. accounting exercises

Bibliography

Basic

1. Makarewicz R.: Hałas w środowisku. Ośrodek Wydawnictw Naukowych, Poznań 1996.
2. Nader M.: Modelowanie i symulacja oddziaływania drgań pojazdów na organizm człowieka. Oficyna Wydawnicza Politechniki Warszawskiej, Warszawa 2001.
3. Thompson D.: Railway Noise and Vibration - Mechanisms, Modelling and Means of Control. Publisher Elsevier 2009. Pełnotekstowe Książki w wersji elektronicznej dostępne przez Bibliotekę Politechniki Poznańskiej (Knovel Library).
4. Zwierzycki W.: Płyty eksploatacyjne do środków transportu drogowego. Charakterystyka funkcjonalna i ekologiczna. Wydawnictwo Politechniki Poznańskiej, Poznań 2006.
5. Juda-Rezler K.: Oddziaływanie zanieczyszczeń powietrza na środowisko. Oficyna Wydawnicza Politechniki Warszawskiej, Warszawa 2006.

Additional

1. Boć J., Nowacki K., Samborska-Boć E.: Ochrona środowiska. Wydawnictwo Kolonia Spółka z o.o. Kolonia Limited 2008.
2. Gronowicz J.: Ochrona środowiska w transporcie lądowym. Wydawnictwo i Zakład Poligrafii Instytutu Technologii Eksploatacji Radom 2003.

Breakdown of average student's workload

	Hours	ECTS
Total workload	60	3,0
Classes requiring direct contact with the teacher	30	1,5
Student's own work (literature studies, preparation for laboratory classes/tutorials, preparation for tests/exam, project preparation) ¹	30	1,5

¹ delete or add other activities as appropriate