



COURSE DESCRIPTION CARD - SYLLABUS

Course name

DESIGNING OF VEHICLE OPERATION SYSTEMS AND PROCESSES

Course

Field of study

Construction and Exploitation of Means of Transport

Area of study (specialization)

Mass Transport Vehicles

Level of study

First-cycle studies

Form of study

full-time

Year/Semester

4/7

Profile of study

general academic

Course offered in

Polish

Requirements

compulsory

Number of hours

Lecture

45

Laboratory classes

15

Other (e.g. online)

Tutorials

Projects/seminars

Number of credit points

3

Lecturers

Responsible for the course/lecturer:

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Wydział Inżynierii Lądowej i Transportu

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Responsible for the course/lecturer:

Prerequisites

Student knows the structure and basic principles of operation of passenger transport vehicles.

Student has basic knowledge connected with a random variable.

Student has knowledge relating to reliability of technical facilities.

Student can create programs in at least one programming environment.

Student has fluent skills in computer office software.

Student can do simple design tasks on his own, relating to mechanics and machine design following prescribed specifications.



Student can manage his/her own time dedicated to performance of indicated tasks.

Course objective

Acquisition of theoretical knowledge and practical skills relating to designing of vehicle operation systems and processes.

Course-related learning outcomes

Knowledge

Student has basic theoretical knowledge of passenger transport vehicle operation and systems and processes in public transport.

Student knows selected methods of designing and optimization of processes and systems of vehicle operation in public land transport.

Skills

Student can describe vehicle operation systems and processes in various concepts.

Student can use modeling methods for designing subsystems of maintenance and operation in elementary systems of vehicle operation.

3. Student can formulate and solve optimization tasks in simple and elementary vehicle operation systems.

Social competences

Student is aware that in procedures of design and optimization of vehicle operation systems in public transport, one should try to find a compromise between costs of vehicle system functioning and its readiness to realize socially desired tasks.

Student improves his teamwork skills.

3. Student improves systemic thinking skills.

Methods for verifying learning outcomes and assessment criteria

Learning outcomes presented above are verified as follows:

Lecture: a written examination.

Designing: credit based on prepared designs.

Programme content

A general concept of design of vehicle operation systems and processes. Design of elementary systems of vehicle operation through analytical methods. Design of operation systems in elementary systems of vehicle operation through analytical methods. Optimization of elementary subsystems of vehicle operation. Optimization of elementary systems of land transport vehicle operation. Generation of random figures for the purposes of optimization of elementary systems of operation. A concept of the method of designing of vehicle systems dedicated to realization of a random number of tasks. A method of optimization of the size of own vehicle fleet in the system dedicated to realization of a random



number of tasks. Designing of vehicle systems of transport operators in the aspect of reliability and cost criteria. Planning demand for a selected range of spare parts necessary for a group of homogenous vehicles. The policy of renewal of a selected range of spare parts in a vehicle system. Design of vehicle operation systems operating based on a principle of planned and preventive operating activities on the example of rail transport operator systems.

Teaching methods

Lecture with the use of multimedia presentations.

Bibliography

Basic

1. Cempel, Cz., Teoria i inżynieria systemów. Wyd. Instytutu Technologii Eksploatacji - PIB, Radom, 2006.
2. Kadziński A., Projektowanie procesów i systemów eksploatacji pojazdów. E-skrypt Politechniki Poznańskiej, 2017, niepublikowane.
3. Niziński S., Eksploatacja obiektów technicznych. Wyd. Instytutu Technologii Eksploatacji - PIB, Warszawa, Sulejówek ? Olsztyn – Radom, 2002.
4. Woropay M., Knopik L., Landowski B., Modelowanie procesów eksploatacji w systemie transportowym. Biblioteka Problemów Eksploatacji, Wyd. Instytutu Technologii Eksploatacji - PIB, Bydgoszcz - Radom, 2001.

Additional

1. Grabski F., Semi-markowskie modele niezawodności i eksploatacji. Instytut Badań Systemowych, seria Badania Systemowe, tom 30, Warszawa, 2002.
2. Kadziński A., Badania operacyjne. Ćwiczenia laboratoryjne, Wyd. Politechniki Poznańskiej, Poznań, 1994.
3. Kadziński A., Niezawodność pojazdów szynowych. Ćwiczenia laboratoryjne, Wyd. Politechniki Poznańskiej, Poznań, 1992.
4. Zeigler B.P., Teoria modelowania i symulacji. PWN, Warszawa, 1984.

Breakdown of average student's workload

	Hours	ECTS
Total workload	85	3,0
Classes requiring direct contact with the teacher	55	2,0
Student's own work (literature studies, preparation for laboratory classes/tutorials, preparation for tests/exam, project preparation) ¹	30	1,0

¹ delete or add other activities as appropriate