COURSE DESCRIPTION CARD - SYLLABUS

Course name
Designing vehicle operation processes and systems [S1MiBP1>PPiSEP]

Course

Field of study
Mechanical and Automotive 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
45

Laboratory classes
15

Other
0

Tutorials
0

Projects/seminars
0

Number of credit points

4,00

Coordinators

dr inż. Piotr Smoczyński

Lecturers

Prerequisites

The student starting this subject knows the construction and basic principles of operation of public transport vehicles. The student has knowledge of the theory of probability, mathematical statistics and the basics of reliability. The student has the ability to work in at least one programming environment. He is fluent in a suite of office computer programs. The student is able to independently or in a team carry out simple design tasks according to a given specification and can manage the time available for the execution of a design task.

Course objective

Getting to know the theoretical basis and acquisition of practical skills in the design of processes and systems of vehicle operation.

Course-related learning outcomes

Knowledge:
Has knowledge in the field of mathematics, including algebra, analysis, theory of differential equations, probability, analytical geometry necessary to: describe the operation of discrete mechanical systems, understand computer graphics methods, describe the operation of electrical and mechatronic systems.
Has extended basic knowledge necessary to understand specialist subjects and specialist knowledge

about the construction, construction methods, manufacturing and operation of a selected group of working, transport, thermal and flow machines covered by the diploma path.
Has elementary knowledge of the life cycle of machinery, recycling of machine elements and construction and consumables.
Has elementary knowledge of the economics and economics of industrial enterprises, banking system, commercial law, and entrepreneurial accounting.

Skills:
Can develop a manual and repair a simple machine from the group of machines covered by the selected certification path.
Can organize and substantively manage the process of designing and operating a simple machine from a group of machines from the group covered by the selected diploma path.
Can interact with other people as part of teamwork (also of an interdisciplinary nature).

Social competences:
Is ready to recognize the importance of knowledge in solving cognitive and practical problems and to consult experts in case of difficulties in solving the problem on its own.
Is ready to initiate actions for the public interest.
Is willing to think and act in an entrepreneurial manner.

Methods for verifying learning outcomes and assessment criteria

Learning outcomes presented above are verified as follows:

Learning outcomes presented above are verified as follows:
Lecture: Written test during the last class
Design classes: Assessment on the basis of a completed project task - technical opinion related to the operation of vehicles by a fictitious railway carrier

Programme content

Lecture: Elements of the railway network. Station diagrams. Basics of railway signaling. Principles of railway traffic and shunting. Safety systems - railway traffic control systems. Timetables. Rolling stock rosterings. Mass service systems. Kendall"s notation. Making decisions about the vehicle operation system based on analytical and simulation models.
Project: Development of a technical opinion containing the timetable and circulation plan (rostering) for a fictitious railway carrier, taking into consideration information about the railway network - the condition of the infrastructure and the characteristics of connected towns and cities

Course topics

none

Teaching methods

Lecture: Blackboard lectures supplemented with audiovisual materials
Project: Development of a document using graphic methods and dedicated software

Bibliography

Basic
1. Zalewski P., Siedlecki P., Drewnowski A., Technologia transportu kolejowego, WKŁ 2013, ISBN: 978-83-206-1919-5
2. Gołębiowski P., Krześniak M., Jacyna M., Szkopiński J., Organizacja ruchu kolejowego, PWN, Warszawa 2019, ISBN 978-83-01-20692-5
3. Badania operacyjne, pod red. W. Sikory, Polskie Wydawnictwo Ekonomiczne, Warszawa 2008, ISBN 978-83-208-1743-0
Additional
1. Żurkowski A., Pawlik M., Ruch i przewozy kolejowe: sterowanie ruchem, Polskie Linie Kolejowe: Związek Pracodawców Kolejowych, Warszawa 2010, ISBN 978-83-930600-5-4
2. Chełmecki W., Stacje kolejowe cz. 1, skrypt Politechniki Krakowskiej, Kraków 1997, ISBN: 83-903878-4-0

3. Pawlik M., Europejski system zarządzania ruchem kolejowym. Przegląd funkcji i rozwiązań technicznych – od idei do wdrożeń i eksploatacji, KOW, Warszawa 2015, ISBN: 978-83-943085-1-3
4. Eiselt H.A., Sandblom C.-L., Operations Research. A Model-Based Approach, wyd. 2, Springer-Verlag, Berlin-Heidelberg 2012, ISBN 978-3-642-31054-6

Breakdown of average student's workload

	Hours	ECTS
Total workload	100	4,00
Classes requiring direct contact with the teacher	60	2,00
Student's own work (literature studies, preparation for laboratory classes/ tutorials, preparation for tests/exam, project preparation)	40	2,00