COURSE DESCRIPTION CARD - SYLLABUS

Course name
Urban rail transport [S2TIIZM1E>STM]

Course

Field of study
Information Technology for Smart and Sustainable Mobility

Year/Semester
2/3

Area of study (specialization)
–

Profile of study
general academic

Level of study
second-cycle

Course offered in
English

Form of study
full-time

Requirements
elective

Number of hours

Lecture
15

Laboratory classes
0

Other
0

Tutorials
15

Projects/seminars
0

Number of credit points

2,00

Coordinators

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Lecturers

Prerequisites

Knowledge: The student has basic knowledge of the construction of rail vehicles and the organization of transport Skills: Student is able to solve specific problems appearing in technical systems Social competences: Student is able to cooperate in a group, assuming various roles and is able to determine the priorities important in solving tasks

Course objective

Getting to know the existing urban transport systems in Poland and around the world; the importance of rail transport for the development of modern cities; modern trends in the construction and operation of urban rail vehicles.

Course-related learning outcomes

Knowledge:
The student has well-structured and theoretically grounded general knowledge related to the construction of vehicles and urban transport systems in Poland and worldwide, the EU’s policy on urban transport systems, and the importance of rail transport for the development of modern cities.

The student has advanced and in-depth knowledge of the specifics and principles of operation of urban rail transport, including knowledge of quality criteria in urban public transport and the transport challenges faced by Polish and European cities.
The student has knowledge of development trends and the most significant recent achievements in the field of modern trends in the construction and operation of urban rail vehicles, as well as modern solutions in rolling stock and infrastructure.

Skills:
The student is able to obtain information from literature, databases, and other sources, integrate it, interpret and critically evaluate it, draw conclusions, and formulate well-justified opinions
The student is able to use information and communication technologies applied in urban rail transport systems and is able to use artificial intelligence tools to analyze data related to system performance and to generate reports supporting decision-making processes.
The student is capable of conducting a critical analysis of existing urban transport systems and possesses the skills to analyze and evaluate rail systems and organizational structures in terms of efficiency, accessibility, environmental impact, and their relevance to achieving the European Union's sustainable development goals.
When formulating and solving engineering tasks, the student is able to recognize environmental and social aspects-assess the level of sustainability of urban rail transport solutions and propose improvements in line with the principles of sustainable development.

Social competences:
The student understands the importance of using the latest technological knowledge to solve practical problems in urban rail transport-recognizes the need to implement innovations, European standards, and sustainable development principles in their future professional work and is prepared to seek expert advice when facing difficulties in solving problems independently.
The student understands the importance of dissemination activities related to the latest developments in railway transport systems and is willing to initiate actions in support of the community and the public interest.
The student is ready to critically evaluate their own knowledge and understands that, in transport engineering, knowledge and skills can quickly become outdated.
The student is aware of the need to develop professionally, uphold the professional ethos, and adhere to professional ethics. They understand their professional and ethical responsibility for decisions in the transport sector-recognizing the impact of transport on society and the environment, as well as the need to observe ethical standards in the implementation of urban rail transport projects.

Methods for verifying learning outcomes and assessment criteria

Learning outcomes presented above are verified as follows:

The final grade takes into account both the grade from the written exam as well as the student's activity during the classes and preparation for them

Programme content

Specificity and principles of operation of urban rail transport; urban transport systems in Poland and around the world; importance of rail transport for the development of modern cities; modern trends in the construction and operation of urban rail vehicles; rolling stock tenders and rolling stock policy of cities; quality criteria in urban transport; transportation problems of Polish and European cities; modern solutions in the field of rolling stock and infrastructure; European Union policy towards urban transport.

Course topics

The topics of the classes focus on vehicles and urban transport systems, in particular:
- the role of urban rail transport in modern cities
- European Union policy on urban transport
- quality issues in public transport
- rolling stock policy of 21st century cities
- modern urban transport infrastructure
- modern urban rail transport vehicles

Teaching methods

Lecture: multimedia presentation
Tutorials: solving practical problems occurring in the operation of urban transport vehicles (Project Based Learning approach)

Bibliography

Basic:
Green Paper - Towards a new culture for urban mobility, Brussels 2007, COM/2007/0551 final
Bernick M. & Cervero R., Transit villages in the 21st century, McGraw-Hill, Incorporated 1997
Vukan R. Vuchic - Urban Transit: Systems and Technology, 2007
Vukan R. Vuchic - Urban Transit: Operations, Planning and Economics, 2005
National Academies of Sciences, Engineering, and Medicine - Track Design Handbook for Light Rail Transit, Second Edition, 2012
Kraus, L.; Proff, H. Sustainable Urban Transportation Criteria and Measurement-A Systematic Literature Review. Sustainability 2021, 13, 7113. https://doi.org/10.3390/su13137113

Additional:
Urban Rail Transit: https://www.springer.com/journal/40864
Metro Report International
Railway Gazette International
Baum-Snow N., Kahn M., & Voith R. (2005). Effects of Urban Rail Transit Expansions: Evidence from Sixteen Cities, 1970-2000. Brookings-Wharton Papers on Urban Affairs, 147-206. http://www.jstor.org/stable/25067419

Breakdown of average student's workload

	Hours	ECTS
Total workload	60	2,00
Classes requiring direct contact with the teacher	30	1,00
Student's own work (literature studies, preparation for laboratory classes/ tutorials, preparation for tests/exam, project preparation)	30	1,00