COURSE DESCRIPTION CARD - SYLLABUS

Course name
Data processing in logistics [N1Trans1>PDwL]

Course

Field of study
Transport

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
part-time

Requirements
elective

Number of hours

Lecture
9

Laboratory classes
18

Other
0

Tutorials
0

Projects/seminars
0

Number of credit points

4,00

Coordinators

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Lecturers

Prerequisites

KNOWLEDGE: The student has basic knowledge of information technology provided in the program of the first-cycle studies. SKILLS: The student is able to use modern electronic communication tools at a basic level, uses office applications. SOCIAL COMPETENCES: The student is aware of the globalization and intensification of information processing and exchange in social and economic life

Course objective

Acquainting with the problems and existing IT solutions in the field of data transmission and processing. Developing the ability to optimize the use of technology and computer tools, taking into account the effectiveness of the created solutions, economic aspects and design assumptions.

Course-related learning outcomes

Knowledge:
The student has an extended and deepened knowledge of mathematics useful for formulating and solving complex technical tasks concerning various means of transport.
The student has knowledge of important development trends and the most important technical achievements and of other related scientific disciplines, in particular transport engineering.

The student knows the basic techniques, methods and tools used in the process of solving tasks in the field of transport, mainly of an engineering nature engineering.

Skills:
The student can properly use information and communication techniques, applicable at various stages of the implementation of transport projects.
Student is able to assess - at least in a basic scope - various aspects of the risk associated with a transport project.
The student is able to assess the computational complexity of algorithms and transport problems.

Social competences:
The student understands that in technology, knowledge and skills very quickly become obsolete.
The student is aware of the importance of knowledge in solving engineering problems, knows examples and understands the causes of malfunctioning transport systems that have led to serious financial and social losses or to serious loss of health and even life.
The student is aware of the social role of a technical university graduate, in particular, he/she understands the need to formulate and transfer to the society, in an appropriate style, information and opinions on engineering activities, technological achievements, as well as the achievements and traditions of the transport engineer profession.

Methods for verifying learning outcomes and assessment criteria

Learning outcomes presented above are verified as follows:

Learning outcomes presented above are verified as follows:
Assessment of student activity during laboratory classes; assessment of the degree of implementation of laboratory tasks on the basis of the submitted reports and generated result files.
Assessment taking into account the activity of students during lectures and a test of the material studied (checking the understanding of basic concepts and knowledge of the issues covered by the program of the course).

Programme content

Basic concepts of information theory: byte structure, character coding, source coding, error detection, information redundancy and methods of its elimination based on the Huffman algorithm; the laboratory exercises include the implementation of a few simple tasks on the basis of a spreadsheet and Matlab system (including familiarization with the system) illustrating the concepts and algorithms presented.
Signal properties: basic concepts, Fourier series, filtration, communication channel; laboratory classes illustrate the concepts introduced: students identify ways of coding data and information.
Speed of transmission and signaling: basic modulation methods, hybrid modulations, multi-state signaling, noise, the idea of trellis coding, Viterbi algorithm; During the laboratory classes, test modulations and demodulations of signals are carried out, the basics of modeling and simulation of logic systems as well as the construction and simulation of data processing algorithms are introduced.
Communication protocols: asynchronous and synchronous protocols. detection and correction of errors in transmission, levels of data redundancy versus the security and reliability of transmission systems, cyclic redundancy CRC.
Computer networks: wide area networks and local networks, open standards, the basics of TCP / IP protocol operation, IP address, netmask, gateway, broadcast addresses, rules of route selection; As part of the laboratory classes, a model will be constructed to facilitate the understanding of the essence of the concepts introduced during the lecture for the end user of network systems.
Input data correctness: algorithms for ensuring input data correctness. Automatic data input systems based on barcodes (1D and 2D) and RFID technology (active and passive); As part of the laboratory classes, a database system will be constructed to handle and print barcodes in the Code 39 standard.
Automation of data processing based on macro commands and VBA language. Integration of your own algorithm designs with websites such as Google API. As part of the laboratory classes, a simple system will be built to integrate the selected API with its own spreadsheet.

Course topics

none

Teaching methods

Lecture with multimedia presentation
Laboratories - creating solutions to illustrate the issues discussed during lectures using simple (spreadsheet) and advanced data processing systems (Matlab)

Bibliography

Basic
1. Simmonds A.: Wprowadzenie do transmisji danych. WKŁ, 1999.
2. Lyons R.G.: Wprowadzenie do cyfrowego przetwarzania sygnałów. WKŁ, 2010.
3. Szapiro T. (red.), Decyzje menedżerskie z Excelem. Wydawnictwo PWE, Warszawa 2000
Additional
1. Tanenbaum A.S.: Sieci komputerowe. Helion, 2004/10.
2. Leyland V.: EDI Elektroniczna wymiana dokumentacji, Wydawnictwa Naukowo-Techniczne, Warszawa 1995
3. Narkiewicz J. : GPS. Budowa, działanie, zastosowanie. WKŁ, Warszawa 2002
4. Kubicki J., Kuriata A.: Problemy logistyczne w modelowaniu systemów transportowych, Wyd. WKŁ Warszawa 2000

Breakdown of average student's workload

	Hours	ECTS
Total workload	90	4,00
Classes requiring direct contact with the teacher	27	1,00
Student's own work (literature studies, preparation for laboratory classes/ tutorials, preparation for tests/exam, project preparation)	63	3,00