STUDY MODULE DESCRIPTION FORM

Name of the module/subject		Code
Information Engineering		**1010604311010611272**

Field of study	Profile of study (general academic, practical)	Year /Semester
Transport	**general academic**	**1 / 1**
Elective path/specialty	Subject offered in:	Course (compulsory, elective)
-	**Polish**	**obligatory**

Cycle of study:	Form of study (full-time,part-time)
First-cycle studies	**part-time**

No. of hours				No. of credits
Lecture: **18**	Classes: **-**	Laboratory: **-**	Project/seminars: **-**	**2**

Status of the course in the study program (Basic, major, other)	(university-wide, from another field)
other	**university-wide**

Education areas and fields of science and art	ECTS distribution (number and %)
technical sciences	**2 100%**
Technical sciences	**2 100%**

Responsible for subject / lecturer:

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Prerequisites in terms of knowledge, skills and social competencies:

1	**Knowledge**	Student has a basic knowledge of information technology provided for the curriculum of secondary schools
2	**Skills**	Basic skills in mathematics and computer science, as for all graduates of secondary schools
3	**Social competencies**	Student is able to do a literature research and knows the rules of group work and discussion. Student is aware of and understands the importance of mastering information technology to effectively support the transport activities

Assumptions and objectives of the course:

Acquainting with existing information technology for the acquisition, processing and presentation of information in all of its forms from the text information to the multimedia formats. Indication of whether and how the effective use of modern information technology may help in the optimization and management of transportation systems.

Study outcomes and reference to the educational results for a field of study

Knowledge:

1. Knows the basic concepts of modern computer systems. Knows the methods of encoding, storing and searching of information - [K1A_W06]
2. Knows technology used to store and process information in typical forms. Knows specifics of building modern software solutions. - [K1A_W06]
3. Knows problems of design and analysis of algorithms and creation of optimized data structures. Has knowledge of basics of modern technologies used in transportation. - [K1A_W15]

Skills:

1. Is able to analyze the common problems of transportation in terms of the selection of appropriate IT tools. - [K1A_U01]
2. Is able to make selection of appropriate methods of coding and storing of information, depending on the purpose of operation - [K1A_U02]
3. Is able to identify the optimal methods of processing typical classes of information. - [K1A_U06]
4. Is able to formulate in a formal way algorithms necessary to solve given tasks. - [K1A_U13]
5. Is able to work with IT experts due to communication at the appropriate level of abstraction. - [K1A_U17]

Social competencies:

1. Recognizes the importance of modern information technologies on the transport market. Is able to communicate effectively in collaboration with other professionals in the field of IT. - [K1A_K01]
2. Is able to develop his knowledge in the field of modern information systems. - [K1A_K04]

Assessment methods of study outcomes

Partial evaluation:

- assessment of the student activity during lectures

Final evaluation:

- average rating taking into account assessment of the student activity during lectures and a written final test

Course description

1. Basic concepts of information theory: bits, bytes, information coding, entropy, redundancy of information, data compression algorithms

2. Types of information: Overview of the concept of data and information, the optimal form of stroing information, capabilities and restrictions imposed by specific data types. The concept of a lossy and a lossless compression.

3. Algorithmics: Basic concepts, design and analysis of algorithms, problem solving techniques and the design of algorithms and data structures. Block Diagrams and metalanguages.

4. Computer Graphics: Overview of image formats and the application of certain formats. Overview of raster, vector and 3D graphics. Areas of use and methods of conversion of graphic formats.

5. Multimedia - audio recording: Overview of sound formats and the application of certain formats. Overview of methods for a lossy and a lossless compression. Identification of areas of use and methods of conversion.

6. Multimedia - Video: Overview of video streams recording and the application of certain formats. Overview of compression and compensation. Conversion techniques.

7. Internet Technologies: Content publishing, information searching, dynamic feeds

8. Database systems: Basic concepts of databases. Tools and methods for the construction of databases. Simple examples of implementation and the use in transport.

9. Advanced technologies in transport: Automatic object identification (barcodes, RFID) and fleet management with use of GPS and GSM technology

10. Presentation of information: Principles for the preparation of documents and papers with the use of modern computer systems, the creation of the presentation and preparation of speeches

Basic bibliography:

1. Robert Chi, Jae K. Shim, Joel G. Siegel Technologia informacyjna, Dom Wydawniczy ABC, 1999

2. Ewa Gurbiel i in.: Technologia informacyjna. WSIP, 2006

3. Zdzisław Nowakowski: Technologia informacyjna bez tajemnic, MIKOM, 2002

Additional bibliography:

1. Michalewicz Z. Algorytmy genetyczne + struktury danych = programy ewolucyjne, Wyd. Naukowo-Techniczne Warszawa 1999

2. James A. Senn: Information Technology: Principles, Practices, and Opportunities, Prentice Hall, 2004

3. Efraim Turban, R. Kelly Rainer, Richard E. Potter, Rex Kelly Rainer: Introduction to Information Technology, John Wiley & Sons, 2004

4. Brian K. Williams, Stacey C. Sawyer: Using Information Technology: A Practical Introduction to Computers & Communications, McGraw-Hill College, 2006

5. David Cyganski, John A. Orr, Vaz Richard F.: Information Technology: Inside and Outside, Prentice Hall, 2000

Result of average student's workload

Activity	Time (working hours)
1. Preparation for the lecture	6
2. Participation in the lecture	18
3. Consolidation of the lecture	8
4. Consultations	2
5. Preparation for the final test	12
6. Participation in the final test	2

Student's workload

Source of workload	hours	ECTS
Total workload	48	2

Contact hours	22	1
Practical activities	0	0