



## COURSE DESCRIPTION CARD - SYLLABUS

Course name

Information technology [S1Trans1>TINC]

### Course

Field of study

Transport

Year/Semester

1/1

Area of study (specialization)

–

Profile of study

general academic

Level of study

first-cycle

Course offered in

polish

Form of study

full-time

Requirements

compulsory

### Number of hours

Lecture

30

Laboratory classes

0

Other (e.g. online)

0

Tutorials

0

Projects/seminars

0

### Number of credit points

2,00

### Coordinators

dr inż. Waldemar Walerjańczyk

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### Lecturers

dr inż. Waldemar Walerjańczyk

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### Prerequisites

**KNOWLEDGE:** The student has a basic knowledge of information technology provided in the curriculum of upper secondary schools **SKILLS:** The student is able to effectively use basic office software and elements of modern computer systems **SOCIAL COMPETENCES:** The student is aware of the importance and understands the need to master information technologies for effective support of transport activities

### Course objective

Acquainting with the existing information technologies in the field of collecting, processing and presenting information in all its typical forms, from textual information to multimedia formats. Indication of the possibilities and methods of effective use of modern information processing technologies in modeling and optimization of transport processes.

### Course-related learning outcomes

Knowledge:

Has an extended and deepened knowledge of mathematics useful for formulating and solving complex technical tasks concerning various means of transport

Has knowledge of important directions of development and the most important technical achievements

and other related scientific disciplines, in particular transport engineering  
Knows the basic techniques, methods and tools used in the process of solving tasks in the field of transport, mainly of an engineering nature

#### Skills:

Can properly use information and communication techniques, applicable at various stages of the implementation of transport projects

Can assess the computational complexity of algorithms and transport problems

Has the ability to formulate tasks in the field of transport engineering and their implementation using at least one of the popular tools

#### Social competences:

Understands that in technology, knowledge and skills very quickly become obsolete

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 a serious loss of health and even life

Is aware of the social role of a technical university graduate, in particular understands the need to formulate and provide the society, in an appropriate form, with information and opinions on engineering activities, technological achievements, as well as the achievements and traditions of the profession of a transport engineer

### 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 taking into account the activity of students during lectures and a test on the material studied (checking the understanding of basic concepts and knowledge of the issues covered by the program of the subject).

### Programme content

1. Basic concepts of information theory: Bits, bytes, information encoding, entropy, information redundancy, data compression algorithms
2. Types of information: Discussion of the concept of data and information, optimal forms of information recording, possibilities and limitations resulting from specific types of data. The concept of lossy and lossless compression.
3. Algorithmics: Basic concepts, construction and analysis of algorithms, techniques for solving problems and designing algorithms and data structures. Block diagrams and metalanguages.
4. Computer graphics: Discussing the issues of image recording and the scope of application of specific formats. Overview of raster, vector and 3D graphics. Indication of application areas and methods of format conversion.
5. Multimedia: sound recording: Discussing the issues of sound recording method and the scope of application of specific formats. Discussion of the methods of lossy and lossless compression. Indication of application areas and methods of recording conversion.
6. Multimedia: video recording: Discussing the issues of how to record video streams and the scope of application of specific formats. Overview of compression and compensation methods. Indication of application areas and methods of format conversion.
7. Internet technologies: Content publishing, information retrieval, specialist websites, dynamic information channels
8. Database systems: Basic concepts of databases. Tools and methods of building databases. Simple examples of implementation and use in transport.
9. Advanced technologies in transport: Fundamentals of technologies such as automatic object identification (barcodes, RFID) or vehicle fleet management using GPS and GSM technology
10. Presentation of information: Principles of preparing documents with the use of modern computer systems, principles of creating presentations and preparing speeches

### Teaching methods

Lecture with multimedia presentation

### Bibliography

## Basic

1. Ewa Gurbiel i in.: Technologia informacyjna. WSIP, 2006
2. Zdzisław Nowakowski: Technologia informacyjna bez tajemnic, MIKOM, 2002

## Additional

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

## Breakdown of average student's workload

|   | Hours | ECTS |
|---|-------|------|
| Total workload  | 55    | 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) | 25    | 1,00 |