STUDY MODULE DESCRIPTION FORM

Name of the module/subject **Information theory and coding**		Code **1010331471010337138**

Field of study **Computer Science**	Profile of study (general academic, practical) **(brak)**	Year /Semester **4 / 7**

Elective path/specialty **Safety of Computer Systems**	Subject offered in: **polish**	Course (compulsory, elective) **obligatory**

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

No. of hours Lecture: **1** Classes: **-** Laboratory: **-** Project/seminars: **1**	No. of credits **3**

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

Education areas and fields of science and art **technical sciences**	ECTS distribution (number and %**)** **3 100%**

Responsible for subject / lecturer:

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Prerequisites in terms of knowledge, skills and social competencies:

1	**Knowledge**	K_W01: K_W04:
2	**Skills**	K_U01: K_U03:
3	**Social competencies**	K_K02:

Assumptions and objectives of the course:

The aim of the course is to familiarize students with basic terms concerning coding and transmission of information, optimal codes, redundant codes and data compression.

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

Knowledge:

1. x - [K_W19]

Skills:

1. x - [K_U07]
2. x - [K_U22]

Social competencies:

1. x - [K_K01]

Assessment methods of study outcomes

Lecture: written exam. More than 50% of all points is necessary for positive result.

Projekt: assessment of the project, reports assessment.

Course description

Lecture. Basic terms ? information, message, coding of a message, problems related to transmission of information. Metrics for quantity of information in a message; sources of a message, entropy, properties of entropy. Shannon?s information theory. Codes and message coding. Classes of codes, codes decodable without delay. Kraft?s inequality. Data compression; universal compression methods, Shanon-Fano coding, static and dynamic Huffman coding, arithmetic coding and lexical methods. Integration of compression and encryption. Analysis of cryptographic properties of some compression methods. Detection and correction codes; Cyclic Redundancy Check (CRC) codes; Correction codes, Hamming code.

Project. Implementation of selected compression algorithms. Calculation of compression coefficients for different files, comparison with entropy. Implementation of CRC codes. Analysis of effectiveness of these codes.

Basic bibliography:

1. Teoria informacji i kodowania, Abramson N., PWN, Warszawa 1969.

2. Wprowadzenie do kompresji danych, Drozdek A., WNT, Warszawa 1999

3. Sieci komputerowe, Tanenbaum A., Helion 2004.

4. Kompresja danych-wprowadzenie, Sayood K., Wydawnictwo RM, Warszawa 2002.

Additional bibliography:

1. Metody kompresji danych, Heim K., Wydawnictwo MIKOM, Warszawa 2000

2. Ochrona danych i zabezpieczenia w systemach teleinformatycznych, Stokłosa J. (red.), Wydawnictwo PP, Poznań 2003.

3. Information and Coding Theory, Jones G. A., Jones M., Springer 2000.

Result of average student's workload

Activity	Time (working hours)
1. Lectures	15
2. Project	15
3. Preparation for project	20
4. Reports	10
5. Exam preparation	5
6. Consultations and exam	10

Student's workload

Source of workload	hours	ECTS
Total workload	75	3
Contact hours	40	2
Practical activities	45	2