

<b>STUDY MODULE DESCRIPTION FORM</b>		
Name of the module/subject <b>Information theory and coding</b>		Code <b>1010331571010337138</b>
Field of study <b>Information Engineering</b>	Profile of study (general academic, practical) <b>(brak)</b>	Year /Semester <b>4 / 7</b>
Elective path/specialty <b>Security of Information Technology (IT)</b>	Subject offered in: <b>Polish</b>	Course (compulsory, elective) <b>obligatory</b>
Cycle of study: <b>First-cycle studies</b>	Form of study (full-time, part-time) <b>full-time</b>	
No. of hours Lecture: <b>15</b> Classes: <b>-</b> Laboratory: <b>-</b> Project/seminars: <b>15</b>		No. of credits <b>3</b>
Status of the course in the study program (Basic, major, other) <b>(brak)</b>		(university-wide, from another field) <b>(brak)</b>
Education areas and fields of science and art		ECTS distribution (number and %)
<b>Responsible for subject / lecturer:</b>  dr inż. Ewa Idzikowska email: ewa.idzikowska@put.poznan.pl tel. 61 665 35 31 Wydział Elektryczny ul. Piotrowo 3A 60-965 Poznań		
<b>Prerequisites in terms of knowledge, skills and social competencies:</b>		
1	<b>Knowledge</b>	K_W01: K_W04:
2	<b>Skills</b>	K_U01: K_U03:
3	<b>Social competencies</b>	K_K02:
<b>Assumptions and objectives of the course:</b> 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.		
<b>Study outcomes and reference to the educational results for a field of study</b>		
<b>Knowledge:</b>		
1. x - [K_W19]		
<b>Skills:</b>		
1. x - [K_U07]		
2. x - [K_U22]		
<b>Social competencies:</b>		
1. x - [K_K01]		
<b>Assessment methods of study outcomes</b>		
Lecture: written exam. More than 50% of all points is necessary for positive result. Projekt: assessment of the project, reports assessment.		
<b>Course description</b>		

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. Język VHDL projektowanie programowalnych układów logicznych, Skahill K., Wyd. Naukowo-Techniczne, Warszawa, 2001
2. Projektowanie układów cyfrowych z wykorzystaniem języka VHDL, Zwoliński M., Wydawnictwa Komunikacji i Łączności, Warszawa, 2002
3. Mikrokontrolery - architektura, programowanie, zastosowania, Pełka R., WKŁ, Warszawa, 2000

**Additional bibliography:**

1. VHDL język opisu i projektowania układów cyfrowych, Wrona W., WPKJS, Gliwice, 1998
2. Embedded System Design, Kluwer Academic Publishers, Marwedel P., Kluwer Academic Publishers, Boston, 2003.

**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