Obuda University John von Neumann Faculty of Informatics			Institute of Applied Mathematics	
Name and code: *Information and coding theoryNMXIK1PMNE, NMXIK1EMNE* **Credits*: 5*** *2019/20 year II. semester*				
Subject lecturers: Marta Takacs				
Prerequisites (with code):	-			
Weekly hours:3	Lecture: 3	Seminar.:	Lab. hours:	Consultation:
Way of assessment:	exam			

Course description:

Goal: The purpose of this course is to provide a summary of the mathematical foundations of information and code theory and to introduce students to the general rules of code theory, compression and cryptography. During the course, students will have a basic understanding of mathematical coding techniques and will gain proficiency in security issues.

Course description: The basic principle of information theory. Information and entropy, schema of communication channel. Variable length source code - prefix code, Huffman code. Conditional entropy and mutual information measure. Channel capacity. Bug fix coding. Finite vector spaces and their relationship to coding. Data compression algorithms. Cryptographic Methods - Summaries.

Lecture schedule

Education week	*Topic*
1.	Basic concepts of information theory
2.	Information and entropy, Schema of Telecommunication Channel
3.	Variable length source code - prefix code, Huffman code
4.	Conditional entropy and mutual information
5.	Channel Capacity. The basic principle of information theory
6.	1st meantime exam
7.	Error correction coding
8.	Finite vector spaces
9.	Linear Codes (Hamming, Extended and Abbreviated Codes)
10.	Rector's break – canceled class
11.	Data Compression. Run length compression, LZV
12.	Cryptography, history and algorithms used
13.	2nd meantime exam
14.	Presentation of individual projects
15.	Additional presentation of projects, ZH replacement

Midterm requirements

Education week	*Topic*
every week	Consultation time, in advance arranged time, in the lab. 2,10, Wednesdays
6th and 13th week	Midterm exams (1st and 2nd) according to the timetable and requirements
14th, 15th week	Submission and presentation of individual projects/essay according to the timetable and requirements, midterm exam replacement

Final grade calculation methods

Conditions for obtaining the mid-term signature/ final grade.
The student may only receive the signature if:
- During the semester he / she wrote the meantime exam (maximum score 20 points / meantime exam). Replacement of those exams is possible at a pre-arranged time, in the 14/15th week of the semester.
- Prepare an essay related to the new coding algorithms, submits it in writing form to the Moodle system, and defends it verbally at weeks 13/14 (maximum score 10 points). The essay assignments can be completed at a pre-arranged time of the 14/15th week of the semester.
-The student can prepare / develop homework during the semester, which can be counted towards the end-of-year grade.
In order to complete the signature, the student must have achieved at least 30% of the prerequisites each.
During the exam period, the student will receive an additional 50 points in the oral / written exam.

Achieved result	Grade
89%-100%, 89-100 points	excellent (5)
76%-88%, 76-88 points	good (4)
63%-75%, 63-75 points	average (3)
51%-62%, 51-62 points	satisfactory (2)
0%-50%, 0-50 points	failed (1)

Type of exam

oral/written

Type of replacement

At the week 14/15 will be an opportunity for midterm exam and essay presentation replacement.
In the absence of midterm exams and project assignment, it will be possible to replace the signature once within the first 10 days of the exam period, at a predetermined date. Anyone who did not appear at midterm exams or at his replacement, did not give up his essay, and was unjustifiably absent from more than half of the lessons, is not entitled to the signature replacement.

References

Mandatory: accessible curriculum, slide series, recommended by class, by subjects on the Moodle system

Recommended:
Gareth Jones, Mary Jones: Information and Coding Theory, Springer (2002), ISBN-13: 978-1852336226
Stefan Moser, Po Ming-Chen, Coding and Information Theory, Cambridge Univ. Press (2012), ISBN-13: 978-1107684577