

COURSE OUTLINE

(1) GENERAL

SCHOOL	SCHOOL OF SCIENCES		
ACADEMIC UNIT	DEPARTMENT OF MATHEMATICS		
LEVEL OF STUDIES	UNDERGRADUATE PROGRAM		
COURSE CODE		SEMESTER	H
COURSE TITLE	CODING THEORY		
INSTRUCTOR			
INDEPENDENT TEACHING ACTIVITIES	WEEKLY TEACHING HOURS	CREDITS	
	3	4,5	
COURSE TYPE	Specialised general knowledge		
PREREQUISITE COURSES:	NO		
LANGUAGE OF INSTRUCTION and EXAMINATIONS:	GREEK		
IS THE COURSE OFFERED TO ERASMUS STUDENTS	YES		
COURSE WEBSITE (URL)	http://www.math.aegean.gr/index.php/en/academics/undergraduate-programs		

(2) LEARNING OUTCOMES

Learning outcomes
<p>At the end of this course, students should be able to:</p> <ul style="list-style-type: none"> • Define error-detecting and error-correcting codes, explain their significance and construct simple examples, such as repetition and parity-check codes. • Define the constants related with the length(n) and the distance(d) of the code, and calculate small examples. • State and prove bounds on the sizes of codes – the Hamming and Singleton bounds. • Explain and construct decoding processes, compute error probabilities and state Shannon's Noisy Coding Theorem. • Explain the definition and advantages of linear codes. • Define, construct and manipulate generator matrices and parity-check matrices. • Decode linear codes using syndrome decoding. • Explain the relationship between a code and a parity-check matrix. • Construct Hamming codes, Golay codes and MDS codes, and understand their properties.
General Competences
Working independently. Team work. Working in an interdisciplinary environment.

(3) SYLLABUS

<p>Overview of Coding Theory</p> <p>Finite (Galois) fields</p> <p>Linear Codes</p> <p>Polynomial Rings</p> <p>Cyclic Codes</p> <p>BCH Codes</p> <p>Convolutional Codes</p>
--

TEACHING MATERIAL DISTRIBUTION	The teaching material of the course is uniformly distributed during the semester.
---------------------------------------	---

(4) TEACHING and LEARNING METHODS - EVALUATION

DELIVERY	Face-to-face	
USE OF INFORMATION AND COMMUNICATIONS TECHNOLOGY	Communication with students via e-mail	
TEACHING METHODS	Activity	Semester workload
	Lectures	39
	Independent study	73,5
	Course total (25 per ECTS)	112,5
COURSE COMMITMENTS	Attending course is not obligatory.	
STUDENT PERFORMANCE EVALUATION	Student's evaluation is done in Greek language through a written examination which includes short-answer questions and problem solving. For students with disabilities, evaluation takes place via oral exam.	

(5) ATTACHED BIBLIOGRAPHY

1. Coding Theory and Cryptography: The Essentials by D. R. Hankerson; D. G. Hoffman; D. A. Leonard; C. C. Lindner; K. T. Phelps; C. A. Rodger; J. R. Wall.
--