SUBJECT TEACHING GUIDE

G1493 - Channel Coding

Degree in Telecommunication Technologies Engineering

Academic year 2019-2020

1. IDENTIFYING DATA					
Degree	Degree in Telecommunication Technologies Engineering			Type and Year	Optional. Year 4
Faculty	School of Industrial Engineering and Telecommunications				
Discipline	Speciality Optional Subjects				
Course unit title and code	G1493 - Channel Coding				
Number of ECTS credits allocated	6	Term	Semester based (1)		
Web	https://www.tlmat.unican.es/index.php?l=es&p=teaching&s=subjects&ss=g_cc&				
Language of instruction	Spanish	English Friendly	Yes	Mode of delivery	Face-to-face

Department	DPTO. INGENIERIA DE COMUNICACIONES
Name of lecturer	LUIS MUÑOZ GUTIERREZ
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Office	Edificio Ing. de Telecomunicación Prof. José Luis García García. Planta: - 2. DESPACHO (S202)
Other lecturers	

3.1 LEARNING OUTCOMES

- The student will acquire the knowledge and skills for selecting the most appropriate channel coding schemes fullfiling the requirements imposed by different telecommunication networks and services.

4. OBJECTIVES

The main objective is to study coding and decoding techniques for linear block and convolutional codes most commonly used in communication systems.

6. COURSE ORGANIZATION

CONTENTS	
1	Coding fundamentals. User messages. Codeword. Parity-check matrix. Some examples: ISBN.
2	Channel coding fundamentals. Finite fields. Transmission channel. Decision rule. Minimum distance. Concept of erasure. Redundancy and Singleton bound.
3	Decoding with the Slepian table. Choosing the generator-matrix G. Hamming codes. Shortened and extended codes. Correction, detection and residual error probability. Algorithms for incomplete decision schemes.
4	Code design. Matrix description of BCH codes. RS codes. Some practical examples.
5	Decoding block codes. Error decoding in BCH and RS codes. Chien search. Erasure and error decoding in BCH and RS codes.
6	Forney's formula. Euclid's algorithm. Massey Algorithm.
7	Convolutional codes. Linear convolutional codes. Memory and contraint lenght. Polynomial and matrix description. State and trellis diagrams. Transfer function. Free-error distance. Performance evaluation. Trellis coded modulation.

7. ASSESSMENT METHODS AND CRITERIA

Description	Type	Final Eval.	Reassessn	%
The subject will be evaluated through a final exam whose mark, FEM, will be weighted (60%) with the continuous evaluation, CEM. In the former, a mark higher than 4 points out of 10 is required to be considered for averaging both of them.	Written exam	No	Yes	40,00
The students not attending the lectures or deciding not to participate in the continuous evaluation will obtain the mark corresponding to the final exam.	Written exam	Yes	Yes	60,00
TOTAL				100,00

Observations

The subject will be evaluated through a final exam whose mark, FEM, will be evaluated weighting it with the one linked to the continous evaluation, CEM. A mark higher than 4 points is required to average both of them. The final mark will be the maximum of (FEM; FEM*0.60+CEM*0.40).
The students not attending the lectures or deciding to do not rely on the continous evaluation they will have the mark corresponding to the final exam.

Observations for part-time students

The students not attending the lectures or deciding not to participate in the continuous evaluation will obtain the mark corresponding to the final exam.

8. BIBLIOGRAPHY AND TEACHING MATERIALS

BASIC

G.C. Clark, J.B. Cain: Error Correction Coding for Digital Communicationss, Plenum Press, 1988.
A. Michelson, A. Levesque: Error-Control Techniques for Digital Communications, John Wiley, 1985.