SUBJECT TEACHING GUIDE

G1495 - Non-conventional Networks

Degree in Telecommunication Technologies Engineering

Academic year 2023-2024

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	G1495 - Non-conventional Networks				
Number of ECTS credits allocated	6	Term		Semester based (2)	
Web	http://www.tlmat.unican.es				
Language of instruction	Spanish	English Friendly	No	Mode of delivery	Face-to-face

Department	DPTO. INGENIERIA DE COMUNICACIONES
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Other lecturers	MARTA GARCIA ARRANZ

3.1 LEARNING OUTCOMES
- To understand the architecture and the main communicaiton protocols used in wireless and mobile non -conventional networks.
- The student understands and interpret the protocols architecture for wireless sensor networks
- The student is able to distinguish the basic principles for wireless mesh networks.

4. OBJECTIVES
To analyse the different mechanisms and protocols, as well as the architecture and design principles, used in wireless sensor networks.
To study in detail the protocols IEEE 802.15.4 and 6LoWPAN as the most spread examples, for MAC and network layer respectively, used nowadays for wireless sensor networks.
To let the student to be familiar with different architectures for mobile and wireless networks that have not been addressed in previous subjects such as personal networks and mobile corporate networks.
To study the main features of ad-hoc and meshed networks with special emphasis to the protocols used in this topologies.

6. COURSE ORGANIZATION	
CONTENTS	
1	UNIT 1: INTRODUCTION. Network structure. Network topology. Non-conventional networks.
2	UNIT 2: NON-CONVENTIONAL WIRELESS AND MOBILE NETWORKS. WPAN networks: Bluetooth. Extensions to the IEEE 802.11 standard and its application to vehicular communications. Corporate mobile networks (TETRA).
3	UNIT 3: MESH NETWORKS. Concept. Mesh networks formation. MANETs. Mesh networking. Ad-hoc routing protocols. The IEEE 802.11s standard.
4	UNIT 4: SENSOR NETWORKS. Architecture and main design principles. Physical layer. MAC layer. IEEE 802.15.4. Network layer. 6LoWPAN. Data-centric networking. Interaction between WSN and Internet. Middleware for WSN. Services over WSN. COAP.

7. ASSESSMENT METHODS AND CRITERIA

Description	Type	Final Eval.	Reassessn	%
Evaluation of Practice sessions	Laboratory evaluation	Yes	No	20,00
Conituous evaluation	Others	No	Yes	24,00
Final exam	Written exam	Yes	Yes	56,00
TOTAL				100,00

Observations

Practice sessions are mandatory but they realization will depend on the restrictions imposed by the health authorities. Its evaluation is not recoverable given its experimentation nature.
Final mark is obtained by applying the following formula, in which TEOR is the mark from theory sessions and PRAC is the mark from the practice sessions: MARK = TEOR * 0.8 + PRAC * 0.2
The mark from the theory sessions (i.e. TEOR) comes from the marks obtained from the Continuous Evaluation (EC) tests and the one from the Final Exam (EF). In any case, it will be necessary to get a mark above 4.0 in the Final Exam to pass.
Moreover, the mark from the EC will not harm the final mark so TEOR = max{0.7 * EF + 0.3 * EC; EF}
Given the uncertainty created by the pandemic situation, both the Continuous Evaluation and the Final Exam could be organized remotely supported by telematic tools. If this were the case, in addition to the evaluation exercises, the students could be called to a remote and synchronous session (e.g. videoconference) in which they will be asked to defend their answers in the exercises.
The Evaluation of Practice Lessons could not be handled if the practice lessons were not physically holded at the laboratory. In the practice lessons specialized material and devices are used. Thus these sessions could not be organized in a remote manner. In case of mixed teaching, the restrictions enforced by the health authorities would determine whether the Evaluation of Practice Lessons could be holded or not.

Observations for part-time students

Continuous Evaluation is not mandatory; students which do not participate in this evaluation would obtain is final mark from the Evaluation of Practice sessions and the Final Exam.

8. BIBLIOGRAPHY AND TEACHING MATERIALS

BASIC

Holger Karl, Andreas Willig, "Protocols and Architectures for Wireless Sensor Networks", John Wiley & Sons, 2005

Thomas Haenselmann, "Sensor Networks", available online for free, 2008.

B. H. Walke, "Mobile Radio Networks, Second Edition", John Wiley & Sons, 2002

J. Dulop, D. Girma, J. Irvine, "Digital Mobile Communications and the Tetra System", John Wiley & Sons, 2000

Mohammad Ilyas, "The Handbook of Ad Hoc Wireless Networks", CRC Press, 2010