

## SUBJECT TEACHING GUIDE

M1593 - Embedded Electronic Systems

Master's Degree in Telecommunication Engineering

Academic year 2021-2022

| 1. IDENTIFYING DATA              |   |                  |                    |                  |                    |
|----------------------------------|---|------------------|--------------------|------------------|--------------------|
| Degree                           | Master's Degree in Telecommunication Engineering  |                  |                    | Type and Year    | Compulsory. Year 2 |
| Faculty                          | School of Industrial Engineering and Telecommunications   |                  |                    |                  |                    |
| Discipline                       |   |                  |                    |                  |                    |
| Course unit title and code       | M1593 - Embedded Electronic Systems   |                  |                    |                  |                    |
| Number of ECTS credits allocated | 5   | Term             | Semester based (1) |                  |                    |
| Web                              | <a href="http://moodle.unican.es/moodle27/course/view.php?id=1355">http://moodle.unican.es/moodle27/course/view.php?id=1355</a> |                  |                    |                  |                    |
| Language of instruction          | Spanish   | English Friendly | Yes                | Mode of delivery | Face-to-face       |

|                  |   |  |  |  |  |
|------------------|---|--|--|--|--|
| Department       | DPTO. TECNOLOGIA ELECTRONICA E INGENIERIA DE SISTEMAS Y AUTOMATICA                              |  |  |  |  |
| Name of lecturer | EUGENIO VILLAR BONET  |  |  |  |  |
| E-mail           | eugenio.villarb@unican.es   |  |  |  |  |
| Office           | E.T.S. de Ingenieros Industriales y de Telecomunicación. Planta: - 3. DESPACHO PROFESOR (S3098) |  |  |  |  |
| Other lecturers  | VICTOR MANUEL FERNANDEZ SOLORZANO<br>HECTOR POSADAS COBO  |  |  |  |  |

| 3.1 LEARNING OUTCOMES   |
|---|
| - To know the technological development to date and be able to evaluate its future development  |
| - To acquire the necessary knowledge about the architectures that support the design of embedded systems currently and their future evolution |
| - To know the languages and tools used to specify, simulate and design embedded electronic systems  |
| - To apply the knowledge acquired to the implementation of an embedded electronic system  |

#### 4. OBJECTIVES

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|--|
| Pro-active attitude regarding the technological development  |
| Knowledge of the specification and co-design methodologies of complex embedded systems from high level languages |
| Skills for the development and optimization of the embedded SW in mono and multi-processor systems               |
| Capability for HW synthesis from high level languages and design of HW/SW communications                         |
| Verification and debugging of HW/SW systems  |

#### 6. COURSE ORGANIZATION

| CONTENTS |   |
|----------|---|
| 1        | High-Level languages: SystemC           |
| 2        | Embedded SW development                 |
| 3        | High-Level synthesis of HW              |
| 4        | Introduction to Technological Evolution |

#### 7. ASSESSMENT METHODS AND CRITERIA

| Description  | Type                  | Final Eval. | Reassessn | %             |
|--|-----------------------|-------------|-----------|---------------|
| Classroom exercises  | Work                  | No          | No        | 15,00         |
| Laboratory practices   | Laboratory evaluation | No          | No        | 15,00         |
| Written exam   | Written exam          | No          | Yes       | 70,00         |
| <b>TOTAL</b>   |                       |             |           | <b>100,00</b> |
| <b>Observations</b>  |                       |             |           |               |
| <p>If the student fails the Continuous Assessment, he/she may pass the subject with a Written Exam. The final grade in that case will be decided from the grade obtained in Continuous Assessment (30%) and in the Final Exam (70%).</p> <p><b>Exercises in class</b><br/>Students will be proposed different exercises on specific aspects of the subject and in any case at the end of each thematic block.</p> <p><b>Laboratory practices</b><br/>Each practice will be evaluated in its aspects of quality of the proposed solution, systemic thinking and ability to solve the problem.</p> |                       |             |           |               |
| <b>Observations for part-time students</b>   |                       |             |           |               |
| For students who prove their part-time participation, dates will be sought in which they can perform the assessable exercises proposed in class as well as the laboratory practices  |                       |             |           |               |

#### 8. BIBLIOGRAPHY AND TEACHING MATERIALS

| BASIC   |
|---|
| D.C. Black, J. Donovan, B. Bunton & A. Keist: "SystemC: From the Ground Up", Springer, 2nd Edition, 2010                        |
| R. Kamal: "Embedded Systems: Architecture, Programming and Design", McGraw-Hill, 2nd Edition, 2008                              |
| P. Marwedel: "Embedded System Design", Springer, 2006   |
| D. Gajski, S. Abdi, A. Gerstlauer & G. Schirner: "Embedded System Design: Modeling, Synthesis and Verification", Springer, 2009 |

