Cyberphysical systems engineering

Academic Year: (2023 / 2024) **Review date: 25-05-2022**

Department assigned to the subject: Computer Science and Engineering Department

Coordinating teacher: LLORENS MORILLO, JUAN BAUTISTA

Type: Electives ECTS Credits : 6.0

Year : 4 Semester :

SKILLS AND LEARNING OUTCOMES

Complement the basic, transversal and compulsory knowledge of the Degree according to the student's preferences.

DESCRIPTION OF CONTENTS: PROGRAMME

-Foundations of the cyber-physical systems engineering.
-Lifecycle of a cyber-physical system
-Technical processes and tools within the lifecycle of a cyber-physical system
-Technical management processes and tools within the lifecycle of a cyber-physical system
-Automation of the engineering process
-Multicultural aspects of the engineering process of a cyber-physical system

LEARNING ACTIVITIES AND METHODOLOGY

THEORETICAL-PRACTICAL CLASSES (2,5 ECTS). In them the knowledge to be acquired by the students will be presented. They will receive the class notes and will have basic reference texts to facilitate the follow-up of the classes and the development of the subsequent work. Exercises will be solved by the student that will serve as self-evaluation and to acquire the necessary skills. Classes of problems, in which the problems proposed to the students will be developed and discussed.

WORKSHOPS AND/OR LABORATORY PRACTICES (0.5 ECTS).

TUTORIALS (1.0 ECTS). Individualized assistance (individual tutorials) or in group (collective tutorials) to the students by the professor.

INDIVIDUAL OR GROUP WORK OF THE STUDENT (2.0 ECTS).

ASSESSMENT SYSTEM

The evaluation of the course will consist of partial deliveries and a final practice where all the knowledge acquired in the course is applied. The evaluation system includes the assessment of the directed academic activities and practices according to the following weighting.

CONTINUOUS EVALUATION (70%). In this evaluation will be valued the Works, Presentations, Debate Performance, Class Exhibitions, Exercises and Laboratory Practices.

FINAL EXAM (30%). In which the knowledge, skills and abilities acquired throughout the course will be globally assessed.

% end-of-term-examination:	30
% of continuous assessment (assigments, laboratory, practicals…):	70

BASIC BIBLIOGRAPHY

- Martin Eigner System Lifecycle Management: Engineering Digitalization (Engineering 4.0) 1st ed. 2021 Edition, Springer, 2021
- Rajeev Alur Principles of Cyber-Physical Systems, MIT Press, 2015
- Thomas M. Shortell (ed) INCOSE Systems Engineering Handbook: A Guide for System Life Cycle Processes and Activities, Wiley, 2015

ADDITIONAL BIBLIOGRAPHY

- Cathleen Shamieh Systems Engineering For Dummies, Wiley, 2011

- Patrice Micouin Model Based Systems Engineering: Fundamentals and Methods (Control, Systems and Industrial Engineering Series), Wiley, 2021

BASIC ELECTRONIC RESOURCES

- Functional Mock-up Interface . FMI Site: https://fmi-standard.org/

- International Council of Systems Engineering . INCOSE Site: https://www.incose.org/

- Object Management Group . OMG SysML Site: http://www.omgsysml.org/