Advanced automation of industrial and services

Academic Year: (2020 / 2021)   **Review date:** 17-05-2019

Department assigned to the subject: Systems Engineering and Automation Department

Coordinating teacher: ABDERRAHIM FICHOUCHE, MOHAMED

Type: Compulsory ECTS Credits : 3.0

Year : 1 Semester : 1

OBJECTIVES

BASICS COMPETENCES
CB6   Possess and understand knowledge that provides a basis or opportunity to be original in the development and / or application of ideas, often in a research context
CB7   That students know how to apply the knowledge acquired and their ability to solve problems in new or unfamiliar environments within broader (or multidisciplinary) contexts related to their area of study
CB8   That students are able to integrate knowledge and face the complexity of making judgments based on information that, being incomplete or limited, includes reflections on social and ethical responsibilities linked to the application of their knowledge and judgments
CB9   That students know how to communicate their conclusions and the knowledge and ultimate reasons that sustain them to specialized and non-specialized audiences in a clear and unambiguous way

GENERALS COMPETENCES

CG1   Knowledge and understanding of the theoretical foundations of both industrial processes and services, and communications.
CG2   Ability to model, identify basic requirements and analyze various processes.
CG6   Capacity to adapt to changes in requirements associated with new products, new specifications and environments.

SPECIFIC COMPETENCES

CE1   Ability to design automatic process systems (production machinery, transport and storage systems and quality control) and the interconnection between their different modules (industrial protocols)
CE2   Ability to integrate and program the different industrial process control systems both from a hardware and software point of view
CE3   Ability to program and simulate robot control systems at high, intermediate and low levels
CE4   Ability to implement and simulate a system of intelligent and flexible control of processes and systems

LEARNING RESULTS
As a result of the learning, the student will be able to:
- Know the basics of automation of industrial systems and services (non-industrial): structure, industrial communications and systems control.
- Know the basics of collaborative robotics: structure, sensorization, control, programming, paths / outputs, multi- robot systems, industrial applications and services.
- Analyze and synthesize systems using advanced control: identification methods, fuzzy control, control with reference model, learning systems, control with neural networks, predictive control, etc.
- Use of simulation tools of production systems with continuous and discrete parts: lay-out, warehouses, transport, specific machines, delays, etc.
- Design an automated system of low and medium complexity with its cyber-physical components.

Common themes of the subjects:
- Automatization and control of processes, plants and factories
- Structures of industrial plants and services according to CI 4.0 model
- Systems engineering and process integration
- Process and plants simulation tools

Specific themes of the subjects:
Advanced automation of industrial and services processes:
- Fundaments of system automation
- Basic elements and technologies of system automation
- Hierarchical automation
- Automation of discrete events systems
- Examples of automated systems

% end-of-term-examination: 60

% of continuous assessment (assigments, laboratory, practicals…):   40