Electromechanical Actuators

Academic Year: (2019 / 2020) **Review date: 20-12-2019**

Department assigned to the subject: Electrical Engineering Department

Coordinating teacher: CASTRONUOVO , EDGARDO DANIEL

Type: Electives ECTS Credits : 6.0

Year : 4 Semester : 1

REQUIREMENTS (SUBJECTS THAT ARE ASSUMED TO BE KNOWN)

electrical Machines
Control Engineering
Power electronics

OBJECTIVES

By the end of this content area, students will be able to have:
1. coherent knowledge of their branch of engineering including some at the forefront of the branch in electrical machines and installations;
2. the ability to apply their knowledge and understanding of electrical machines and installations to identify, formulate and solve engineering problems using established methods;
3. workshop and laboratory skills.
4. the ability to combine theory and practice to solve engineering problems regarding electrical machines and installations;
5. an understanding of applicable techniques and methods in electrical machines and installations, and of their limitations;

DESCRIPTION OF CONTENTS: PROGRAMME

Mechanical Systems. Equation of motion.
Selection and specification of components drives.
General control of electrical machines.
Operating principle of DC machine.
Control of DC machines.
Principle of operation of the ac machine.
Scalar control of induction motor.
Vector control of induction motor.
Permanent magnet synchronous machines.
Vector control of synchronous motors.
Stepper motors.
Applications for control of speed and position.

LEARNING ACTIVITIES AND METHODOLOGY

- Lectures: based on the student's previous work on text or other materials provided in class or through Global Classroom. It will develop the fundamental concepts of the subject, the student must have studied previously. It resolved the doubts that arise on these concepts, supporting them in examples when necessary.
- Types of simulation in the computer classroom: they learn MATLAB management, and SimPowerSystems Simlunik or some alternative tool as Octave or MISP. These programs will be used to perform dynamic simulations on the various aspects of the control of electrical machines.
- Labs: labs will be three, to control dc machines, induction motors and permanent magnet synchronous motors.

ASSESSMENT SYSTEM

Three tests:
1. - Practical examination in the laboratory on one of the three practices carried out during the course. (35%)
2. - Simulation test with MATLAB / Simulink / SimPowerSystem (or others), which will include some exercise on the simulations that have been made during the course. (15%)
3. - Problems test on the ordinary call. (50%)

% end-of-term-examination:	50
% of continuous assessment (assigments, laboratory, practicals…):	50

BASIC BIBLIOGRAPHY

- Chiasson Modeling and high performance control of electrical machines, IEEE, 2005
- Fraile Mora Máquinas Eléctricas, McGrawHill, 1995
- Leonhard Control of Electrical Drives, Springer, 1996