29936 - Automatic Systems

1.Basic info

1.1.Recommendations to take this course

1.2.Activities and key dates for the course

2.Initiation

2.1.Learning outcomes that define the subject

2.2.Introduction

3.Context and competences

3.1.Goals

3.2.Context and meaning of the subject in the degree

3.3.Competences

3.4.Importance of learning outcomes

4.Evaluation

5.Activities and resources

5.1.General methodological presentation

The learning process designed for this course is based in the following aspects:

1. Master classes by the teachers.

2. Resolution of the problems proposed during the course.

3. Lab sessions for the students supervised by a teacher. The students will apply, in a real or simulated environment, their theoretical knowledge, dealing with the problems and limitations of real systems. All of this will result in a better

understanding, deepening and comprehension of the theoretical part of the course.

4. Personal study by the students.

It should be considered that the course has an important theoretical basis and that additionaly the student must understand and assimilate its importance in the world of industrial application.

The learning process emphasizes

1. The attendance of the student to the master classes.

2. The personal study.

3. The resolution of problems.

5.2.Learning activities
The program offered to the student, in order to help him to achieve the expected results, includes the following activities:

Master classes explaining the theoretical contents. The contents developed in the course are the following:

1st. BLOCK. - Logic automatisms.

- Control of Discrete Event Systems.

2nd. BLOCK.- Dynamic Behavior of Continuous-Time Systems.

- Modeling of Continuous-Time Systems.
- Time-Domain Analysis of Continuous-Time Systems.
- Frecuency Analysis of Continuous-Time Systems.

3rd. BLOCK.- Feedback Control Systems.

- Feedback Systems.
- Control of Continuous-Time Systems.

Doing exercises selected from a collection provided for student work.

Lab sessions . The sessions will take place in the following laboratories:

- Computer lab for the simulation tasks.
- Lab with Continuous-Time System models. Process control using PLCs (with an integrated PID algorithm) and industrial controlers.
- Lab with a Discrete Event System model. Control using PLCs.

5.3.Program

Lesson 1. Control of Discrete Event Systems

Lesson 2. Modeling of Continuous-Time Systems

Lesson 3. Time-Domain Analysis of Continuous-Time Systems

Lesson 4. Frecuency Analysis of Continuous-Time Systems

Lesson 5. Feedback Systems

Lesson 6. Control of Continuous-Time Systems

5.4.Planning and scheduling

Schedule of classes, lab sessions and works presentation

The schedule of classes and lab sessions of the course is fixed by the Center.

Other learning activities that can be done during the course will be announced with adequate notice.

5.5.Bibliography and recomended resources

BB	Dutton, Ken. The art of control engineering / Ken Dutton, Steve Thompson, Bill Barraclough . - 1st pr.,[1st]repr. Harlow : Addison-Wesley, 1998
BB	Kuo, Benjamin C.. Sistemas de control automático / Benjamin C. Kuo ; traducción, Guillermo Aranda Pérez ; revisor técnico, Francisco Rodríguez Ramírez . - 1ª ed. en español México [etc.] : Prentice Hall Hispanoamericana, cop. 1996
BB	Lewis, Paul H.. Sistemas de control en ingeniería / Paul H. Lewis, Chang Yang . - 1a ed. en español Madrid : Prentice Hall, cop. 1999
BB	Montano Gella, Luis. Regulación automática : análisis y diseño en el dominio de la frecuencia / Luis Montano Gella, José Luis Villarroel Salcedo . - [1a. ed.] Zaragoza : Universidad, Secretariado de Publicaciones, D.L.1991
BB	Ogata, Katsuhiko. Ingeniería de control moderna / Katsuhiko Ogata ; traducción Sebastián Dormido Canto, Raquel Dormido Canto ; revisión técnica Sebastián Dormido Bencomo ; revisión técnica para Latinoamérica Amadeo Mariani ... [et al.] . - 5ª ed. Madrid : Pearson Educación, D.L. 2010
BB	Ollero de Castro, Pedro. Control e instrumentación de procesos químicos / Pedro Ollero de Castro, Eduardo Fernández Camacho Madrid : Síntesis, D. L. 1997
BB	Piedrafita Moreno, Ramón. Control de

BB sistemas industriales continuos / Ramón Piedrafita Moreno Zaragoza : Kronos, 2002

BB Piedrafita Moreno, Ramón. Ingeniería de la automatización industrial / Ramón Piedrafita Moreno . - 2a ed. amp. y act. Madrid : Ra-Ma, D.L. 2003 [cop. 2004]

BB Silva Suárez, Manuel. Las redes de Petri : en la automática y la informática / Manuel Silva . - 1a ed. 1985, 1a reimp. 2002 Madrid : Editorial AC, 2002

BB Smith, Carlos A.. Principles and practice of automatic process control / Carlos A. Smith, Armando B. Corripio . - 3rd ed. Hoboken, NJ : John Wiley & Sons, cop. 2006

BB Stephanopoulos, George. Chemical process control : an introduction to theory and practice / George Stephanopoulos Englewood Cliffs, N.J. : Prentice-Hall, cop. 1984

BB Svrcek, William Y.. A real-time approach to process control / William Y. Svrcek, Donald P. Mahoney, Brent R. Young Chichester [etc.] : John Wiley and sons, cop. 2000