28952 - Utilities and process control

Información del Plan Docente

Academic Year	2016/17
Academic center	201 - Escuela Politécnica Superior
Degree	437 - Degree in Rural and Agri-Food Engineering
ECTS	6.0
Course	4
Period	First semester
Subject Type	Compulsory
Module	---

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

THEORY LESSONS

The theoretical academic sessions will be used to allow students to learn through exposure professor concepts and methodologies of work needed to start developing your self-employment. These sessions will be conducted mostly with the support of computer presentations and projected; previously will be provided to the student.

28952 - Utilities and process control

PROBLEM SOLVING:

The student will be given a series of problem sets that will solve or try to solve, then the interactive sessions will address the doubts and resolutions thereof.

WORKS:

In the classroom will be In the classroom will be proposed during the course 3 or 4 works, which the students have to solve. subsequent to the delivery, they made the defense of the same.

LABORATORY PRACTICE:

The professor made an explanation of the theoretical framework necessary for understanding the theory of practice to develop.

Explanation of equipment and instruments

Students operate the equipment, take data order that they can develop the practice report.

The completion of the practices is obligatory.

5.2.Learning activities

The achievement of a student's basic training is based on theoretical type classes (30 hours) and problems type classes (20 hours), but active participation of students will be encouraged.
Group work/activities (20 hours) are required; they allow the acquisition of general and specific competence.
Individual tutoring will be conducted to clarify particular problems of each student and mandatory tutoring to work with reduced groups specific topics.
Also, the practice program (10 hours) allows to transpose theoretical knowledge to practical application and development of scientific and technical documents.
Tools will be used to support teaching and problem solving .
The Virtual Campus of UniZar will also be used as support.

5.3.Program

Theory programme

Topic 1: Introduction

Thematic block 1:

28952 - Utilities and process control

AUXILIARY EQUIPMENT IN THE FOOD PROCESSING INDUSTRY

Topic 2: Use of steam in food processing industries. Steam distribution network.Steam boilers.

Topic 3: Drive compressed air and gases. pneumatic equipment. Distribution networks of compressed air.

Topic 4: Drive liquids. Equipment and distribution networks

Thematic block 2:

PROCESS CONTROL IN THE FOOD PROCESSING INDUSTRY

Topic 5: Introduction to automatic control.

Topic 6: The Process.

Topic 7: Process characteristics

Topic 8: Control actions .

Topic 9: Tuning controllers.

Topic 10 : Industrial Instrumentation (I)

Topic 11 : Industrial Instrumentation (II)
Topic 12 : Characteristics of typical process control loops
Topic 13 : Advanced Control
Topic 14 : Programmable Logic Controller.

Topic 15 : Applications in the industry. typical control schemes.

Practical Programme

Practical 1: Simulating a food processing process. Dynamic response to different inputs

Practical 2: Searching for, consulting and handling information: Catalogues of boilers and burners.

Practical 3: PLC Programming.

28952 - Utilities and process control

Practical 4: Tuning a controller for a continuous process.

Practical 5: Visit to a food processing industry to discover its auxiliary installations "in situ" and to control its processes.

5.4.Planning and scheduling

Study time and individual work

Assistance to the presential sessions is mandatory in works/activities and laboratory practice.

The students must take up the subject (4-5 hours per week) to understand and carry out further issues and problems that arise in class.

Overall it is estimated that students must use a total of 90 hours of personal work to complete a total of 150 hours devoted to the subject.

Activity / Weak	**1**	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**	**11**
Classroom activity											
Theory	4	3	1	1	2	2	1	3	1	3	1
Troubleshooting	1	3	3		2	1	1	1	1	1	
Laboratory sessions					2		2		2		2
Personal study and work											
Individual work:	4	4	4	3	3	3	3	3	3	2	2
Group work				2	2	2	2	2	2	2	2
Exams,											

28952 - Utilities and process control

tests										
TOTAL	**8**	**8**	**8**	**9**	**9**	**9**	**9**	**9**	**9**	**8**	**8**

Activity / Weak	**12**	**13**	**14**	**15**	**16**	**17**	**18**	19	Total
Classroom activity									60
Theory	2	1	3			2			**30**
Troubleshooting	2	1	1			2			**20**
Laboratory sessions		2							**10**
Personal study and work									85
Individual work:	2	2	4	4	4	5	7	3	**65**
Group work	2	2							**20**
Exams tests								5	**5**
TOTAL	**8**	**8**	**8**	**4**	**4**	**9**	**7**	**8**	150

5.5.Bibliography and recomended resources

Basic Bibliography

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28952 - Utilities and process control

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- Josep Balcells, José Luis Romeral, Autómatas Programables, Marcombo Boixareu Editores, Barcelona 1997
- Fundamentos termodinámicos y diseño de las instalaciones de vapor en las industrias agroalimentarias. (2005) Editorial Trymar. E. Arbones. I Corral. J. Gómez
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Complementary Bibliography

- OGATA, Katsuhiko: "Sistemas de control en tiempo discreto"
- MANDADO PÉREZ, E: "Controladores lógicos y autómatas programables", Ed. Marcombo, 681.5 MAN con.
- Bolton, W. Instrumentación y control industrial. Paraninfo. Madrid, 1996.
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