Course guide
240172 - 240172 - Automatic Control

Unit in charge: Barcelona School of Industrial Engineering
Teaching unit: 707 - ESAII - Department of Automatic Control.

Degree: BACHELOR’S DEGREE IN INDUSTRIAL TECHNOLOGY ENGINEERING (Syllabus 2010). (Compulsory subject).
BACHELOR’S DEGREE IN AUTOMOTIVE ENGINEERING (Syllabus 2017). (Optional subject).

Academic year: 2023 ECTS Credits: 6.0 Languages: Catalan, Spanish

LECTURER

Coordinating lecturer: Roberto Griñó

DEGREE COMPETENCES TO WHICH THE SUBJECT CONTRIBUTES

Specific:
1. Capacity to design control systems and industrial automation.
2. Knowledge on automatisms’ fundamentals and control methods.

TEACHING METHODOLOGY

LEARNING OBJECTIVES OF THE SUBJECT

STUDY LOAD

<table>
<thead>
<tr>
<th>Type</th>
<th>Hours</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>Self study</td>
<td>90,0</td>
<td>60.00</td>
</tr>
<tr>
<td>Hours small group</td>
<td>12,0</td>
<td>8.00</td>
</tr>
<tr>
<td>Hours large group</td>
<td>48,0</td>
<td>32.00</td>
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</tbody>
</table>

Total learning time: 150 h

CONTENTS

(ENG) Tema 1 Introduction to digital control

Description:

Full-or-part-time: 5h
Theory classes: 2h
Self study: 3h
(ENG) Tema 2 Sampling of signals

Description:

Full-or-part-time: 10h
Theory classes: 4h
Self study: 6h

(ENG) Tema 3 Discrete-time systems

Description:
Definition of z transform. Properties of the z transform. Correspondence between the s-plane and the z-plane. Calculation of z transforms. Calculation of inverse z transforms. z domain transfer function. Block diagrams. Simplification. Closed-loop systems. Open-loop transfer functions (L) and closed-loop transfer functions (T,S).

Full-or-part-time: 19h
Theory classes: 7h
Self study: 12h

(ENG) Tema 4 Time-domain analysis

Description:

Full-or-part-time: 37h
Theory classes: 12h
Laboratory classes: 3h
Self study: 22h

(ENG) Tema 5 Frequency domain analysis

Description:

Full-or-part-time: 25h
Theory classes: 7h
Laboratory classes: 3h
Self study: 15h
(ENG) Tema 6 Design and implementation of digital controllers

Description:
Control algorithms and digital controllers. Digital PID controllers. Frequency domain design of lead and lag controllers. Algebraic design of digital controllers: Pole assignment and other specifications, general controllers and PID controllers. Control algorithms programming. Selection of the sampling period. Quantification and computation time effects.

Full-or-part-time: 51h
Theory classes: 13h
Laboratory classes: 6h
Self study: 32h

GRADING SYSTEM

BIBLIOGRAPHY

Basic:

Complementary: