

## 340603 - SIAC-R1007 - Advanced Control Systems

Coordinating unit: 340 - EPSEVG - Vilanova i la Geltrú School of Engineering  
Teaching unit: 707 - ESAII - Department of Automatic Control  
Academic year: 2017  
Degree: MASTER'S DEGREE IN AUTOMATIC SYSTEMS AND INDUSTRIAL ELECTRONICS (Syllabus 2012).  
(Teaching unit Compulsory)  
ECTS credits: 5 Teaching languages: Catalan, English

### Teaching staff

Coordinator: PAU MARTI COLOM  
Others: PAU MARTI COLOM

### Opening hours

Timetable: To be defined

### Prior skills

In construction

### Degree competences to which the subject contributes

Specific:

1. CC01 - Ability to research, design, develop and characterize advanced control systems that enable the dynamic system behave according to the operational performance requirements.
2. CC02- capacity and analyzing the results of the advanced control system integrated into the automated process, formulating alternatives in design or implementation if the controlled system does not reach the required specification.

Transversal:

3. TEAMWORK: Being able to work in an interdisciplinary team, whether as a member or as a leader, with the aim of contributing to projects pragmatically and responsibly and making commitments in view of the resources that are available.
4. EFFECTIVE USE OF INFORMATION RESOURCES: Managing the acquisition, structuring, analysis and display of data and information in the chosen area of specialisation and critically assessing the results obtained.

### Teaching methodology

Combination of theoretical classes, problem based learning and lab classes

### Learning objectives of the subject

Students will be able to analyse, design and implement advanced control systems



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### Study load

Total learning time: 125h	Hours large group:	15h	12.00%
	Hours medium group:	0h	0.00%
	Hours small group:	30h	24.00%
	Guided activities:	0h	0.00%
	Self study:	80h	64.00%

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### Content

Introduction	Learning time: 2h Theory classes: 2h
<p>Description: Introduction</p> <p>Related activities: In construction</p> <p>Specific objectives: In construction</p>	
Linear systems	Learning time: 4h Theory classes: 4h
<p>Description: State space models for linear systems</p> <p>Related activities: In construction</p> <p>Specific objectives: In construction</p>	
Non-linear systems	Learning time: 4h Theory classes: 4h
<p>Description: Non-linear systems</p> <p>Related activities: In construction</p> <p>Specific objectives: In construction</p>	



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Advanced techniques for controller design	Learning time: 5h Theory classes: 5h
<p>Description: Advanced techniques for controller design</p> <p>Related activities: In construction</p> <p>Specific objectives: In construction</p>	

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### Planning of activities

Systems modeling	Hours: 4h Laboratory classes: 4h
<p>Description: In construction</p> <p>Support materials: In construction</p> <p>Descriptions of the assignments due and their relation to the assessment: In construction</p> <p>Specific objectives: In construction</p>	
Controller design	Hours: 6h Laboratory classes: 6h
<p>Description: Controller design</p> <p>Support materials: In construction</p> <p>Descriptions of the assignments due and their relation to the assessment: In construction</p>	
Control design feasibility	Hours: 4h Laboratory classes: 4h
<p>Description: Control design feasibility</p> <p>Support materials: En construcció</p> <p>Descriptions of the assignments due and their relation to the assessment: In construction</p> <p>Specific objectives: In construction</p>	
Controller implementation	Hours: 16h Laboratory classes: 16h
<p>Description: Controller implementation</p> <p>Support materials: In construction</p>	

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Descriptions of the assignments due and their relation to the assessment:

In construction

Specific objectives:

In construction

### Qualification system

Final mark: 50% Theory + 50% Labs

Theory is evaluated via exams

Labs are as evaluated according to the lab deliveries.

### Regulations for carrying out activities

Exams are with computer and with class notes

### Bibliography

Basic:

Slotine, Jean-Jacques E. ; Li, Weiping. Applied nonlinear control. Englewood Cliffs, NJ: Prentice-Hall, 1991. ISBN 0130408905.

Aström, Karl J ; Wittenmark, Björn. Computer-controlled systems: theory and design. 3rd ed. Mineola, NY: Prentice-Hall International, 2011. ISBN 9780486486130.

Franklin, Gene F. ; Powell, J. David; Emami-Naeini, Abbas. Feedback control of dynamic systems. 7th ed. Upper Saddle River [etc.]: Pearson, 2015. ISBN 9781292068909.

Franklin, Gene F; Powell, J. David; Workman, Michael L. Digital control of dynamic systems. 3rd ed. Menlo Park [etc.]: Addison-Wesley, 1998. ISBN 0201820544.

Luenberger, David G. Introduction to dynamic systems: theory, models and applications. New York, NY [etc.]: John Wiley and Sons, 1979. ISBN 0471025941.