# 240AR058 - Robust Control

**Coordinating unit:** 240 - ETSEIB - Barcelona School of Industrial Engineering  
**Teaching unit:** 707 - ESAII - Department of Automatic Control  
**Academic year:** 2017  
**Degree:** MASTER'S DEGREE IN AUTOMATIC CONTROL AND ROBOTICS (Syllabus 2012). (Teaching unit Optional)  
**ECTS credits:** 4.5  
**Teaching languages:** English

## Teaching staff

**Coordinator:** RAMON COSTA CASTELLÓ  
**Others:** RAMON COSTA CASTELLÓ  
VICENÇ PUIG CAYUELA

## Prior skills

## Degree competences to which the subject contributes

**Specific:**
1. The student will be able to analyze and design linear systems (single and multiple variables, external and internal representation) and nonlinear systems. This includes their stability, controller design and evaluation of closed-loop response.  
2. The student will be able to use analysis tools and computer-aided design of control systems in the tasks usual analysis, simulation and controller design.

**General:**
3. Ability to lead, plan and monitor multidisciplinary teams.
4. Have adequate mathematical skills, analytical, scientific, instrumental, technological, and management information.

## Learning objectives of the subject

## Study load

<table>
<thead>
<tr>
<th>Total learning time: 112h 30m</th>
<th>Hours medium group: 40h 30m</th>
<th>36.00%</th>
<th>Self study: 72h</th>
<th>64.00%</th>
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</thead>
</table>
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## Content

### Robust control concepts

**Learning time:** 22h 30m  
Theory classes: 9h  
Self study: 13h 30m

**Description:**  
Internal model principle. Disturbance observers.

**Related activities:**  
Lectures and practice sessions

**Specific objectives:**  
To fix the appropriate controller architecture for a given system, disturbances and references.

### General servo-mechanism problem

**Learning time:** 22h 30m  
Theory classes: 9h  
Self study: 13h 30m

**Description:**  
Principle of the internal model. Observer of disruptions

**Related activities:**  
Sessions of theory and problems.

**Specific objectives:**  
Select and design the architecture of the control system from a description of the systems, the references we want to work with and the disturbances taking place.

### Linear matrix inequalities in control

**Learning time:** 22h 30m  
Theory classes: 9h  
Self study: 13h 30m

**Description:**  

**Related activities:**  
Lectures and problems.

**Specific objectives:**  
Using LMI to synthesize controllers for simple plants.


### Linear parameter varying systems

**Description:**
Formulation and resolution of main problems in linear systems with varying parameters. Basic theory and examples.

**Related activities:**
Lectures and practice sessions

**Specific objectives:**
Modeling and controller design using linear systems with varying parameters.

**Learning time:** 30h
- Theory classes: 12h
- Self study: 18h

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### Robust identification

**Learning time:** 15h
- Theory classes: 6h
- Self study: 9h

**Description:**
Obtaining models and uncertainty from experimental data. Model validation.

**Related activities:**
Lectures and problems.

**Specific objectives:**
Using robust identification tools.

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### Bibliography

**Basic:**


**Complementary:**
