Course guide
220021 - CA - Automatic Control

Last modified: 02/04/2024

Unit in charge: Terrassa School of Industrial, Aerospace and Audiovisual Engineering
Teaching unit: 707 - ESAII - Department of Automatic Control.

Degree: BACHELOR'S DEGREE IN AEROSPACE TECHNOLOGY ENGINEERING (Syllabus 2010). (Compulsory subject).
BACHELOR'S DEGREE IN AEROSPACE VEHICLE ENGINEERING (Syllabus 2010). (Compulsory subject).

Academic year: 2024 **ECTS Credits:** 4.5 **Languages:** Catalan

LECTURER

Coordinating lecturer: Fatiha Nejjari Akhi-Elarab

Others: Joseba Quevedo, Jordi Damunt

DEGREE COMPETENCES TO WHICH THE SUBJECT CONTRIBUTES

Specific:
1. GrETA/GrEVA - An adequate understanding of the following, as applied to engineering: the basics of fluid mechanics; the basic principles of flight control and automation; the main characteristics and physical and mechanical properties of materials
CE17. GrETA/GrEVA - An adequate understanding of the following, as applied to engineering: fundamental elements of the various types of aircraft; functional elements of air navigation systems and related electrical and electronic installations; the basics of the design and construction of airports and their various elements
CE17-GREVA. (ENG) Coneixement adequat i aplicat a l'enginyeria de: els elements fonamentals dels diversos tipus d'aeronaus; els elements funcionals del sistema de navegació aèria i les instal·lacions elèctriques i electròniques associades; els fonaments del disseny i construcció d'aeroports i els seus diversos elements.
CE14-GRETA. GrETA/GrEVA - An understanding of air transport systems and coordination with other modes of transport.

TEACHING METHODOLOGY

It is divided into three parts:
· Attendance lessons of exposition of the contents
· Attendance lessons of evaluable group work.
· Self-study and exercises.
In the first ones, the teacher will expose the theoretical basis of the subject, concepts, methodology and results, that will go along with examples in order to easy the comprehension of the subject.
In the second ones, the students will develop the laboratory practices under the supervision and help of the teacher.
The students, autonomously, will study to assimilate the concepts and resolve the exercises.

LEARNING OBJECTIVES OF THE SUBJECT

Get the basic knowledge to model, analyse, and design the automatic control systems. It will be given special importance to concepts of stability and performance of closed-loop systems and their limitations.
Use of the computer to implement application examples of the concepts.

STUDY LOAD

Type	Hours	Percentage
Hours small group	14,0	12.44
Self study	67,5	60.00
Hours large group	31,0	27.56

Total learning time: 112.5 h

CONTENTS

1. Dynamic system modelling

Description:

Full-or-part-time: 26h
Theory classes: 8h
Laboratory classes: 2h
Self study : 16h

2. Dynamic system analysis.

Description:

Full-or-part-time: 29h 30m
Theory classes: 8h
Laboratory classes: 4h
Self study : 17h 30m

3. Stability and precision.

Description:

Full-or-part-time: 30h
Theory classes: 8h
Laboratory classes: 4h
Self study : 18h

4. Control system design.

Description:

Full-or-part-time: 27h
Theory classes: 7h
Laboratory classes: 4h
Self study : 16h

ACTIVITIES

ACTIVITY 1: THEORY SESSIONS

Full-or-part-time: 65h 30m
Self study: 37h 30m
Theory classes: 28h

ACTIVITY 2: LABORATORY SESSIONS

Full-or-part-time: 34h
Self study: 20h
Laboratory classes: 14h

ACTIVITY 3: MIDTERM EXAM

Full-or-part-time: 6h 15m
Self study: 5h
Theory classes: 1h 15m

ACTIVITY 4: FINAL EXAM

Full-or-part-time: 6h 15m
Self study: 5h
Theory classes: 1h 15m

ACTIVITY 5: LABORATORY EXAM

Full-or-part-time: 0h 30m
Theory classes: 0h 30m

GRADING SYSTEM

Laboratory: 20%
Midterm exam: 35%
Final exam: 35%
Laboratory exam: 10%

Unsatisfactory results in the midterm exam (examen parcial) can be recovered by doing a global exam that covers the first and second part of the course. The global exam will be held on the same date and hour scheduled for the final exam of the course. The mark of this global exam may replace the one obtained in the midterm exam if it is higher than this.
All the students, who wish so, can opt for this mechanism by sending an email to the coordinator of the course. Laboratory grades are exempt from this recovering mechanism.

EXAMINATION RULES.

All the activities are mandatory

BIBLIOGRAPHY

Basic:
- Ogata, K. Ingeniería de control moderna [on line]. 5ª ed. Madrid: Pearson Educación, 2010 [Consultation: 19/09/2022]. Available on: https://www-ingebook-com.recursos.biblioteca.upc.edu/ib/NPcd/IB_BooksVis?cod_primaria=1000187&codigo_libro=1259. ISBN 9788483229552.
- Dorf, R. C. Sistemas de control moderno. 10ª ed. Madrid: Prentice Hall, 2005. ISBN 8420544019.

Complementary:
- Goodwin, G. C.; Graebe, S. F.; Salgado, M. R. Control system design. Upper Saddle River: Prentice Hall, 2001. ISBN 0139586539.
- Aström, K. J.; Murray, R. M. Feedback systems: an introduction for scientists and engineers. Princeton: Princeton University, 2008. ISBN 9780691135762.
- Villà, R. Apuntes de dinámicas de sistemas. Barcelona: CPDA ETSEIB,