Course guide
340130 - ENCO-K6O07 - Control Engineering

Last modified: 17/05/2023

Unit in charge: Vilanova i la Geltrú School of Engineering
Teaching unit: 707 - ESAII - Department of Automatic Control.

Degree: BACHELOR'S DEGREE IN ELECTRICAL ENGINEERING (Syllabus 2009). (Optional subject).
BACHELOR'S DEGREE IN INDUSTRIAL ELECTRONICS AND AUTOMATIC CONTROL ENGINEERING (Syllabus 2009). (Compulsory subject).
BACHELOR'S DEGREE IN MECHANICAL ENGINEERING (Syllabus 2009). (Optional subject).

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

LECTURER

Coordinating lecturer: Pau Martí i Colom

Others: Marti Colom, Pau

DEGREE COMPETENCES TO WHICH THE SUBJECT CONTRIBUTES

Specific:
1. CE25. Knowledge and ability of systems modeling and simulation.
2. CE26. Knowledge of automatic regulation and control techniques and its application into industrial automatization.
3. CE29. Ability to design automotion control systems.

TEACHING METHODOLOGY

LEARNING OBJECTIVES OF THE SUBJECT

The subject â¿¿Engineering of Controlâ¿¿ tries:
- Standardization of knowledge of the students in Control Engineering on the analysis of linear control systems in continuous time as well as discrete time.
- To enable grade students with the capacity of analysing control systems in state-space
- To enable grade students with the capacity of designing control systems in state-space

STUDY LOAD

Type	Hours	Percentage
Hours large group	15,0	10.00
Hours small group	45,0	30.00
Self study	90,0	60.00

Total learning time: 150 h

CONTENTS

Analysis of control systems in state-space. Continuous systems

Description:
In construction

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

Analysis of control systems in state space. Discrete systems

Description:
Objectives
The specific objective of the subject is to redefine the technique of the space of state for sampled systems.

Contents
1. - Solution of the homogenous equation
2. - Calculation of the transition matrix.
3. - Solution of the complete equation.

Activities, knowledge, abilities, aptitudes
The pupils will have to be able of:
- To formulate the control systems in discreet time by the route of state variables.
- To solve equations of state for systems in discreet time.

Commentaries
The development of the subject can be followed through [Dom02].
A theoretical complement, as well as of exercises and examples], [Oga99]

Full-or-part-time: 15h
Theory classes: 2h
Laboratory classes: 3h
Self study : 10h

title english

Description:
content english

Full-or-part-time: 36h
Theory classes: 4h
Laboratory classes: 12h
Self study : 20h

title english

Description:
content english

Full-or-part-time: 31h
Theory classes: 2h
Laboratory classes: 9h
Self study : 20h

title english

Description:
content english

Full-or-part-time: 26h
Theory classes: 2h
Laboratory classes: 9h
Self study : 15h

title english

Description:
content english

Full-or-part-time: 36h
Theory classes: 4h
Laboratory classes: 12h
Self study : 20h

GRADING SYSTEM

The qualification of the subject considers all the work carried out throughout the course, assessing both the theoretical and practical aspects

MARK_CONTINUOUS_EVALUATION=0.3*FIRST_EXAM+0.5*SECOND_EXAM+0.2*LABORATORY

If the mark of the continuous evaluation is not greater or equal than five, and in accordance to the School regulation, a REEVALUATION exam can be taken whose mark is 100% of the subject

BIBLIOGRAPHY

Basic:
- Wang, Liuping. Model Predictive Control System Design and Implementation Using MATLAB® [Recurs electrònic] [on line]. London: Springer London, 2009 [Consultation: 12/02/2024]. Available on: https://link-springer-com.recursos.biblioteca.upc.edu/book/10.1007/978-1-84882-331-0. ISBN 1282018310.
- Slotine, Jean-Jacques E; Li, Weiping. Applied nonlinear control. Englewood Cliffs : Upper Saddle River: Prentice Hall International, 1991. ISBN 0130408905.
- Ogata, Katsuhiko. Ingeniería de control moderna [on line]. 5a ed. Madrid: Pearson Prentice Hall, 2010 [Consultation: 16/02/2024]. Available on: https://www-ingebook-com.recursos.biblioteca.upc.edu/ib/NPcd/IB_BooksVis?cod_primaria=1000187&codigo_libro=1259. ISBN 9788483226605.
- Vaccaro, Richard J. Digital control : a state-space approach. New York [etc.]: McGraw-Hill, 1995. ISBN 0-07-066781-0.
- Dominguez, Sergio ... [et al.]. Control en el espacio de estado. 2a ed. Madrid [etc.]: Prentice Hall, 2006. ISBN 8483222973.
- Franklin, Gene F; Powell, J. David; Emami-Naeini, Abbas. Feedback control of dynamic systems [on line]. 8th ed. Harlow, England: Pearson Education Limited, 2020 [Consultation: 06/03/2024]. Available on: https://ebookcentral-proquest-com.recursos.biblioteca.upc.edu/lib/upcatalunya-ebooks/detail.action?pq-origsite=primo&docID=5770170. ISBN 1-292-27454-9.