Course Unit Description - (SISCA)

(Advanced Control Systems)

(Mestrado em Engenharia Electrotécnica e de Computadores)

isep

Subject group: MEEC

	Semestral		**Compulsory**	
Mode of study	Diurno	**Hours/Week**	**T-**Teórica	2
Year	1º		**PL-**Prática-Laboratorial	2
Semester	1º		**OT-**Orientação Tutorial	1

ECTS 6

Objectives

The students will learn how to design controllers by using modern control strategies

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Course Contents

Selected topics of:
- Analysis and design of discrete-time systems
- Analysis and design of nonlinear systems
- Adaptive control and model reference control
- Fuzzy control
- Fractional-order control
- System identification
- Multivariable and optimal control

Recommended reading

1. Digital Control of Dynamic Systems, G. F. Franklin, J. D. Powell, M. Workman, Addison-Wesley
2. Feedback Control of Dynamic Systems, G. F. Franklin, J. D. Powell, Emami-Naeini, Addison-Wesley
3. Linear Feedback Control: Analysis and Control with MATLAB, D. Xue, Y.Q. Chen, D. P. Atherton, SIAM
4. Fuzzy Control, K. M. Passino, S. Yurkovich, Addison-Wesley
5. The Fractional Calculus, K. B. Oldham, J. Spanier, Academic Press
6. Fractional Differential Equations, I. Podlubny, Academic Press
7. Documentation provided by the teacher

Teaching Methods

The teaching methods are divided into theoretical, laboratory and tutorial classes.

In the theoretical classes, the teaching subjects of the course will be exposed, which are supported by the use of slides. The emphasis in the application concepts will be made through examples and analysis of concrete cases. It will be used essentially the expositive and interrogative methods.

In the laboratory classes, it will be used preferentially the techniques based on the active method such as the work in group, the study of cases, and learning based on problems. The students will also use tools for the analysis and simulation of dynamical systems. Also, this kind of class will be used as support for the realization of the proposed laboratory projects.

In the tutorial classes, the student will solve, in an autonomous way, problems similar to those given in the classes. The teacher has the main function of clarifying any doubts that students have in the resolution of such problems. The tutorial class aims the solidification of the underlying concepts learned in the course. Also, this kind of class will be used as support for the realization of the proposed tutorial projects.

All supporting material and on-line resources regarding the course will be made available in the e-learning platform Moodle of ISEP.

Assessment methods

The assessment of the course consists of:

a) Laboratory projects, in number of one or more. It consists in laboratory experiments and/or in the resolution of problems. These lab projects should be finished one week before the end of the teaching period.

b) Realization of one research work during the tutorial classes. This work should be finished in a date to be accorded with the students.

Both works, a) and b), can be made in group and they are subjected to oral presentation and an examination.

Both works, a) and b), must be realized by all students, excused or not from the continuous assessment.

The final classification consists of the assessment in the laboratory work (10.0 values) and of the assessment in the tutorial work (10.0 values).

Both assessment components, a) and b), require a minimum of 6.0 values (in a scale of 20.0 values).

The classifications obtained in each one of the assessment components are rounded until tenth.

The final classification results of the weighed mean of the classifications obtained in the two components of assessment, being the resultant value rounded to the nearest integer value.

	Name
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Lecturer:	Ramiro de Sousa Barbosa (RSB)

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