

Course Unit Description - (CSIAU)

(Control of Autonomous Systems)

(Mestrado em Engenharia Electrotécnica e de Computadores)

Academic year: 2008/2009



Subject group: Automação e Robótica

| | Semestral | Optional | | |
|---------------|----------------|------------|-------------------------|---|
| Mode of study | Diurno | Hours/Week | T-Teórica | 2 |
| Year | 1 ^o | | PL-Prática-Laboratorial | 2 |
| Semester | 2 ^o | | OT-Orientação Tutorial | 1 |
| ECTS | | | | 3 |

Objectives

This course aims to provide the concepts, techniques and methodologies necessary for the design and implementation of control systems and in particular for the complex ones as the autonomous mobile robots.
Being an integrating discipline it requires basic knowledge of programming, digital and analog hardware design and control theory basics, namely linear systems control and modeling techniques.

Course Contents

Autonomous systems control architectures
Motion control
Manouverability
Robotic actuators
land locomotion
Aero-space systems motion control
Marine and underwater propulsion and control
Special locomotion mechanisms
Motion planning for autonomous systems

Recommended reading

Guidance and Control of Ocean Vehicles, Thor Fossen, John Wiley & Sons, 1994, ISBN 0-471-94113-1

Robot dynamics and control, M. Spong, M. Vidyasagar, John. Wiley & Sons, 1989.

Principles of Robot Motion: Theory, Algorithms, and Implementations, H. Choset, K. M. Lynch, S. Hutchinson, G. Kantor, W. Burgard, L. E. Kavraki, S. Thrun, MIT Press, Boston, 2005.

Introduction to Autonomous Mobile Robots, Roland Siegwart, Illah R. Nourbakhsh, MIT Press 2004.

DSP-Based Electromechanical Motion Control, Hamid A. Toliyat, CRC Press 2003

Teaching Methods

Theory concepts presentation with consolidating practical examples and exercises done in the lab classes. An integrating project is performed with tutorial counseling during the teaching period.

Assessment methods

The final grade is composed of 30% part obtained by homework exercises during the classes, 40 % given by a final project to be delivered at the end of the course and a final exam covering all the course

When by legal reasons the grades obtained by the work done in the classes period can not be used, a final exam is to be performed. This exam a 30% valued part on theory concepts and a 70% practical part covering design and implementation phases.

| | Name |
|----------------------|---------------------------------------|
| Teacher responsible: | Alfredo Manuel Oliveira Martins (AOM) |
| Lecturer: | Alfredo Manuel Oliveira Martins (AOM) |