

# International Master in Automation Engineering and Intelligent systems (Code: 040018)

## Presentation

Nowadays, there exists great interest in the world for the design of highly autonomous systems capable of making intelligent decisions in order to achieve higher performance in the complex and dynamic processes (aerospace platforms, mobile robots, autonomous vehicles, flexible manufacturing processes, intelligent structures, etc). These types of control systems, denominated "intelligent systems", have a broad multi-disciplinary character which covers almost all areas of engineering (electronic, electrical, mechanical, chemical, aero-spatial, biomedical etc). In the aforementioned diverse branches and in their corresponding specialties, there exists a growing demand for qualified experts and practitioners, with updated knowledge in the dynamic and multi-disciplinary field of automatic engineering and with integrated training in the knowledge acquirement of intelligent systems.

As a pioneering program within the framework of European Research Area (ERA) and the European Higher Education Area (EHEA) known as the Bologna Process, this international master has been promoted by the University of Girona together with the top-ranked partners such as Technische Universität München (TUM, Germany), Royal Institute of Technology (KTH, Sweden) and Shanghai Jiao Tong University (SJTU, China), amongst others. Moreover, it has been included by the Catalan Government in its list of 16 Masters from all disciplines and universities and selected as the only official pilot program in the fields of System Engineering and Automation, and Artificial Intelligence.

## Objectives

- To deal with the growing demand for experts in the field of Automation Engineering and Intelligent systems in the current industrial world.
- To provide integrated academic training through a program that includes courses, tutorial studies, traineeships in companies and/ or foreign universities, and research projects in an inter-disciplinary environment.

## Who is it aimed at?

The master is towards students and practitioners from the industrial and services sector holding degrees of scientific and technical character from Catalonia, Spain and foreign countries.

## Admission requirements

University degrees (science, engineering, etc) affined to the master program

## Program

### *First academic year:*

1. **First semester:** 30 ECTS\* in advanced academic training distributed into 4 compulsory courses (each one 6 ECTS) and language and cultural learning (6 ECTS).

- Fundamentals of Artificial Intelligence
- Automation and Control
- Intelligent Control
- Network technologies and Distributed Systems

\* ECTS: European credits

2. **Second semester:** 30 ECTS in advanced academic training (with options) distributed into language and cultural learning (6 ECTS) and 6 courses (each one 4 ECTS) to be chosen from the following list\*\*:

- Advanced Control Techniques
- Multi-agent Systems
- Case Based Reasoning
- Problem Detection and Diagnosis
- Hybrid Systems: Modelling, Management and Supervision
- Interval Control Methods
- Automatic Learning
- Modal Intervals
- Multivariable Statistical control
- Planning and Scheduling for Automation
- Robust and Nonlinear Control
- Management of High Performance Networks
- Monitoring of Electrical Service Quality
- Management of Intelligent Structures
- Management of Waste Water Treatment Systems
- Cooperative Micro robots

\*\* Each course will be given whenever the minimum number of students is reached.

### **Second academic year:**

1. **First semester:** 24 ECTS for Research Initialization (RI) or Professional Specialization (PS) + 6 ECTS for language and cultural learning.

- Supervised personal study in some of the above subjects and/or traineeship in companies' R&D departments, research centres and collaborating universities.

2. **Second semester:** 30 ECTS of type RI/PS

- Master's Degree thesis. Depending on the nature of the supervised personal study the master's degree thesis will have either a professional or research orientation.

### **Academic partners:**

- Technische Universität München (TUM, Munich, Germany)
- Royal Institute of Technology (KTH, Stockholm, Sweden)
- Shanghai Jiao Tong University (SJTU, Shanghai, China)

In the second academic year, students will have the opportunity to make their stay at the above top-ranked universities receiving the highly qualified personal supervision of their research and/or to get the traineeships in the leading industrial companies collaborating with our master.

### **Evaluation system**

- The evaluation of the courses will be made by exam and/or complementary work.
- The supervised study or the traineeship will be evaluated by the presentation of a work report.
- The evaluation of the master's degree thesis will be made by the presentation of a thesis report and its defence examined by a committee of experts.

### **Language**

English / Catalan / Spanish

### **Degree denomination**

Master's Degree in 'Automation Engineering and Intelligent Systems' from University of Girona

### **Director**

Ningsu Luo Ren, ningsu@eia.udg.es, Tel. +34 972 418 888

### **Coordinator**

Joan Colomer Llinàs, colomer@eia.udg.es, Tel. +34 972 418 756

### **Teaching staff**

Teachers with PhD degree from Department of Electronics, Computer Science and Automatic Control at the University of Girona and recognized international specialists in the diverse subject areas

### **Duration, calendar and timetable**

120 ECTS

From February 14 of 2005 to September 30 of 2006

Afternoon/Evening timetable

### **Imparted in**

Department of Electronics, Computer Science and Automatic Control, University of Girona

### **Available number of students**

Minimum: 10\* / Maximum: 30

\* The course will be given whenever the minimum number of students is reached.

### **Price**

8.000 € (4.900 €\* for the first year and 3.100 €\* for the second)

\*includes accident insurance of 13,50 € but does not include fees for issuing the degree from UdG.

### **Funding**

It has been established special payment conditions with various banking entities that will allow payment to be made in fractional way. For more information, please visit our web page.

### **Admission and registration**

Deadline for receiving applications: from July 1 to January 31 of 2005.

Registration: until February 6 of 2005

Please fill in the application form and hand it in or send it by post together with the documentation indicated to: GIGS - Admissió i Matrícula Edifici Mercadal Plaça Jordi de Sant Jordi, 1 17001Girona

Documentation: photocopy of ID document/passport, an officially certified photocopy of university degree (or justifying document), Curriculum Vitae (maximum 2 pages) and a passport size photo.

### **Fast reply**

Within a maximum of 7 working days from the reception of your application (form filled in + documentation) we will formally inform you by e-mail about your acceptance or non-acceptance and/or other relevant information concerning your application.

### **On-line application**

You can also present your application on-line and send the documentation by post, which is what we recommend for candidates from outside Girona. We will immediately provide you with your personal code, which you will need for any future consultation.

### **Services**

UdG offers various services to its students: Student card, electronic mail, access to the computing rooms and UdG libraries, access to training activities of the Modern Language Service, access to the different activities organised by the UdG Sports Service, employment service for students and ex-students and placements in companies and/or institutions.

### **Information**

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