Electronique, énergie électrique, automatique

M2 - Smart aerospace & autonomous systems

labelisation

Diplôme national de l'Enseignement Supérieur

- formation initiale
- formation continue

Durée : 1 an

Présentation

Consulter la page du Master 2 sur le site de l'Université Paris-Saclay

Ce parcours est enseigné uniquement en langue anglaise, toutes les informations sont affichées en anglais.

The important application potential of Autonomous Systems and Smart Aerospace vehicles has helped them to become the new focus of education. The last decade has seen a significant increase in Research in Smart Aerospace and Autonomous Systems. Now, the field is sufficiently mature to engage in a procedure of education. Recently, the application of autonomous systems is finding its way into industries and even into the everyday life of people. One can mention several examples such as robotic helicopters for surveillance, aerial photography or farm spraying, cars that park themselves, robotic vacuum cleaners,... It is becoming more important that our students learn about autonomous systems and our engineers have information resources for designing, analyzing and controlling these systems. Since most of the robotic masters deal only with conventional robots, nowadays, students do not have a chance to learn about autonomous systems and engineers who design autonomous robots have to resort to extracting information from research literature to design them, which is tedious for them. The present master provides the theories and methods that are useful for understanding and designing autonomous systems to students and engineers in a form that is detailed and easy to follow. The purpose of this master is to render the students and engineers familiar with the methods of modeling/ analysis/ control that have been proven efficient through research. Similar to the conventional robotic manipulators, the autonomous systems are multidisciplinary machines and can be studied from different points of view. Autonomous systems can also be studied from the artificial intelligence point of view. Covering all these aspects of autonomous systems in one master is almost impossible and each of these aspects has their own audience. For these reasons, the scope of the present master is the mechanics and control of autonomous systems. The master covers the kinematic and dynamic modeling, analysis of autonomous systems as well as the methods suitable for their control. The key feature of the present master is its content which has never been gathered within one master and has never been presented in a form useful to students and engineers. The present master contains the theoretical tools necessary for analyzing the dynamics and control of autonomous systems in one place. The topics that are practical and are of interest to autonomous robot designers have been picked from advanced robotics research literature. These topics are sorted appropriately and will form the contents of the master.

Objectifs

This Master is designed to promote a high quality educational offer in the domain of autonomous systems and robotics systems. After graduation, the students will master competences of different areas of this multidisciplinary area: electrical engineering, computer and science engineering, mechanical and science engineering and general training.

Savoir-faire et compétences

Students will have the following skills: scientific and technical knowledge of autonomy engineering, capacity to develop and design innovative autonomous systems, capacity to work both independently and in multidisciplinary teams, to communicate by written and oral presentations, in an international context, capacity to transfer high techniques methodology from university to industry, competency to manage an engineering team, ability to understand different European cultures and languages.

Echanges internationaux

The first and third semesters will be taught at UEVE. The second semester will be held in Poznan University of Technology. The fourth semester is principally devoted to the Master's thesis.

The capacities necessary in participating in this master are those of autonomous systems: terrestrial or aerial. The members of the consortium are well known for their

research in these domains. They also have an extended experience in teaching at the master's level and PhD thesis supervision. As senior members of the IEEE (Institute of Electrical and Electronics Engineers), they also have many duties in editing and promoting scientific documentation. Common research axis allows them to meet to perform common research.

Organisation

The duration of the SAAS Master's course is two academic years (120 ECTS Credits). Each year is split into two semesters with 30 ECTS each.

Stages

6 months are devoted to the Master's thesis.

Stages et projets tutorés

Students must do a project during the fourth semester (around 180h).

Passerelles

Students can change their school path under conditions.

Second semester :
- French, english or polish
- Management
- Non linear systems
- Fondamental of autonomous systems
- Adaptative control
- Sensor integration
- Basics of smarts systems
- Networks and programming systems

Third semester :
- English or french
- Flight modelling and simulation
- Flight control
- Flight planning
- Flight communications
- Aeronautical software
- Integrated navigation systems
- Mission decision making
- Aerial robots
- Advanced artificial perception

Fourth semester :
- Project
- Master's thesis

Et après

Poursuite d'études

Ph.D.

Insertion professionnelle

Europe needs an effective method that will allow the European Community to take up global leadership in selected strategic policy areas.
Europe is home to a large advanced technology based aerospace and robotics industry that supplies a significant part of the world's commercial requirement in these domains.
Potential jobs are:
• government, fire and rescue, energy sector, agriculture,
• forestry - fisheries,
• earth observation,
• remote sensing, communication,
• broadcasting, archaeology, surveillance...

Programme

Semestre 3

Bloc S3	30 ECTS
- Choix 1	
1 option(s) au choix parmi 3	
- Mission Coordination	3 ECTS
- Embedded software	3 ECTS
- Flight communications	3 ECTS
- Choix 4	
1 option(s) au choix parmi 3	
- Integrated navigation systems	3 ECTS
- Advanced artificial perception	3 ECTS
- Sensors fusion	3 ECTS
- Choix 6	
1 option(s) au choix parmi 4	
- Flight control	3 ECTS
- Mission decision making	3 ECTS
- AI and Aerospace systems	3 ECTS
- Flight planning	3 ECTS
- Choix 3	
1 option(s) au choix parmi 3	
- Integrated navigation systems	3 ECTS
- Advanced artificial perception	3 ECTS
- Sensors fusion	3 ECTS
- Choix 7	
1 option(s) au choix parmi 4	
- Flight control	3 ECTS
- Mission decision making	3 ECTS
- AI and Aerospace systems	3 ECTS
- Flight planning	3 ECTS

- Flight modelling and simulation	3 ECTS
- Aerial robots	3 ECTS
- Language	3 ECTS
- Choix 2	

1 option(s) au choix parmi 3

- Mission Coordination	3 ECTS
- Embedded software	3 ECTS
- Flight communications	3 ECTS
- Choix 5	

1 option(s) au choix parmi 4

- Flight control	3 ECTS
- Mission decision making	3 ECTS
- AI and Aerospace systems	3 ECTS
- Flight planning	3 ECTS

Semestre 4

Bloc S4	30 ECTS
- Master's thesis	24 ECTS
- Elective courses/Individual project	3 ECTS
- Project 1-2	3 ECTS