MSc-AMA

Master of Science in Aerospace Mechanics and Avionics

National Master Degree Accredited by the Ministry of Higher Education

Aims

The Master of Science in aerospace mechanics and avionics is a two-year course of study that allows students to develop a high level of competence in engineering science, current technology, and engineering design related to aeronautics and space. It aims at preparing students for careers in the aerospace industry in Europe and worldwide. The program consists of a total of 4 semesters of 30 ECTS each, ie 120 ECTS credits for the whole program. The MSc AMA starts with a first semester emphazing aerospace mechanics or control and avionics to prepare students to the majors to be selected for semester two and three: «aerodynamics & fluid mechanics», «structures & aeronautical engineering» or «command & control». Students have strong opportunities to develop practical skills through research projects in ISAE's laboratories and professional thesis during internships in aerospace industry.

Organization

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Duration of studies: Two year full time

Beginning of classes: September

Location: ISAE, Campus SUPAERO and campus ENSICA for some courses

Teaching language: English, except major «Advanced Fluid Engineering» during semester 3 taught in French, students selecting these courses must be proficient in French.

Pedagogical approach

The ISAE Master's programs are designed with a combination of lectures, personal project and assignments and thesis projects to be performed in industrial environment or in ISAE's laboratories. They are taught in English.

Compliant with European higher education system, the MSc AMA is a two-year program with a total of 120 ECTS credits.

The MSc AMA program includes three-semester academic session, in ISAE's premises, provided by permanent professors and experts from aerospace industry bringing current knowledge and experience, including: lectures, tutorials, case study, personal project in laboratory and industrial visits.

The last semester consists in performing professional thesis in a firm or a laboratory in the aerospace sector. After the project, students having obtained 120 credits under examination will be awarded the Master of Science in Aerospace Mechanics and Avionics from ISAE.

Syllabus

Semester 1

Common part - 105 h
Mathematics: Foreign languages - structures standardisation - Matlab standardisation

Aerospace and mechanical engineering - 233 h
Aircraft structures - Aerodynamics 1- Propulsion - Control & avionics - Computer Aid Design - Vibrations & modal analysis - Flight dynamics - Applied Aerodynamics - Modelling of Aerostructures (MEF)

Witness

HUAN Qianjiao, China, MSc AMA Graduated in 2010

«After I got my bachelor degree at BUAA (Beijing University of Aeronautics and Aerospace), I heard that there is an opportunity of the AIRBUS scholarship program to study the Master of Science in Aerospace Mechanics and Avionics at ISAE. As ISAE is the best European school for aeronautics, I'm very grateful for AIRBUS and ISAE gave me this opportunity to make my dream come true.

During the two years at ISAE, we had classes not only in technologies but also in lots of other domains, such as management, language and culture. More than half of the classes are given by professors who are come from the industrial companies, AIRBUS, CNES, ONERA, EUROCOPTER, etc. We learnt the knowledge by a more professional way with helps a lot in our future career. The internship which took place at the last semester gives us a great opportunity to link what we have learnt at school to what we are going to do as a job in the future. For me, I have performed a six months internship at AIRBUS France which is a precious chance to me and leads me to my future career. After this internship, I was recruited by SOGETI High Tech which is a subcontractor of AIRBUS and I'm working now on some projects of structure calculation on the AIRBUS family aircrafts.

More over, this two years mater is an international program with students coming from all over the word. Here, we got the chance to know the different cultures and ways of thinking in different countries and we made great friendship which we will never forget».

Semester 2: 30 credits

Common part (320 h)

Foreign languages - European cultures and Research Project in ISAE's laboratories (250 h)

Students have to select one major among:

Major 1: Design - aerodynamics & aerothermics - 120 h

Softwares for computational fluid dynamics – Acoustics – Flight characteristics – Experimental approach in fluid mechanics

Major 2: Aircraft control - 119 h

Control implementation – Flight characteristics- Aircraft control - guidance – Navigation

Major 3: Aeronautical structures -120 h

Materials for airframes – Calculating structures - Dimensioning structures – Design project

Semester 3: 30 credits

Common part - 150 h

Foreign languages – Research Project in ISAE's laboratories (100 h)

Students have to select one major among:

Major 1: Advanced Fluid Engineering - 197 h

Turbomachinery – Aeroelasticity – Turbomachinery 1: Advanced aerodynamics of turbomachines – Turbulence Aeroacoustics – Numerical fluid mechanics – Turbomachinery 2: The turbomachine system

Major 2: Flight control - Guidance - 179 h

Multivariables systems – Optimal control – Estimation - Kalman filter – Control of flexible structures – Robust control - Space applications – Aircraft identification

Major 3: Aeronautical structures - 223 h

Aircraft techniques – Helicopters – Flight dynamics - Propulsion – Quality – Dynamics of aeronautical and space structures – Advanced structural dynamics - Mechanics of laminated structures – Production and maintenance of aircraft

Major 4: Aeronautical engineering - 233 h

Aircraft techniques - Helicopters - Flight dynamics - Propulsion - Advanced structural dynamics Aeronautical engineering environnement - Mastery of aeronautical products - Aerodynamics - Materials for aerospace structures - Composites

Major 5: Helicopter engineering - 261 h

Helicopter propulsion and motorization – Helicopter avionics – Arming - mission – Helicopter flights test- Certification – Helicopter maintenance – Aerodynamics - Flight qualities - Performances – Helicopter dynamics - Helicopter construction materials & techniques – Systems - Prototypes - tests- production quality assurance

Semester 4

Students conduct a thesis in aeronautical industry or organisation, in France or abroad and supervised by a tutor from the host organisation and from ISAE. The Master thesis is concluded by the preparation of a report and an oral dissertation in front of jury.

Career opportunities

Toulouse is at the hub of the European aerospace industry, and accommodates leading European engineering and postgraduate institutions.

The majority of graduates find positions in the aerospace industry (aircraft, engine and equipment manufacturers), and government agencies.

They have senior positions in industry as researchers, experts, and heads of projects or managers.

Companies recruiting our students

AIRBUS, EADS, ALENIA, EMBRAER, CNES, MECACHROME Canada, MTU, …

Industrial Partnerships

Airbus, wanting to motivate engineering Chinese students in the international orientation of their studies, awards international scholarships to a limited number of students applying to MSc AMA. Awarded students by Airbus take on a commitment to follow the study program Aeronautical structures specialisation.

Masters of Science in English