

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 emphasizing 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

Head of common program and global teaching coordination

→ Didier DELORME

E-mail: didier.delorme@isae.fr

Head of program major aerodynamics

→ Prof. Laurent JOLY

E-mail: laurent.joly@isae.fr

Head of program major Aircraft control

→ Prof. Yves BRIERE

E-mail: yves.briere@isae.fr

Head of program major Aeronautical structures

→ Prof. Jacques HUET

E-mail: jacques.huet@isae.fr

Head of program major Aeronautical engineering

→ Prof. Alain LACOMBE

E-mail: alain.lacombe@isae.fr

Head of program major Helicopter engineering

→ Prof. Frédéric LACHAUD

E-mail: frederic.lachaud@isae.fr

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)

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.

Common ISAE's admission procedures

Masters of Science

Tuition fees 2011-2013: 14000 € for the two-year master program

European students: 8000€ (students graduated in the year of enrolment or the year before, and with no professional experience)

Academic requirements

Applicants must have a bachelor's degree or equivalent degree, in the following areas:

MSc AMA: bachelor in aeronautical, aerospace, mechatronics or mechanical engineering

Selection and admission

Admission to ISAE's master at:

<http://AdmissionsMasters.isae.fr>

Selection and admission are made by an admission committee: possible interviews can be organized if necessary

Deadlines for application: several admission committees scheduled from April to June 2011, see schedule on our website: www.isae.fr

Application fees: 65 € (non-refundable)

Language qualification requested

English: TOEFL (Paper-based): 550; TOEFL (IBT): 79; TOEIC: 750; IELTS: 6.0, CAE Cambridge, ...

Your contacts at ISAE

- Michel CHAUVIN, Deputy Director of Masters Programs:
michel.chauvin@isae.fr - Phone: +33 (0)5 61 33 80 27
- Marie JENTET, Information and Marketing Manager:
marie.jentet@isae.fr - Phone: +33 (0)5 61 33 80 28

Web: www.isae.fr

The "Institut Supérieur de l'Aéronautique et de l'Espace" (ISAE) was created in 2007 from the merger of the two prestigious French graduate and postgraduate schools of engineering, SUPAERO and ENSICA. Today, ISAE, is a world-class higher institute for aerospace engineering education and research. Nowadays with a student corpus of over 1500, ISAE is one of Europe's largest Aerospace Institute offering graduates and postgraduates programs. Yearly, ISAE awards around 20% of master's degrees in Europe in aeronautics and space field. ISAE develops its worldwide reputation on the prestige of its master's programs, the fame of its teaching staff, or the excellence of its research but also on the high-value of its graduates, their skills in engineering or management, as well, their capacity to evolve within a very high-technology environment, their enterprising mind and international opening.

Key figures

- ➔ 2 Graduate Engineering Programs: SUPAERO and ENSICA
- ➔ 15 Specialized Masters including 11 in English
- ➔ 2 Masters of Science
- ➔ 9 Research Masters
- ➔ 6 PhD Programs
- ➔ 1500 students (1300 masters and 200 PhDs more or less)
- ➔ 160 international cooperation opportunities
- ➔ 50 academic and research partnerships

Identity card

Name: Institut Supérieur de l'Aéronautique et de l'Espace (ISAE)

Founded in 2007 - as the result of the merging of SUPAERO (1909) and ENSICA (1945)

Legal Status: A large public institution of scientific, cultural and vocational missions

Trustees: Délégation Générale pour l'Armement (DGA) [French Defence Procurement] - Ministry of Defense

Endorsements and awards: CTI agreement of the two Graduate Programs, Conference des 'Grandes Écoles', for postgraduate specialized masters Ministry of Higher Education and Research for Masters of Science

Staff: 450 permanent staff

Contacts ISAE

Email: communication@isae.fr

Address : ISAE - 10, avenue Édouard Belin -
BP 54032 - 31055 Toulouse cedex 4 - France

Phone : 33 (0)5 61 33 80 80 - Fax : 33 (0)5 61 33 83 30

Web site: www.isae.fr

Non legal document
Contents and design: ISAE
Images: ISAE/jpgphotographie,
© Eurocopter
Print : imprimerie Fabrègue

