

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 - Phone: +33 (0)5 61 33 80 15
E-mail: didier.delorme@isae.fr

Head of program major aerodynamics

Prof. Laurent JOLY - Phone: +33 (0)5 61 33 91 65
E-mail: laurent.joly@isae.fr

Head of program major Aircraft control

Prof. Yves BRIERE - Phone: +33 (0)5 61 33 91 52
E-mail: yves.briere@isae.fr

Head of program major Aeronautical structures

Prof. Jacques HUET - Phone: +33 (0)5 61 33 91 37
E-mail: jacques.huet@isae.fr

Head of program major Aeronautical engineering

Prof. Alain LACOMBE - Phone: + 33 (0)5 61 33 83 83
E-mail: alain.lacombe@isae.fr

Head of program major Helicopter engineering

Prof. Frédéric LACHAUD - Phone: + 33 (0)5 61 33 92 68
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

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)

Semester 2: 30 credits



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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 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 (100h)

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

Multivariable 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 environment - 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.

Witness

Interview QIAO Yongxin, China, Graduated in 2008

When I finished 4 years student life in BUAA, I got an opportunity to study the Master of Science in Aerospace Mechanics and Avionics at ISAE. During the two-year program at ISAE, we got classes on different domains, technology, management, and French language. Moreover, students come from different parts of world what is an outstanding opportunity to meet and to communicate with them, to learn different cultures, different ways of thinking or life. Last but not least, 85% classes are offered by engineers from companies, Airbus, CEAT, CNES, this is strong professional asset for us and should be very powerful for our future job. Last semester, I performed work placement at Airbus France in the frame of the Master thesis, which is a unique chance for me, as foreign student, to have such working experience in Airbus. Fortunately, I was supported by Airbus scholarship during these 2 years, not only for monthly allowance and tuition fees, but also for the internship opportunity. Whatever, these two years is one of my most important part in my life, to make me know more about the world, about aircraft, and which will be cherished by me forever. I work now at Beijing engineering Center of Airbus as development engineer

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,...

Admission 2010

Common ISAE's admission procedures

Masters of Science

Tuition fees 2010-2012: 13 500 € for the two-year master program

French and European students: 6 750 € (students graduated in the year of application 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 aerospace, or mechanical engineering or mechatronics,

MSc AESS: Bachelor in aerospace, or electrical engineering, or mechatronics

Selection and admission

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 2010,

Application form to be downloaded at www.isae.fr

Application fees: 65 € (non-refundable).

Complete application files to be sent: Institut Supérieur de l'Aéronautique et de l'Espace - Direction des masters et mastères spécialisés - 10, avenue Édouard-Belin - BP 54032 - 31055 Toulouse Cedex 4 – France

Language requirements for Masters in English

Language qualification requested : TOEFL 550 (paper-based). Except if applicant's first language is English or total instruction of Bachelor or Master degree has been provided in English.

Other admission procedures

MS IEVex

Specific admission process through the French Ministry of Defence, contact us for more detailed information.

MS MGP

Selection and admission organized by HEC:

www.hec.edu/Specialized-Masters

Contact us for more detailed information.

MS IMF

Selection and admission organized by ESC Toulouse:

www.esc-toulouse.com

Contact us for more detailed information.

Contacts

Michel CHAUVIN, Deputy Director of Masters Programs: michel.chauvin@isae.fr - Phone: +33 5 61 33 80 27

Marie JENTET, Information and Marketing Manager: marie.jentet@isae.fr - Phone: +33 5 61 33 80 28

Web: www.isae.fr

ISAE

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 1600, 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.

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: 420 permanent staff

Key figures

2 Graduate Programs: SUPAERO and ENSICA

17 Specialized Masters including 12 in English

2 Masters of Science

9 Research Masters

6 PhD Programs

1600 students

160 international cooperation opportunities

50 academic and research partnerships

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



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