IMT Mines Albi-Carmaux
École Mines-Télécom

Advanced Master AMPAS

An Advanced Master of **IMT Mines Albi** Graduate School of Engineering in France

Accredited and labelled by the 'Conférence des Grandes Écoles'

In collaboration with ISAE-SUPAERO Toulouse

ADVANCED MANUFACTURING PROCESSES FOR AERONAUTICAL STRUCTURES

With an ever-increasing backlog the aeronautical sector requires engineers with the ability to develop management strategies for manufacturing and technology transfer. The Advanced Master AMPAS provides an in-depth understanding of the materials and manufacturing processes coupled with supply chain and quality management. The program takes place in IMT Mines Albi and ISAE-Supaero campuses.

SKILLS ACQUIRED

- General scientific and technical knowledge of aircraft constraints and forming processes
- Scientific and technical expert level skills in the following fields
  - Fiber reinforced thermoset composite material processes based on autoclave and liquid RTM/infusion
  - Metallic (aluminum and titanium alloys) sheet forming processes at ambient and high temperature and related surface treatment processes
  - Machining, trimming and drilling of metallic and composite structures
- Knowledge of the aeronautical supply chain structure and its communication rules
- Understanding of the aeronautic dedicated quality and management requirements
- Knowledge and practice of lean manufacturing tools

CAREER OPPORTUNITIES

- **Manufacturing engineer**
- **Supply chain engineer**
- **Method & process engineer**
- **Sales and operations planning manager**

Aircraft manufacturers

Aeronautical maintenance companies

The program includes many company visits and seminars.

DURATION: 1 year including a semester-intership

INTAKE: September

LANGUAGE: English

MODE: Full time on IMT Mines Albi and ISAE-Supaero campus

LOCATIONS: Albi (70%) and Toulouse (30%), France

ACCOMMODATION: For all students

TUITION FEES:
9500€ to 15000€

APPLICATION DEADLINE:
from January to June
more info on ISAE-SUPAERO website

SYLLABUS

The academic course consists of modules aiming to provide a deep knowledge of the **three main material families used in airframe structures** and their related forming routes in aeronautical industries. It is also devoted to gain knowledge in **aircraft architecture**, on **aeronautical supply chain specificities**, lean manufacturing and **quality management** required to be able to take over technical and organisational responsibilities in industry.

A team project will demonstrate the ability to address an aeronautical part manufacturing, putting into practice the theoretical and professional skills gained over this course.

SEMESTER 1

1. AIRCRAFT, MATERIAL AND PROCESS BASIC SCIENTIFIC KNOWLEDGE

- Flight Dynamics - Aircraft and airframe architecture
- Computer Aided Design (CATIA)
- Aluminium and titanium alloys
- Epoxy and thermoplastic composites - Assembly processes
- Material and processes qualification - NDT for metallic and composite materials
- Optical techniques for assembly aid

2. COMPOSITE STRUCTURE FORMING AND MACHINING PROCESSES

- Physical phenomena description and modelling related to thermoset based manufacturing
- Raw material and composite quality control - LCM/ RTM processes
- Autoclave Vacuum Bagging (monolithic - sandwich) processes
- Composite material trimming, drilling and assembly
- RTM/Infusion Simulation

3. METALLIC STRUCTURE FORMING AND MACHINING PROCESSES

- Material behaviour and mechanical models
- Cold and hot sheet forming processes
- Surface treatments
- Machining additive manufacturing
- Sheet forming simulation

4. INDUSTRIAL ORGANISATION AND MANAGEMENT

- Supply chain structure and Organisation
- Materials management and Lean manufacturing
- Supply chain improvement and collaborative processes
- Quality requirement, management and tools

5. INTEGRATED TEAM PROJECT

SEMESTER 2

- 6-month Internship and professional thesis in industry and/or research laboratory

ADMISSION REQUIREMENTS

Master degree, or an equivalent degree in sciences or engineering, or bachelor degree completed by 3 years of professional experience

English: B2, IELTS 6.5, TOEIC 785 or equivalent.

I think the strength of this Advanced Master is that it covers the entire aspect of the manufacturing field. Actually, there is a good balance between theory and practical use, thanks to the several transverse projects, and a constant support from the teachers within a very friendly environment.

Katerina, Czech alumni

CONTACT
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APPLICATION
candidatures.isae-supaero.fr

WEBSITE
www.imt-mines-albi.fr/en
www.isae-supaero.fr/en