IMT Mines Albi
École Mines-Télécom

RÉPUBLIQUE FRANÇAISE
Liberté
Égalité
Fraternité

PROGRAM OF STUDIES

GENERAL ENGINEER

STUDENT
PATH

Welcome to IMT Mines Albi

IMT Mines Albi is part of Institut Mines-Télécom (IMT), France's leading group of engineering and management schools.

Become a responsible general engineer prepared to drive transition with IMT Mines Albi.

GENERAL ENGINEER

- Gain versatile skills and the capacity to design and manage large multidisciplinary projects
- Choose from a wide range of professions and business sectors
- Secure the possibility of making several meaningful career changes

RESPONSIBLE

- Committed to ensuring the positive environmental and social impact of their activities
- Trained in diversity management with intercultural awareness
- Involved in several organizations with a wide range of missions and a commitment to solidarity

AUTONOMOUS

- Active learning methods promote autonomy
- 20% of work is planned and completed independently with supervision
- Trained in learning to learn techniques

DRIVING TRANSITIONS

- Motivated by training on ecological and digital transitions and factories of the future
- Trained by expert research professors on themes directly connected to industry issues

A comprehensive three year program commited to a more responsible world.

As a student at IMT Mines Albi, you receive personalized support and complete a well-balanced three-year program. You gain the fundamental knowledge and an open, multidisciplinary approach sought after by companies.

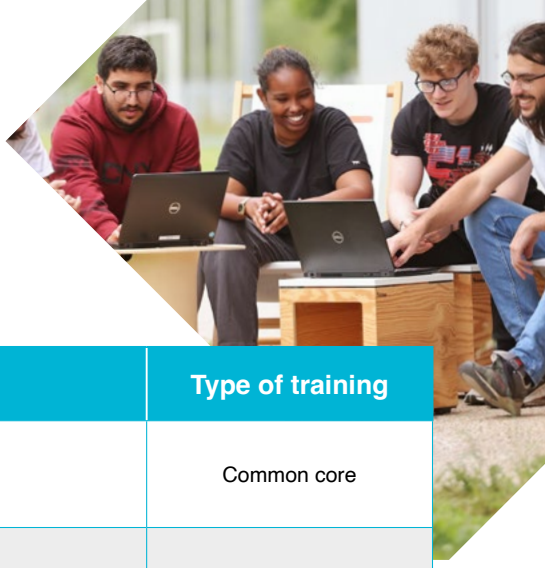
After three semesters of general training, you can choose one of the **four available options** starting in the second semester of your second year. The options focus on strategic themes for ecological, digital and industrial **transitions of the future**.

	1st year	2nd year	3rd year
TEACHING	**Fundamental sciences** Solid and fluid mechanics, chemical processes, thermodynamics, numerical calculus... **Engineering technologies** Information systems, data sciences, materials and structures, energy and environment, project management... **General training** Languages and interculturality, health and safety at work, teamwork, innovation...		
IN-DEPTH	Choice of a **mentor** to help you build your career plan	**Choice of an option on semester 2**	**Double degrees** and options available at partner institutions *(+300 possibilities)*
HUMANITY & TRANSITIONS (QUITUS)	**Dedicated courses:** Philosophy and history of science, socio-technical controversies, diversity management... **«Transition meetings»:** Conferences, collective work, company visits, personal initiatives...		
INTERNATIONAL MOBILITY (QUITUS)	1 semester of academic exchange *(in 2nd or 3rd year)* **or** 1 internship of 14 weeks *in a company abroad*		
BUSINESS (QUITUS)	TECHNICIAN OPERATOR INTERNSHIP **1 month**	ENGINEERING ASSISTANT INTERNSHIP **4 months**	END-OF-STUDY ENGINEERING INTERNSHIP **6 months**

GENERAL ENGINEER DEGREE

Students must earn 30 credits each semester.

1st year



1st semester

7 teaching units	30 credits	Program	Type of training
Fundamental sciences 1	6	- Thermodynamics and energy conversion - Fundamentals of heat transfer - Fluid mechanics	Common core
Fundamental sciences 2	6	- Algorithmics and programming - Material sciences - Statistics for engineers	Common core
Engineering techniques	8	- Material flow analysis - Introduction to databases - Introduction to numerical computing - Mechanics of solids and material strength	Common core
Engineering culture 1	4	- English - Second language and intercultural communication	Common core
Engineering culture 2	4	- Law, data protection and macro-economy - Philosophy of science and technology	Common core
Company	2	- Professional project, companies and health & safety at work	Common core
Physical and sporting activities	-	- Compulsory sport	Common core

2nd semester

7 teaching units	30 credits	Program	Type of training
Fundamental sciences	8	- Introduction to sensors and instrumentation - Enterprise modeling - Applied thermodynamics for chemical engineering - Mass transfer and chemical kinetics	Common core
Engineering techniques 1	4	- Chemical reaction engineering - Chemical analytical techniques and chemical engineering laboratory	Common core
Engineering techniques 2	6	- Numerical computing for engineers - Materials management - Project management	Common core
Engineering culture 1	4	- English - Second language and intercultural communication	Common core
Engineering culture 2	4	- Controversies and history of sciences - Innovative corporate strategy	Common core
Company	4	- Technician operator internship ***(4 weeks)***	Common core
Physical and sporting activities	-	- Compulsory sport	Common core

2nd year

1st semester

7 teaching units	30 credits	Program	Type of training
Fundamental sciences	4	- Linear programming and nonlinear programming	Common core
		• Continuous-time automatic control • Separation operations based on diffusion • Data analysis	Elective course: 1 of 3
Engineering techniques 1	4	• Machine design • Refrigeration and air conditioning • Continuous improvement	Elective course: 1 of 3
		• Modelling and simulation of thermo-mechanical PDEs • Macroscopic modelling and simulation in chemical process engineering • Introduction to discrete optimization	Elective course: 1 of 3
Engineering techniques 2	4	- Continuum mechanics - Design and system engineering	Common core
Engineering culture 1	4	- English - Second language and intercultural communication	Common core
Engineering culture 2	4	- Design Thinking for the ecological transition - Management tools	Common core
Company	10	- Challenges of organisations and role of engineers	Common core
		• Project - Introduction to research • Project - Entrepreneurship • Project - Innovation in practice	Elective course: 1 of 3
Physical and sporting activities	-	- Compulsory sport	Common core

2nd semester

4 teaching units		30 credits	Program	Type of training
OPTION CHOICE: 1 of 5	**Renewable energies, sustainable production and construction**	6	- Environmental assessment - Electrical networks and electrochemistry - Fluid and heat networks	Common core
	Materials and processes for transport of the future	6	- Introduction to finite element method: application to structural calculation - Eco-design of a mechanical part: pre-project - Materials and processes 1	Common core
	Pharmaceutical, agri-food and cosmetic processes and procedures	6	- Real flows modelling, rheology and stirring - Pharmaceutical, food and cosmetic industrial processes - Physical characterisation of powders and classification operations	Common core
	Industrial engineering for organizations' performance	6	- Modelling for process simulation - Data Science for Industry - Methods and tools for decision-making	Common core
	Data engineering for information systems, and energy systems	6	- Digital responsibility and project management - Àdvanced Machine Learning - Little Big Data	Common core
Engineering culture 2		4	- Second language, intercultural communication and diversity - Business Game	Common core
Company		20	- Engineering assistant internship ***(16 weeks)***	Common core
Physical and sporting activities		-	- Compulsory sport	Common core

3rd year

Renewable energies, sustainable production and construction

OPTION

This option trains engineers in the field of renewable energy systems. Future engineers will manage projects involving the production, transport, storage, distribution and use of renewable energies. The integration of renewable energies is considered at **different scales: buildings, cities, areas (sustainable construction) and industries.**

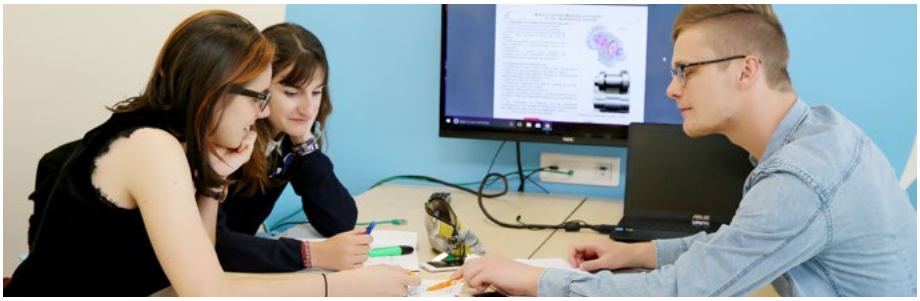
1st semester: a choice of 2 pathways

5 teaching units	30 credits	Program	Type of training
Cross-disciplinary skills	4	- Energy economics and energy transition issues - Rhetoric and technical debating (English), professionalisation	Common core
Advanced transfer and energy systems	6	- Solar energy: heat and electricity production - Cooling thermodynamics and radiative heat transfer - Project on advanced transport phenomena	Common core

PATHWAYS: 1 among 2				
Sustainable buildings and cities	**Active and passive comfort in buildings**	8	- Thermal comfort and properties of insulation materials - IAQ (Indoor Air Quality) and HVAC systems (Heating, Ventilation and Air-Conditioning) - Acoustic and visual comfort - Building renovation	Pathway
	Building integration	6	- Bioclimatic and ecological architecture - Territorial strategy and circular economy - Sustainable urban planning	Pathway
	Building modeling	6	- Dynamic thermal simulations and LCA (Life Cycle Assessment) - Energy performance simulation project - BIM Project (Building Information Modeling)	Pathway
Clean conversion, distribution and production	**Conversion**	6	- Tools for renewable energies integration - High-power wind and solar energy converters - Hydrogen value chain and smart grids	Pathway
	Distribution	6	- Thermodynamic engine cycles for electricity and heat production - Energy storage and control - CO2 capture, transport, use and storage	Pathway
	Production	8	- Renewable gases and biofuels - Project on biomass, wastes and pollutants - Turbulent flows with or without reaction - Simulation of flows and transport phenomena	Pathway

2nd semester

1 teaching unit	30 credits	Program	Type of training
Company	30	- Engineering internship ***(20 weeks)***	Common core



3rd year

Advanced materials and processes for tomorrow's transportation

The aim of this course is to develop high-performance material solutions and associated processes to meet the key challenges facing the companies and industries of the future. The option enables students to acquire the numerical tools and methods needed to evaluate materials under extreme conditions, with the aim of proposing innovative solutions supported by smart manufacturing. It offers 4 courses covering the **different stages of characterization of materials and structures for tomorrow's transport systems** (aeronautics, space, rail, automotive, etc.).

1st semester: a choice of 4 pathways

5 teaching units	30 credits	Program	Type of training
Fundamentals	6	- AI applied to processes and materials - Magnetic, electric and thermal properties of materials - Materials and processes 2	Common core
Training by industry speakers and professionalisation	6	- Training from industry-based speakers: aeronautical / automobile / space technologies - Training from industry-based speakers: aeronautical / automobile / space technologies project - Rhetoric and technical debating (English), professionalisation	Common core
Behaviour and modelling	6	- Modelisation of non-linear behaviour of metallic materials - fatigue of metallic materials - Ecodesign of a mechanical part: pre-project 2 - Plates abd anisotropic laminates	Common core

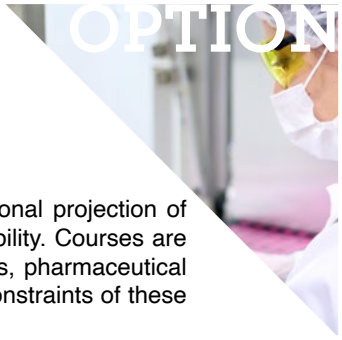
PATHWAYS: 1 among 4				
Behavior and implementation of metallic materials	Metallic materials	6	- Metal manufacturing - Physical metallurgy - Special alloys	Pathway
	Behavior of metallic materials	6	- Damage and failure modes - Surface engineering - From mechanical tests to numerical modelling	Pathway
Implementation and characterization of composite materials	Composite materials	6	- Fibre-reinforcing, flows and Ceramic Matrix Composites - Thermosetting composites materials and processing - Thermoplastic composites materials and processing	Pathway
	Processes and structures	6	- Composites: structural calculation and process modelling - Composites: application issues - Composites project	Pathway
Modeling and mechanical simulation for the resolution of technical problems	Modellind and multiphysics couplings	6	- Basic modelling methodology - Mechanical behaviours and multiphysics couplings - From mechanical tests to numerical modelling	Pathway
	Complex simulations	6	- Composites: structural calculation and process modelling - Process numerical simulation - Solving complex problems	Pathway
Instrumentation and advanced data analysis	Analysis tools	6	- Optics and image analysis - Advanced data analysis - NDT (Nondestructive testing) and failure analysis	Pathway
	Measurement methods and project	6	- Optical techniques for kinematic field measurements - Optical techniques for thermal measurements - Instrumentation design project	Pathway

2nd semester

1 teaching unit	30 credits	Program	Type of training
Company	30	- Engineering internship ***(20 weeks)***	Common core

3rd year

Pharmaceutical, agrifood and cosmetics processes



The pedagogical objective of this option is to develop an industrial culture and a professional projection of students towards these sectors, in order to enhance their skills and promote their employability. Courses are based on the study of **associated manufacturing processes** (solid chain, biotechnologies, pharmaceutical chemistry), as well as **business processes (lean, BPM),** taking into account the specific constraints of these industries.

1st semester: a choice of 2 pathways

6 teaching units	30 credits	Program	Type of training
Industrial environment	6	- Regulations and specific features - Product engineering - Rhetoric and technical debating (English), professionalisation	Common core
Chemistry and biotechnologies	4	- Green chemistry and multiphase reactors - Biotechnological processes	Common core
Industrial methods	4	- Industrial projects management - Lean and processes	Common core
Production of solid forms	6	- Generation of solids - Upstream operations - Downstream operations	Common core
PATHWAYS: 1 among 2			
R&D professions – **Scale-up and modelling**	4	- Dimensioning - changes of scale - A systems approach to process modelling	Pathway
R&D professions – **Development pathway project**	6	- R&D project	Pathway
Production professions – **Production methods**	4	- Production engineering - Supply chain management	Pathway
Production professions – **Production pathway development**	6	- Production project	Pathway

2nd semester

1 teaching unit	30 credits	Program	Type of training
Company	30	- Engineering internship ***(20 weeks)***	Common core

3rd year

Industrial engineering for organizations' performance

The «Industrial engineering for organizations' performance» option trains engineers to deal with **physical and information flow management issues**, and to manage organizational transformation projects with the aim of optimizing performance. The curriculum is based on four pillars, providing knowledge and skills relating to **supply chain management, continuous process improvement, management of organizational transformation projects, and expertise in digital tools.**

1st semester: a choice of 2 pathways

5 teaching units	30 credits	Program	Type of training
Thematic opening and professionalisation	6	- Contract management and team management - Company visits and conferences: Industry 4.0 and industrial performance - Rhetoric and technical debating (English), professionalisation	Common core
Management of company resources and flows	4	- Supply Chain management - ERP and company information systems	Common core
Project management	6	- Collaborative Design and PLM (Product Lifecycle Management) - Agile project management - Advanced project management	Common core

PATHWAYS: 1 among 2				
Supply chain	Manage supply chains	8	- Supply Chain engineering - Purchasing and supply management - Management by process and performance - Advanced process simulation	Pathway
	Industrial project	6	- Industrial project development	Pathway
Operational excellence	Manage improvement of the organization	8	- Green Belt - Maintenance management 5.0 - Quality management - Decision-making tools and methods	Pathway
	Industrial project	6	- Industrial project development	Pathway

2nd semester

1 teaching unit	30 credits	Program	Type of training
Company	30	- Engineering internship ***(20 weeks)***	Common core

3rd year

Data engineering for information systems, and energy systems

OPTION

At the heart of the future of engineering, this option gives you the tools you need to **design, control and optimally manage renewable energy systems and information systems, thanks to advanced data analysis, Artificial Intelligence and Big Data**. Meet tomorrow's complex challenges as a data specialist for energy systems, or as an architect of Big Data-oriented information systems.

1st semester: a choice of 2 pathways

6 teaching units	30 credits	Program	Type of training
Thematic opening and professionalization	4	- Conferences cycle - Rhetoric and technical debating (English), professionalisation	Common core
Data analysis	4	- Visualization and Business Intelligence - Internet of Things	Common core
Data exploitation	4	- Deep Learning - Optimization	Common core

PATHWAYS: 1 among 2				
Information systems engineering	Information systems design	6	- Prime contracting assistance - Security awareness - Model Driven Engineering	Pathway
	Information systems development	4	- Web development - Object orientated programming	Pathway
	Project	8	- Information system project	Pathway
Energy and digital transition	Energies	6	- Renewable energies 1 - Renewable energies 2 - Tools for integrating renewable energies	Parcours
	Energy management	6	- Smart Grid - Energy management - Energy monitoring	Parcours
	Project	6	- Industrial project	Parcours

2nd semester

1 teaching unit	30 credits	Program	Type of training
Company	30	- Engineering internship ***(20 weeks)***	Common core

The keys to success at IMT Mines Albi

At IMT Mines Albi we train you to become an engineer by preparing you for tomorrow's business world.

#01 Discover purpose-driven education

Our engineering programs have been redesigned to meet the challenges of the future and transformed to integrate transition topics into each course. A specific "**Humanities & Transitions**" program allows you to take modules and attend meetings to gain a better understand of ecological, digital and industrial transitions. It includes philosophy and the history of science, scientific controversies, conferences and collective work.

This new course is more independent and open to the world.

#02 Learn by doing

Throughout your training, IMT Mines Albi promotes autonomy through learning by doing. With **active learning methods and 20% of work planned and completed independently with supervision**, the program offers the advantage of plenty of practical sessions and seminars.

And that's not all! With 11 months of internship at companies over the three-year period, the "Corporate" course credit proves the efficiency of the "company - school" combination in ensuring your successful professional integration.

Possibility of work study in the student program

You also have the option of signing a eighteen-month vocational training agreement with a company starting in your second year.

#03 Challenge yourself

Are you ready to take on a major challenge? Choose one of three projects offered in second year to develop your project management skills and innovative capacities:

- **the research project,** to better understand the world of research
- **the entrepreneurship project,** to boost your understanding of corporate culture and develop your ideas
- **the innovation project,** to respond to a problem by experimenting with innovative practices.

Opt for dual skills

IMT Mines Albi offers you several exciting possibilities:

- take a **bachelor's degree in Maths or Physics** at Champollion University in parallel with your 1st year
- do a **master's degree in research** in parallel with your 3rd year
- obtain an **engineer-entrepreneur diploma.**

#04 Train yourself anywhere

IMT Mines Albi offers a wide range of opportunities to combine different skills, enabling you to enter a wide variety of engineering professions.

• National mobility: more than 100 career paths

IMT Mines Albi has a varied catalog of double degrees and academic exchanges throughout France:

- 100 options available through the IMT and Université de Toulouse networks
- a double degree **in engineering and management** with IMT Business School
- a double degree with **Sciences Po**
- partners of excellence such as **ENSTA Bretagne and ISAE Supaero.**

• International mobility: over 130 partner universities

You can also take part in an academic exchange semester in your 2nd or 3rd year, or a double degree at one of our partner institutions of excellence: **Georgia Tech** (USA), **Polytechnique of Montréal** (Canada), **Doshisha University** (Japan), Seoul National University (SNU) Korea, UniAndes (Colombia) **Umwelt-Campus Birkenfeld** (Germany), **Cranfield University** (UK)...

#05 Achieve your career plan

We support you in this great adventure of creating your career plan according to your desires and talents.

From year one, you can **choose a mentor** who will assist you throughout your studies.

A rich and diversified environment!

36% female student engineers
17% international students
10% students from the "Cordées de la Réussite" initiative

In 2020, the engineering programs at IMT Mines Albi obtained the six-year renewal of their accreditation from the Commission des Titres d'Ingénieur (CTI).

They have earned the EU-RACE European Quality Label.
The school also received the two-star "Bienvenue en France" certification and ranks fourth among French institutions according to U-multirank.

Follow us:

IMT Mines Albi
Campus Jarlard - 81013 ALBI - CT Cedex 09
Phone: +33 5 63 49 30 00
www.imt-mines-albi.fr/en