INSTITUT MINES-TELECOM
under the authority of the Ministry of Industry and Electronic Communication

13 Elite Graduate Engineering Schools

With a focus on key transformations in Digital Technologies, Production, Energy and Ecology

12 000 graduate students
1700 PhD students
1977: Telecom Bretagne

Founded with project management and international experience as key features of its engineering education program

1992: Mines Nantes

Core: nuclear energy research center (Subatech)
Key features: Energy, environment and software

2017: IMT Atlantique
VISION

COMBINING

DIGITAL, ENVIRONMENT AND ENERGY

TO SHAPE THE SOCIETY AND THE INDUSTRY

THROUGH EDUCATION, RESEARCH AND INNOVATION
3 CAMPUS

Brest  Nantes  Rennes
FACTS AND FIGURES

730 graduates / year from MSc to PhD

780 staff
including 500 permanent staff

+ 40% international students
+ 70 nationalities

€ 70 M budget
Including € 27 million of our resources, € 18 million of which from research contracts

2,300 students
including 1,400 engineering students and 300 doctoral students

290 permanent researchers and research lecturers on our campuses, including 110 HDRs (Researchers with supervisory accreditation)
INTERNATIONAL RANKINGS

- THE World University Rankings 2019: 351-400
  4th French Graduate Engineering School
  12th French higher education institution

- THE Young University Rankings 2019: 59
  9th French higher education institution

- THE World University Impact Rankings 2019: 201-300
  5th French higher education institution

- ARWU (Shanghai) by subject 2018
  Telecommunication Engineering: 201-300, 3rd France

- QS World University Rankings by subject 2019
  Computer Science 251-300
L’Etudiant 2019 (global ranking)

Top 10 out of 200 Graduate Engineering Schools in France (A+ group)
13 research departments
5 CNRS laboratories and 1 INSERM
750 papers/year, 450 rank A
3 ERC Advanced Grants
60 families of patents
Institutes Carnot
Top 4 Web of Science: Engineering / Computer Science / Physics / Telecom
2 major scientific fields…
  • Physics and engineering for energy and the environment
  • Digital sciences for industry and services.
... crossed by social, economic and management sciences.
AREAS OF RESEARCH

- Nuclear science technology
- Energy fuels
- Applied physics
- Multidisciplinary physics
- Telecommunications
- Environmental Science
- Operations research management science
- Astronomy astrophysics
- Business Management and Accounting
- Computer Sc. theory methods
- Computer Sc. information systems
- Chemistry
- Computer Sc. software engineering
- Biomedical engineering
- Imaging science photographic technology
- Computer Sc. hardware architecture
- Social Sciences
- Electrical and electronic engineering
- Transportation science technology
- Remote sensing
- Robotics
- Particles fields physics
- Physical chemistry
- Nuclear physics
- Optics
- Biochemistry Genetics and Molecular Biology
- Chemical Engineering
- Computer Sc. artificial intelligence
- Earth and Planetary Sciences
- Medicine
- Mathematics
- Decision Sciences
- Energy
- Computer Sc. interdisciplinary applications
- Materials Science
AREAS PER CAMPUS

- Embedded systems and robotics
- Artificial Intelligence - Data science
- From sensors to Internet of things
- Energy and sustainability
- Production engineering
- Computer science
- Security
- Medical imaging
- Telecommunication networks
- Nuclear
- Management and digital transformation

Brest, Nantes, Rennes
5 Doctoral Schools, 29 specialisations

- MathSTIC: In the field of Mathematics and Information & Communication Technology
- SPI: In the field of Engineering sciences
- 3M: In the fields of Physics and Chemistry
- SML: In the field of Earth sciences, universe and space
- EDGE: In the field of Human sciences

THE DUAL STATUS OF DOCTORAL STUDENTS
both a student and an employee, under doctoral contract with IMT Atlantique or a company
Grants, CIFRE (French Industrial Research Training Convention)

ENVIRONMENT OF THE STUDIES
- high level, inter-cultural environment
- Partnerships with prestigious universities and companies (Orange Labs Airbus, DCNS, Air Liquide, EDF, AREVA, Séché Environnement, BNP Paribas, Thales, Mitsubishi, ST Microelectronics...)

IMT Atlantique
Bretagne-Pays de la Loire
École Mines-Télécom
STRONG LINKS WITH INDUSTRY

- 3 incubators in Brest, Nantes and Rennes
  - 2,000 m²
  - 45 incubated companies
  - 15 new start-up created per year
  - 85% reach the 5-year mark after start-up
  - 700 jobs created so far
- 13 industrial chairs
- Internships in all the programs, many available offers to the students
- Excellent visibility of our graduates on the job market
STUDY PROGRAMS

GRADUATE PROGRAMS

- Master of Science in Engineering / Diplôme d'Ingénieur
- Master of Science / Diplôme National de Master
- Post-Master Professional Certificate / Mastère spécialisé
- PhD / Doctorat

SHORT PROGRAMS

- French Summer School (August)
- Winter School (January) : Artificial intelligence, Virtual reality, Human factors, Decision making, Robotics.

MOOCs : leader of 20 MOOCs
European Higher Education Area (EHEA)

French Universities

Graduate Engineering School « Grande école »

**IMT Atlantique**

**PhD**
- Doctorat
- M2
- M1
- L3
- L2
- L1

**Master**
- "Diplôme d'ingénieur"
- Master of Science in Engineering
- Competitive exam
- Preparatory classes (Maths & Physics)
- Admission based on academic records and agreements

**Bachelor**
- "Licence"
- International Master of Science (In English or 1st semester in English)
- "Mastère spécialisé"
- Post Master Professional Certificate
Un nuevo programa

➢ En la convergencia de lo digital, de la energía y del medio ambiente

➢ Construido a partir del proyecto profesional del alumno y de la necesidades de las empresas
Base científica y técnica indiscutible.

Ciencias humanas, sociales y gestión.

Desarrollo sustentable y responsabilidad social.

Internacional, intercultural y lenguas.

Emprendimiento e innovación.

Rol importante de la empresa en la formación.
Common core program over 3 years (*Parcours commun de formation* = PCF)

- Year 1: common core courses
- Years 2 and 3: 1 course on Economics, Human and Social Sciences, 1 course on Network based-systems
- Over Years 1 to 3: projects, 2 languages, career coaching, sport

Personalized study program over 2 years (*Parcours personnalisé de formation* = PPF)

- 2 In-depth study themes or TAFs (*Thématiques d’approfondissement*)
Master of Science in Engineering / Diplôme d’Ingénieur IMT Atlantique

PROGRAM STRUCTURE

First year
- September: First semester
- October: First semester
- November: First semester
- December: First semester
- January: Inter-semester
- February: Professional immersion/internship
- March: Second semester
- April: Second semester
- May: Second semester
- June: Second semester
- July: Second semester
- August: Second semester
- September: Second semester

Second year
- September: Third semester
- October: Third semester
- November: Third semester
- December: Third semester
- January: Inter-semester
- February: Fourth semester
- March: Fourth semester
- April: Fourth semester
- May: Fourth semester
- June: Fourth semester
- July: Fourth semester
- August: Fourth semester
- September: Two-month or Four-month engineering internship

Third year
- September: Fifth semester
- October: Fifth semester
- November: Fifth semester
- December: Fifth semester
- January: Inter-semester
- February: Sixth semester
- March: Sixth semester
- April: Sixth semester
- May: Sixth semester
- June: Sixth semester
- July: Sixth semester
- August: Sixth semester
- September: Four-to six-month final internship
- October: Four-month final internship

Optional study-abroad semester
- A placement year is possible (e.g. internship in France or abroad)

Optional study-abroad semester
- Degree
YEAR 1 – Common core in Engineering – semesters 1 and 2

A broad spectrum of disciplines and cross-disciplinary skills

- Networks/Computer Science
- Electronics
- Mathematics, Signal Processing & Automation
- Economics & Social Sciences
- Physics
- Network based systems
- Sustainability

- 1 internship
- 2 languages
- 2 projects
- 1 intersemester course
- sport
YEARS 2 & 3

2 In-depth study themes or TAFs (Thématiques d’approfondissement)
- one per year
- to be chosen among ~20
- TAFs are formed by core courses and elective courses

1 project per semester
2 foreign languages
1 intersemester course per year
Internships (8 months mandatory)
Optional Gap year in industry (between semesters 4 and 5)
MAJORS

Healthcare engineering / Ingénierie de la santé

Industrial engineering / Systèmes industriels, Organisations

Computer Science and Network / Informatique, Réseaux

Energy, Nuclear and Environmental engineering / Ingénierie de l’énergie, de l’environnement et nucléaire

Electrical engineering / Robotique, électronique, Automatique, Télécommunications, Systèmes embarqués
MAJORS

- Healthcare engineering: assisted surgery technologies, medical imaging, diagnostic assistance or even tattooing of medical data

- Energy, nuclear and environmental engineering: process engineering, energy systems, eco-design, nuclear physics, radiochemistry, neutronics or safety

- Computer science and networks: big data, applied mathematics, software engineering, cybersecurity, artificial intelligence or cloud computing

- Industrial engineering and organizations: industrial performance, digital business models, production management, logistics optimization and digital transformation management

- Electrical engineering / robotics, electronics, automation, telecommunication and embedded systems: human-machine interaction, communication systems, connected objects, space and maritime surveillance, etc.
Master of Science in Engineering - Diplôme d’Ingénieur IMT Atlantique
In-depth study themes (TAFs) offered in 2019

**COMPUTER SCIENCE AND NETWORK**
- **IoT**, IoT for industry 4.0 (R, taught in English)
- **CoOC**, Design of communicating objects (B)
- **Cyber**, Cybersecurity (R)
- **DaSci**, Data Science (B)
- **DCL**, Collaborative software development (BN)
- **DigIC**, Digitalisation, innovation and changes (B)
- **IHM**, HMI & collaborative systems (B)
- **MCE**, Mathematical and computational engineering (B)
- **PNum**, Digital platforms: technologies and markets (R, taught in English)

**ELECTRICAL ENGINEERING**
- **ISC**, Communications Systems Engineering (B)
- **OPE**, Observation and perception of the environment (B)
- **SEH**, Embedded and heterogeneous systems * (B)

**ENERGY, NUCLEAR AND ENVIRONMENT**
- **DEMIN**, Development and management of nuclear facilities (N)
- **TEE**, Energy and environmental transitions - M1 (N)

**HEALTHCARE ENGINEERING**
- **Health**, Healthcare Engineering (BN)

**INDUSTRIAL ENGINEERING**
- **ASCy**, Automation and cyber-physical systems (N)
- **COPSI**, Design, Optimization and Control of Industrial Systems (N)
- **MPR**, Risk and return management (N)
- **Robin**, Robotics and interactions (N)

**Legend:**
- **B**: Brest
- **N**: Nantes
- **R**: Rennes
- **BN**: multi-location organisation
• 1\textsuperscript{st} year: 1 month, first working experience

• 2\textsuperscript{nd} year, 2 possibilities:
• 2 months, to acquire skills
• 4 months, to develop skills
• Engineering, development, project management, research, entrepreneurship...

• 3\textsuperscript{rd} year: 4 to 6 months, end-of-studies internship
• Using scientific knowledge, management and technical competences and human qualities to solve complex problems with a strong technological and/or organizational component

**Internships longer than 2 months are paid in France**
Our students get at least 1000€/month for the end-of-studies internship in companies
Master of Science programs

4 semesters (120 ECTS)

PROGRAMS TAUGHT TOTALLY IN ENGLISH

- Management and Engineering of Environment and Energy
- Project Management for Environmental and Energy Engineering
- Management and Optimization of Supply Chains and Transport
- Sustainable Nuclear Engineering, 3 tracks:
  - Advanced Nuclear Waste Management
  - Nuclear Energy Production and Industrial Application
  - Nuclear Medical Application

BILINGUAL PROGRAMS, ENGLISH AND FRENCH (1st semester taught in English + intensive French language lessons)

- Information Technologies, 4 tracks:
  - Architecture and Engineering for the Internet of Things
  - Communication Systems and Network Engineering
  - Data Science
  - Information System Governance
Develop intercultural skills and improve your French

- Intensive French language courses and introduction to French culture, sport activities, visits and social activities

- 4 weeks in August, in Brest or Nantes

- Fee-paying program, special rate for exchange students (between 700 and 900 euros)

- Open to all students

- Mandatory for students admitted to the « Diplôme d’Ingénieur » if they have not reached B2 level in French
MOOCS AND INNOVATION IN ENGINEERING EDUCATION

- At the origin of the 1st French MOOC in 2013
  - Leader of many MOOCs: Networks, digital fabrication, FabLab, satellite communications, collaborative economy, Arduino, Python programing, queuing theory…

- Active in open courses

- At the origin of the main French speaking blog on innovation in education:
  https://www.innovation-pedagogique.fr/

- At the origin of the first international French speaking conference on pedagogy in higher education (2001):
  « Questions de pédagogie dans l’enseignement supérieur (QPES) »
CDIO™ is an innovative educational framework for the next generation of engineers Initiated by MIT and Swedish universities

Technical knowledge and reasoning
Personal and professional skills and qualities
Interpersonal skills: teamwork and communication
Conceiving, Designing, Implementing and Operating systems in the enterprise and societal context

More than 110 CDIO collaborators including KTH (Sweden), Tsinghua University, University of Bristol (UK), Delft University of Technology, etc.

IMT Atlantique was the first CDIO member in France (since 2008)
ESTUDIANTES DE LA UPM EN IMT ATLANTIQUE

Estancia Erasmus (ETSIT, ETSII, ETSINF)
A partir de 3° año en la UPM
1 ó 2 semestres, comienza en setiembre o a fines de enero o principios de febrero
Nivel B2 en francés, or B1 + French Summer School in August

Doble titulación:
Master MUIT / Diplôme d’Ingénieur IMT Atlantique – 2 years
Master MUIT / MSc in Information Technologies (tracks AEIOT y CSNE) – 1 year
Nivel B2 en francés, or B1 + French Summer School in August
Tesis de Master en un laboratorio de IMT Atlantique (6 meses) – en inglés o francés
PhD en co-tutela – en inglés o francés
Choice of courses

There are 11 slots (rated from A to K) in all the TAFs
Each course \((UE)\) chosen by the student must be from a different slot
Students cannot take more than 11 \(UE\) per year

To validate a TAF students must pass at least 8 courses \((UE)\):

- All the core courses \((UE\ coeur)\) of the TAF, which are mandatory (3 or 4 depending on the TAF)
- 3 or 4 elective courses \((UE\ électives)\) of the TAF
- Free courses \((UE\ libres)\): students can take other UEs from other slots (among all UEs available in all the TAFs) either to get 8 UEs or as extra.
### Activities & Credits

<table>
<thead>
<tr>
<th>Activities</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>1 UE (scientific modules)</td>
<td>3 ECTS</td>
</tr>
<tr>
<td>1 language course</td>
<td>2 ECTS per semester</td>
</tr>
<tr>
<td>Sport activities</td>
<td>1 ECTS per semester</td>
</tr>
<tr>
<td>1 project</td>
<td>6 ECTS per semester</td>
</tr>
<tr>
<td>Career coaching sessions</td>
<td>1 ECTS per semester</td>
</tr>
<tr>
<td>2-month Internship</td>
<td>7 ECTS</td>
</tr>
<tr>
<td>4-month internship</td>
<td>15 ECTS</td>
</tr>
<tr>
<td>6-month internship</td>
<td>23 ECTS</td>
</tr>
<tr>
<td>Intersemester course</td>
<td>1 ECTS</td>
</tr>
</tbody>
</table>

**1 semester: 30 ECTS**
# Master of Science in Engineering / Diplôme d’Ingénieur IMT Atlantique

## YEAR 2 or 3 – PROGRAM SCHEDULE

<table>
<thead>
<tr>
<th>Autumn</th>
<th>September</th>
<th>October-January</th>
<th>January</th>
<th>Spring</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>1 course on Economics and Human and Social Sciences (year 2)</td>
<td>3 or 4 core courses (according to the TAF), called <strong>UE cœur</strong></td>
<td>1 intersemester course</td>
<td>Up to 3 <em>électives</em>, to be chosen from « F », « G » or « H » slots</td>
</tr>
<tr>
<td></td>
<td>1 course on Network-based Systems (year 3)</td>
<td>1 or 2 specialized courses, called <strong>UE électives</strong>, to be chosen from « D » or « E » slots</td>
<td></td>
<td>Up to 3 <em>électives</em>, to be chosen from « I », « J » or « K » slots</td>
</tr>
<tr>
<td></td>
<td>1 project</td>
<td>1 project</td>
<td>2 languages</td>
<td>2 languages</td>
</tr>
<tr>
<td></td>
<td>career coaching sessions</td>
<td>career coaching sessions</td>
<td>sport</td>
<td>sport</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>June-July June-Sept</th>
</tr>
</thead>
<tbody>
<tr>
<td>2 month-internship (year 2)</td>
</tr>
<tr>
<td>4 month-internship (year 3)</td>
</tr>
</tbody>
</table>
**Acronym and title** (number of *UE cœur* + number of *UE électives* to be passed in order to validate the *TAF*)

**UE Cœur:** core courses

**UE Électives:** specialized courses

**UE Libres:** elective courses to be chosen from a different *TAF*

Schedule of *UEs*:

**A, B, C, D:** September - December  
**E:** January  
**F, G, H:** February, March  
**I, J, K:** April, May
ASCY – AUTOMATION AND CYBER-PHYSICAL SYSTEMS (4+3)

Core
A: Modeling, analysis and simulation of mechatronics systems
B: From perception to action: robust control of dynamic systems
C: Identification and estimation of signals and dynamic systems
F: Implementation of control or diagnostic algorithms

Electives
D: Contemporary managerial issues
   Management of the company’s performance
   Engineering of complex systems
   Environmental energy: issues and strategies
E: Prototyping robotic systems
G: Advanced control methodology
   Embedded systems
H: Smart transports
   Cyber-physical systems optimization
   Real time and distributed information systems
I, J, K: free choice of course

Course Director: Fabien Claveau, fabien.claveau@imt-atlantique.fr
Core
A: User centered design
B: Rapid prototyping and agile development
C: The object in its environment

Electives
D: Advanced methods of programming and software development
E: Radio software
   Decrypting a market
F: Evaluation, acceptability and digital resources
   Internet of things, social web and semantic
   New techniques and uses of visualisation and interactive display
G: Web applications Engineering
   AI – optimised implementation
   Connected medical devices
H: Development of mobile devices
   Introduction to AI
I: Sensors and Energy
J: Innovation Ecosystem
   Introduction to AI
K: Electronics integration: from the algorithm to the prototype

Course Director: Charlotte Langlais, charlotte.langlais@imt-atlantique.fr
Core
A: Operation management
B: Modeling languages and technics
C: Operations research
E: Advanced operations research

Electives
D: Contemporary managerial issues
   Management of the company’s performance
   Engineering of complex systems
   Environmental energy: issues and strategies
   Algorithms and machine learning

F: AI and constraint programing
   Logisitic chain design

G: Transport
   Implementation case: Decision, Optimisation and Responsability

H: Planification and sequencing

I, J, K: free choice of course

Course Director: Gilles Simonin, gilles.simonin@imt-atlantique.fr
Core
A: Networks basis
B: Networks Cybersecurity
C: Systems Cybersecurity
E: Evaluation, Analysis and Security certification

Electives
D: System security architecture
E: Core course
F: Cyber in specific environment
   Web applications and Databases Cybersecurity
G: free choice of course
H: Data protection
I, J, K: free choice of course

Course Director: Nora Cuppens, nora.cuppens@imt-atlantique.fr
DCL – COLLABORATIVE SOFTWARE DEVELOPMENT (4+3)

Core
A: Advanced methods for programing and software development
B: Developer’s economic, organizational and legal environment
C: Software development engineering
E: Theoretical foundation of concurrent software development

Electives
D: Contemporary managerial issues (N)
   Management of the company’s performance (N)
   Engineering of complex systems (N)
   Environmental energy: issues and strategies (N)
   Algorithms and machine learning (N)
F: Principles of computer networks through practise (B)
   Aspects of wide scale development (N)
G: Web applications engineering (B)
   Programming robotic systems (B)
   Big data: collect, process and operate large amounts of data (N)
H: Cryptography and its applications (B)
   Apps development on mobile devices (B)
   High performance computing (N)
I: « Userland » operating systems – service-oriented architectures and system programing (B)
   Web applications engineering (N)
J: Languages and logics (B)
   Logical architecture and component based programing (N)
K: Algorithms design and analysis (B)
   Man-machine interaction – user experience (N)
   Certified programing (N)

Course Directors:
Fabien Dagnat (Brest)
fabien.dagnat@imt-atlantique.fr
Hervé Grall (Nantes)
herve.grall@imt-atlantique.fr
DIGIC – DIGITALISATION, INNOVATION AND CHANGES (3+3)

Core
A: Introduction to machine learning
B: Innovative society
C: Digital strategies

Electives
D: free choice of course
E: Decoding a market
Company architecture and Information systems urbanisation
F: Assessment of user experience
Digital marketing and Customer Relationship Management (CRM)
Innovation Ecosystem
G: Company architecture and Information systems urbanisation
Business Engineer
Decision-making
H: Business Intelligence
Change management
I: Graph Theory and social networks analysis
Change management
J: Storytelling Dataviz
Steering tools for company management
K: Game theory and agent based modeling
Digital marketing and CRM

This TAF is very popular among our students. It may not be available to incoming exchange students next year.

Brest campus

Course Director: Bernard Gourvennec, bernard.gourvennec@imt-atlantique.fr
Core
A: Introduction to machine learning
B: A journey to data scientist 1
C: A journey to data scientist 2

Electives
D: Statistics and Statistical Analysis Systems (SAS)
   Advanced C++ programming
   Deep learning
E: Big Data & Cloud computing
F: Advanced data mining
   Data mining cases deployment
G: Decision-making
   Market finance
   Language processing and text mining
   AI algorithms optimisation
H: Business Intelligence
   Advanced Big Data architecture
   Introduction to AI
I: Data sciences
   Graph theory & social network Analysis
   Advanced C++ programming
J: Learning analytics & learners follow-up
   Introduction to AI
K: Game theory & agent based modeling
   Digital marketing

Course Director: Cécile Bothorel, cecile.bothorel@imt-atlantique.fr

This TAF is very popular among our students.
It may not be available to incoming students next year.
DEMIN – NUCLEAR ENGINEERING (4+3)

Core
A: Nuclear physics
B: Fuel cycle
C: Nuclear reactors operation
G: Radio protection

Electives
D: Contemporary managerial issues (N)
   Management of the company’s performance (N)
   Engineering of complex systems (N)
   Environmental energy: issues and strategies (N)
   Algorithms and machine learning (N)

E: Economy of energy
   Fusion, GEN IV, Propulsion

F: Monte Carlo modeling in nuclear physics
H: Management of complex projects in the nuclear field

I, J, K: free choice of course

Course Director: Julie Champion, julie.champion@imt-atlantique.fr
HEALTH – HEALTHCARE ENGINEERING (3+3)

Core
A: Anatomy & physiology for the design of medical devices & sensors
B: The digital patient
C: Health management: Information System organization

Electives
D: free choice of course
E: Computer-aided medical interventions
   Economy and health law
F: Principles of physics, system architecture, training and medical
   image processing
G: Connected medical devices
   Dosimetry
   Health information system, standards and security
H: Analysis of health data: epidemiology and decision-making
   From the radioisotope to the radiopharmaceutical
I, J, K: free choice of course

Course Directors:
Chafia Hamitouche (Brest)
chafia.hamitouche@imt-atlantique.fr

Vincent Métivier (Nantes)
vincent.metivier@imt-atlantique.fr

Brest and Nantes campus
IHM – MAN MACHINE INTERACTION (MMI) AND COLLABORATIVE SYSTEMS (4+3)

Core
A: Software engineering for MMIs and collaboration
B: Cognitive ergonomy for interaction
C: Social, legal and ergonomy principles of work within a collaborative network
D: Advanced methods for programing and software development

Electives
E: Augmented reality
F: User experience evaluation
   IoT Intelligence, social web and semantic
G: Collaborative virtual reality
   Web Apps engineering
   Language processing and data mining
H: Mobile Devices Development

I, J, K: free choice of course

Course Director: Thierry Duval, thierry.duval@imt-atlantique.fr
IOT – INTERNET OF THINGS FOR THE INDUSTRY 4.0 (3+3)

Core
A: Developing and deploying applications in the cloud
B: Information transport protocols
C: New economy models and digital law

Electives
D: Security architecture of systems
   Mobile networks
E: Wireless networks for IoT devices
   Industrial networks
F: Distribution radio networks
G: Cyber-security in specified environments
H: Smart cities and transports
I: Computer networks basis
   Mobile networks
J: Standardisation
K: Literature review project

Course Director: Laurent Toutain, laurent.toutain@imt-atlantique.fr

Rennes campus
ISC – COMMUNICATION SYSTEMS ENGINEERING (3+3)

Core
A: Physical channels of communication
B: Digital communications
C: Transmission systems architecture and engineering

Electives
D: Error correction coding
   Radio technologies
E: Receivers for digital communications: from principles to implementation
   Data and applications security
F: Optical technologies
   Computer networks through practise
G: Mobile networks
   Data compression: from source coding to virtual reality
H: Optical networks
I,J: Fee choice of course
K: Electronic integration: from the algorithm to the prototype

Course Director: Karine Amis, karine.amis@imt-atlantique.fr
Core
A: Introduction to machine learning
B: Stochastic modelling and analysis
C: Numerical methods

Electives
D: Advanced C++ programing
   Deep learning
E: Stochastic Dynamic Models
   Big data & cloud computing
F: Statistical learning & sparse representations
   Empirical finance
   Computational Imaging
   Deployment of data mining true cases
G: Markov chains & applications
   Market finance
   Computer vision
H: Portfolio management & trading algorithms
   Projects on recent advances in machine learning
I: Artificial intelligence
J: Projects on recent advances in machine learning
K: Game theory and agent based modeling

This TAF is very popular among our students. It may not be available to incoming exchange students next year.

Course Director: Abdeldjalil Aissaelbey, abdeldjalil.aissaelbey@imt-atlantique.fr
Core
A: Performance management
B: Risks management
C: Risks in change management
E: Uncertain optimisation

Electives
D: Contemporary managerial questions
   Company performance management
   Complex systems engineering
   Environment energy: issues and strategies
   Algorithms and automatic learning
F: Operational effectiveness
   Conception risk and performance
G: Maintenance in operational readiness
   Economic performance
H: Performance assessment
   Innovation, a risky approach
I, J, K: free choice of course

Course Director: Guillaume Massonnet, guillaume.massonnet@imt-atlantique.fr
Core
A: Network basis
B: Cloud platforms
C: Networks and platforms regulations

Electives
D: Digital networks
E: Economy et platforms
F: Developing and deploying applications in the cloud
Blockchain et consensus: co-operation in digital platforms
G: Building a technico-commercial answer to an international call for tender
H: Networks virtualisation
I: Networks basics (Msc)
Mobile Networks
J: Contents dissemination architectures
K: Service architecture for the Internet

Course Director: Patrick Maille, patrick.maille@imt-atlantique.fr
OPE – ENVIRONMENT OBSERVATION (3+4)

Core
A: Physics of wave propagation and sensors
B: Hardware architecture and sensors networks
C: Observation and perception systems engineering

Electives
D: Radio technologies
   Acoustic systems: architectures and scales
E: Software radio: architecture and applications
   Big data & Cloud computing
F: Electronic integration– from the algorithm to the prototype
   Computational imaging
G: Robotic systems programing
   Computer vision
H: 2D and 3D artificial vision technology
   Machine learning and multi-sensors database advanced processing
I+J: Project JANUS (CNES): Multi-academic partners project for a CubeSat conception
K: Free choice of course

Brest campus

Course Director: François Gallée, francois.gallee@imt-atlantique.fr
Core
A: Robots modelling
B: Robots control
C: Innovation and robotisation
F: Software architecture for robotics

Electives
D: Contemporary managerial questions
  Company performance management
  Complex systems engineering
  Environment energy: issues and strategies
  Algorithms and automatic learning

E: Prototyping a robotic system

G: Bio-inspired robotics
  Embedded systems

H: Cobotics and haptics
  Distributed and real-time information systems

I, J, K: Free choice of course

Course Director: Vincent Lebastard, vincent.lebastard@imt-atlantique.fr

Nantes campus
SEH – HETEROGENOUS EMBEDDED SYSTEMS (3+3)

Core
A: Digital and analogical integrated circuits
B: Methodologies: from the algorithm to the chip
C: Embedded systems: hardware-software interaction

Electives
D: Advanced methods for programming and software development
Radiofrequencies technologies and devices
E: Seminar: Integrated circuits and systems conception (Grenoble)
Software radio: architecture and applications
F: Circuits high level conception
New techniques and uses of visualization and interactive display
G: AI – optimized implementations
Connected medical devices
Web applications engineering
H: AI – introduction
I: Energies and sensors
J: AI – introduction
K: Electronics integration – from the algorithm to the prototype

Course Director: Amer Baghdadi, amer.baghdadi@imt-atlantique.fr
TEE – ENVIRONMENTAL AND ENERGY TURNAROUND (4+3)

Core
A: Environmental and energy issues
B: Energy grids
C: Strategic and socio-technical analysis of energy and environmental issues
E: Energy and environment risks and management

Electives
D: Contemporary managerial questions
   Company performance management
   Complex systems engineering
   Algorithms and automatic learning
F: Renewable energy production sectors
   Building energy performances
   Machines energy
G: Energy recovery and waste-to-energy and biomass processes
   Building environmental performances
   Energy systems and cycles
H: Environmental assessment
   Sustainable cities and territories
   Innovative low-carbon generation technologies
I, J, K: Free choice of course

Course Director: Aurélie Joubert, aurelie.joubert@imt-atlantique.fr

Nantes campus
Other *UE* outside the *TAFs*

**D slot**

*UE* entrepreneurship

*UE* research
STUDENT SERVICES

On-campus accommodation (from €300 to €500 per month)
Catering services (<€4 per meal)
Sports center
International Office
Placement and career advisory service
SPORT ACTIVITIES
STUDENT SERVICES

On-campus accommodation (from €300 to €500 per month)
Catering services (<€4 per meal)
Sports center
International Office
Placement and career advisory service
IMT Atlantique (Brest)
the beach near the campus!
IMT Atlantique (Nantes)
IMT Atlantique (Rennes)
Thank you for your attention

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