



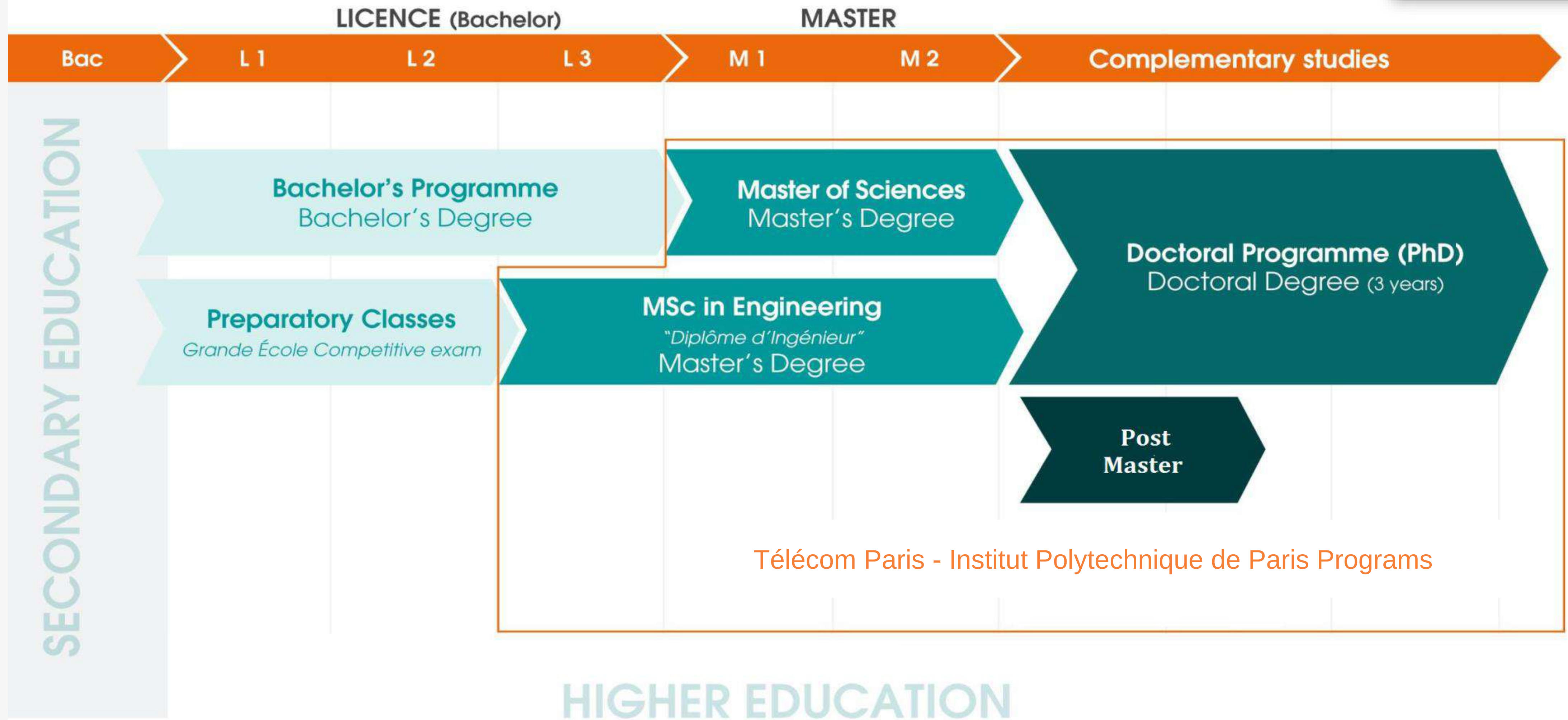
INSTITUT
POLYTECHNIQUE
DE PARIS

Etudiants internationaux à Télécom Paris

International students at Telecom Paris

Mercredi 12 mai 2022

When Do You Enter the Curriculum?



Etudiants internationaux | *international students* *curriculum*

- Le cursus des étudiants qui entrent en 2e année comprend :
 - une période d'enseignement d'une durée de 3 semestres (18 mois) à Télécom Paris
 - un stage d'ingénieur de 6 mois, en entreprise (obligatoirement en France).
 - 120 crédits ECTS au minimum pour obtenir le diplôme.
- *The curriculum for students entering 2nd year includes:*
 - *three semesters of courses (18 months) at Telecom Paris*
 - *a 6-month internship in a company necessarily in France.*
 - *at least 120 ECTS credits to obtain the diploma.*

Semestres et périodes d'enseignement | Academic year

- L'année scolaire est organisée en deux semestres découpés en 2 périodes chacun
 - Semestre 1 :
 - période 1 : 1^{er} septembre - novembre
 - période 2 : novembre – février
 - Semestre 2 :
 - période 3 : février - avril
 - période 4 : avril – fin juin
 - + 1 semaine de cours du programme ATHENS
 - + 3 périodes groupées de cours de Formation Humaine
- *The school year is organized in two semesters divided into two periods each*
 - *Fall semester:*
 - *Period 1: 1st of September - November*
 - *Period 2: November - February*
 - *Spring semester:*
 - *Period 3: February - April*
 - *Period 4: April – end of June*
 - *+ A week with European students*
 - *+ 3 personal and professional skills seminars*

Votre parcours en 2ème année | 2nd year academic organisation

- 2 Filières de 2A
 - Vous devez être inscrits dans deux filières de créneau différent
 - 192 heures / 20 crédits par filière
- Vous devez également choisir :
 - 8 unité d'enseignement (UE) partagées complémentaires : cours scientifiques, SES et humanités (20 crédits)
 - 2 UE de Langues, dont l'anglais (ou le français), par semestre (4 ECTS par semestre) - ou davantage
 - 2 UE de Formation Humaine (3 ECTS par an) - ou davantage
 - 1 « semaine ATHENS » : échanges avec des étudiants européens (3 ECTS par semaine Athens)
- *Two study tracks*
 - *You must be enrolled in two study track in different slots*
 - 192hours / 20 credits per track
- *You must complete by choosing*
 - *8 complementary courses : scientific courses, economics and social sciences and cultural studies (20 credits).*
 - *Language courses (4 credits per semester) : English or French depending on your level*
 - *2 personal and professional skills courses (3 credits per year) or more*
 - *1 week of exchange with European students ("ATHENS program", 3 credits)*

Year 2: a tailor-made Program

40 ECTS

Specialization

2 study tracks (among 14)
= 2x192h

- 5 in English



- 9 in French



20 ECTS

Scientific and Technical courses

Data Sciences

Statistics

Computer
programming

Optimization

Machine
Learning

And many other
specializations



Complementary courses

Economy &
Management

Law

Contemporary humanities:
entrepreneurship &
innovation, etc.

2 languages

Sociology

Personal and
professional skills

Year 2: typical week

- The week is divided into slots

08:30-10:00	Study track slot A		Complementary courses	Study track slot C		Language	Study track slot B
10:15-11:45	Study track slot A		Complementary courses	Study track slot C		Language	Study track slot B
	Monday		Tuesday	Wednesday		Thursday	Friday
01:30-03:00	Study track slot B	Language	Complementary courses	Study track slot A	Language	Free	Study track slot C
03:15-04:45	Study track slot B	Language	Elective courses	Study track slot A	Language		Study track slot C
05:00-06:30	Language		Language	Language			

Year 2:14 Study Tracks

AI & Data Sciences



Data Science
(SD)



Signal Processing for
Artificial Intelligence
(TSIA)



Image (IMA)

Mathematics & Computer Sciences



Stochastic processes and
scientific computing (MACS)

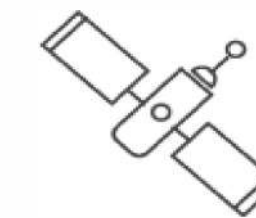


Applied algebra, Cryptography,
Quantum information, Coding
theory (ACCQ)

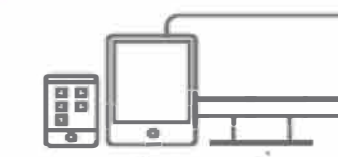


Mathematics, Theoretical
Computer Science & Operation
Research (MITRO)

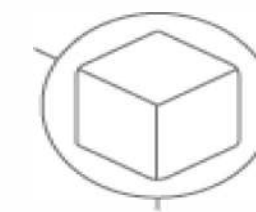
Computer, Interactive and Embedded systems



Embedded Systems
(SE)

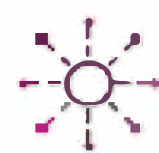


Distributed Software
Systems (SLR)



3D & Interactive
systems (IGR)

Networks, Communications & Cybersecurity



Large Digital
Infrastructure (GIN)



Infrastructures and
Networks Security (SR2I)



Telecommunications:
data to systems (TELECOM)

Economics & Digital Innovation



Markets, Organization,
Data, Strategy (MODS)



Year 2: Study Tracks slots

You have to choose two different slots

Time slot A	Time slot B	Time slot C
GIN, Large Digital Infrastructures	IMA, Image	ACCQ, Applied Algebra
IGR, 3D & Interactive systems	MITRO, Mathematics, Theoretical Computer Science and Operation Research	RI0, Wireless networks and IoT
MACS, Stochastic processes and scientific computing 	MODS, Markets, Organizations, Data, Strategies 	SD, Data Science 
SLR, Distributed Software Systems 	SE, Embedded systems	TSIA, Signal Processing for Artificial Intelligence 
SR21, Infrastructures and Networks Security		
TELECOM, Telecommunications: data to systems		

Year 3: Prepare for your career

Internal option: Technological innovation option

1 study field - 12 ECTS
+ a “PRIM” Research & Innovation Project - 12 ECTS
+ complementary elective courses (sciences, languages, humanities, etc.)

- Image, Artificial Intelligence and Data Science
- Fundamentals of Mathematics and Computer Science
- Networks, IOT and cybersecurity
- Digital systems
- Alternative 3rd year program accessible to all students

OR

External option: dual Master's/engineer programme

students can apply for one of the Masters advised by their study tracks, at the Institut Polytechnique de Paris or at a partner university.



6-month paid internship in France
30 ECTS (*1 semester*)

The 14 study tracks

IMA - Image

Artificial Intelligence and Data Science

- Basics of image analysis
- Mathematical techniques of the image
- Computer vision
- 3D reconstruction,
- Approaches inspired by artificial intelligence and deep learning,
- Applications: image analysis and interpretation, image and video classification and indexing



3rd year at school

- Options IMAGE or IA

Masters

- IMAGE (Sorbonne Université)
- DATA IA
- MVA, Mathématiques, Vision, Apprentissage
- BIM, Bio-Imagerie (Paris-Descartes)



For those you like

- The images
- Digital photography
- Mathematics and algorithms
- Applications of machine learning



Recommended combination with other tracks

- IGR
for the aspects of virtual reality and computer graphics.
- TSIA
for signal processing aspects.
- SD
for learning and data mining techniques

SD – Data Science

Artificial Intelligence and Data Science

- The courses cover the exploitation, management and analysis of large volumes of structured and unstructured data.
- Two possible specializations:
 - Statistical Learning (at the intersection of computer science and mathematics)
 - Data Management (computer science)



3rd year at school

- Options SD or IA

Masters

- Statistical Learning specialization: Data Sciences, MVA, Data AI
- Data Management specialization: DataScale (Data management in a digital world), DATA IA (Data Intelligence Artificielle)



For those who like

- Applied mathematics and computer science
- Working on a recent subject



Recommended combination with other tracks

- MACS
to reinforce the theoretical aspects of data science.
Recommended for Master's Degrees in Data Science
- SE
to go towards a field of the future.

Also: IMA, IGR or MITRO

TSIA – Signal Processing for Artificial Intelligence

Artificial Intelligence and Data Science



Taught in English

- A broad and operational vision of
 - statistical learning
 - signal processing.
- Challenges of data processing and big data,
- Methodological foundations (statistics, optimization)
- Techniques for processing temporal data in particular.



3rd year at school

- Options IA

Masters

- ATSI, Automation and Signal and Image Processing
- Data Science
- DATA Artificial Intelligence (Data IA, IP Paris)
- MVA, Mathematics, Vision, Learning
- ATIAM, Acoustics, signal processing and computer science applied to music
- BIM, Bio-Imaging



For those who like

- Math applied to real-world problems
- Statistical learning
- Signal processing



Recommended combination with other tracks

- IMA

The signal processing tools introduced in TSIA reinforce the specific methods of image analysis

- MACS

The TSIA program contains courses in random modeling which are a very relevant complement to the MACS track

MODS – Markets, organization, data, strategy

Digital economy and innovation



Taught in English

The "Markets, Organizations, Data, Strategies" program will allow you to to

- decode the functioning of markets and the strategies of companies,
- understand the impact of digital technology on organizations and innovations

by introducing you to the qualitative and quantitative tools used in the Economic and Social Sciences.

The program offers complementary multidisciplinary courses in management, economics, law/ethics and sociology.



3rd year at school

- Option MIN "Digital Innovation Management" with Sciences Po Paris

Masters in Innovation, Industry and Society (IP Paris)

- IREN, Network Industries and Digital Economy (french)
- PIC, Projet, Innovation, Conception (french)
- COSI, Organization, Strategy and Information Systems



For those you like

- Understanding the recent challenges of digital transformation
- Discovering the socio-economic methods of data analysis
- Working in consulting or finance



Recommended combination with other tracks

- MODS can be associated to all the fields of study of the school because all the digital technologies are involved in the digital transformation and its economic and organizational consequences. In particular SLR
- With a specialization in economics:
 - MACS: for those who wish to go into market finance
 - SD: to enlarge their skills in data analysis to socio-economic methods while being aware of the ethical issues of AI.

ACCQ - Applied Algebra

Mathematics and theoretical computer science

- An introduction to several areas of computer science and telecommunications
- Formal computation
- Corrective coding
- Cryptography, and quantum information theory,
- A common mathematical corpus, essentially algebraic.
- Mathematical fluency welcome!



3rd year at school

- Option QEng « Quantum Engineering»
- Masters
- AFP - Algorithmics and Foundations of Programming (+ study track MITRO)
 - MICAS - Machine Learning, Communications And Security (+ study track TELECOM)



For those who like

- Algebra
- Mathematics in general, and who are not afraid of abstraction



Recommended combination with other tracks

- MITRO
Research profile in mathematics and theoretical computer science (M2 AFP). For those who love math!
- TELECOM
Expert engineer (or researcher) profile in digital communications.
- SR2I
Expert engineer (or researcher) profile in computer security and cryptography.

MACS - Stochastic processes and scientific computing

Mathematics and theoretical computer science



Mostly in English

- Applied mathematics
- Random modeling and scientific computing
- Applications (of your choice) :
 - financial mathematics,
 - data science,
 - signal and image modeling and processing.
- Acquisition of solid knowledge in mathematics



For those who like

- Probability
- Data analysis
- Mathematics and its applications (in finance, data science, etc.)



3rd year at school

- Option MACS

Masters

- Data Sciences
- MVA Mathématiques, Vision, Apprentissage *(French)*
- MDA Mathématique de l'aléatoire *(French)*
- SFA Statistics, Finance and actuarial
- ProbaFin Probability & Finance



Recommended combination with other tracks

- SD / TSIA
Theoretical foundations of random modeling and scientific computing are essential for mastering the theoretical aspects of data science.
- MODS
for those who want to be involved in finance and marketplaces.
- MITRO
complementary mathematical bases for many applications, in particular towards "operational research."

MITRO - Mathematics, Theoretical Computer Science and Operations Research

Mathematics and theoretical computer science



Partly in English

- At the interface between computer science and mathematics
- Theoretical complements to almost any other course of study in computer science
- Analyze and solve difficult mathematical and algorithmic problems using a variety of approaches
- To understand the limits and to master the ins and outs of programming



For those who like

- Solving mathematical problems using original approaches
- Understanding the possibilities and limits of computer science
- And those who wish to continue with a PhD in computer science



Recommended combination with other tracks

- ACCQ
Focus on cryptography and computer security for example (very mathematical profile)
- SD
Focus on cryptography and computer security for example (very mathematical profile)



3rd year at school

- Option QEng « Quantum Engineering »

Masters

- RO, (ex MPRO) Operational Research
- AFP (ex MPRI) Algorithmics and Foundations of Programming

TELECOM : From data to systems

Networks, communications and cyber security

New telecommunication uses and the explosion of connected objects, large amounts of data:

→ Real issues to be resolved at the technological level

- Very high speed for wireless communications,
- ultra high speed for optical communications,
- intermittent communications for the Internet of Things,
- absolute reliability for certain communications (autonomous cars, etc.)
- ever-increasing mobility,
- the miniaturization of electronic circuits and especially antennas
- the very low energy consumption

→ Need for system design engineers!



3rd year at school

- **Options ICSOC** (Integration Circuits Systems and Communicating Objects)

Masters

- **ICS** (Integration Circuits Systems)
- **ROSP** (Réseaux Optiques Systèmes Photoniques)
- **SyR** (Systèmes Radio)



For those you like

- Understand the architecture of a communication system
- To know how a data transfer is made
- To know how a laser, an antenna, etc. works



Recommended combination with other tracks

- **RIO**
to master the technologies of the physical layer of communication networks (fixed and wireless) and connected objects.
- **SD / TSIA**
to understand how the transfer and backup of data generated by Big Data work.
- **SE**
to master the technologies and techniques for the communication of data from an embedded system

GIN : Large Digital Infrastructures

Networks, communications and cyber security

- Network architecture
- Relationship between different access providers
- Content distribution (video, streaming...)
- Cloud, fixed networks, mobile networks
- Security issues
- Video conferencing, telephony, multimedia applications. 5G, 6G, IoT, Data Centers,...

A complete vision of the actors, architectures and technologies of the major digital infrastructures!



3rd year at school

- option GIN-RIO "Networks
- option SR2I "security management" or "security implementation

Masters

- IP Paris : CSN, Computer Science for Networks



For those you like

- Understanding the different actors involved in large-scale digital infrastructures and their relationships
- Understanding the technologies used and their evolution



Recommended combination with other tracks

The field of study gives a global vision and can be completed by fields of study providing complementary skills:

- Embedded Systems (SE)
- Markets, organization, data, strategy (MODS)
- Data Science (SD)
- Theoretical Computer Science and Operations Research (MITRO)
- Mobile Networks and IoT (RIO)

RIO : Wireless networks and IoT

Networks, communications and cyber security

- Mobile networks and the Internet of Things.
- Internet of Things (IoT) revolution:
 - healthcare,
 - industry, transportation
 - city or leisure...
- Mobile networks and IoT = the two major components of 5G.

The study track therefore intends to train engineers who have an excellent knowledge of existing technologies, but who are also capable of designing the networks of the future.



3rd year at school

- option GIN-RIO “Networks”

Masters

- IP Paris : CSN, Computer Science for Networks
- ROSP Réseaux optiques et systèmes photoniques *(in french)*



For those you like

- Discover the world of the Internet of Things
- Understand how our smartphones communicate
- Understand the challenges faced by operators and IoT industry players

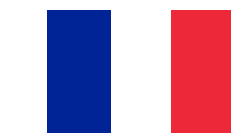


Recommended combination with other tracks

- TELECOM
- Expert engineer profile in Internet of Things
- SE
- Expert engineer profile in Internet of Things.
- MODS
- Entrepreneur or consultant profile
- SR2I
- Expert engineer profile in network cyber security
- GIN
- Network expert engineer profile

SR2I : Infrastructures and Networks Security

Networks, communications and cyber security

 Enseignement en français

Security is no longer a choice, it has become a regulatory requirement!

- Cybersecurity & cyberdefense
- Governance,
- Risk analysis
- Advanced hacking...



For those you like

- Reflect on a system and divert its use
- Cybersecurity in all its aspects
- Cryptographic challenges
- Future networks and critical infrastructures
- Electronic payment and embedded systems



Recommended combination with other tracks

The SR2I study track focuses on the security of communications networks, applications and data and can be naturally linked to most fields. It is an added value for the :

- SD
- RIO
- GIN
- SE



3rd year at school

- option SR2I "Security of networks and IT infrastructures" with two sub-options: security management or security implementation

IGR - 3D and Interactive Systems

Computer, interactive and embedded systems

- Human Machine Interaction & Interactive Systems
- 3D Computer Graphics, Geometric Modeling & Image Synthesis
- Data Visualization, Virtual Reality & Digital Manufacturing.
- Applications :
 - Computer Aided Design
 - Virtual/augmented reality
 - Video Games, Interactive Entertainment
 - Artificial Reality
 - Special Effects, Computer Animation



3rd year at school

- option IGR

Masters

- IGD Interaction, Graphics & Design
- MVA Mathématiques, Vision et Apprentissage



For those you like

- 3D design and virtual reality
- Interactive devices and systems
- Tactile, mobile, gestural interfaces, etc.
- Video games and special effects



Recommended combination with other tracks

- IMA
for the complementarity between human-machine interface and images.
- SD
for data visualization.

SLR – Distributed Software Systems

Computer, interactive and embedded systems

- Today, almost all systems are interconnected or distributed.
- The problems of distribution are omnipresent in all current or future computer and socio-technical applications:
 - massive data processing,
 - Internet commerce,
 - cloud systems,
 - smart homes,
 - Internet of Things, banking, etc.



3rd year at school

- Option SLR « Advanced distributed Software Systems »

Masters

- COMASIC, Conception, Modélisation et architecture des Systèmes informatiques (*French*)
- PDS Distributed and Parallel Systems
- AFP / MPRI Parisian Master of Research in Computer Science



For those you like

- Designing computer systems
- Perceiving trends in current systems
- Making it happen through practical work



Recommended combination with other tracks

In addition, students can follow two directions:

- complete their knowledge for computer systems with distinctive specificities such as Embedded Systems (SE) or Data Science (SD) systems.
- to deepen the theoretical aspects of computer science (MITRO)

SE - Embedded Systems

Computer, interactive and embedded systems

- Interdisciplinary track
- From hardware
 - Electronics for OS design,
 - Reconfigurable architectures,
 - HDL,
 - SystemC modeling,
 - Runtime support
- Up to the software
 - Programming of an OS,
 - Compilation,
 - Concurrent programming,
 - Modeling and verification



3rd year at school

- option SE “Advanced Embedded Systems”

Masters

- ICS Intégration Circuits and Systems
- SETI Systèmes Embarqués et Traitement de l'Information
- COMASIC Conception, Modélisation et Architecture des Systèmes Informatiques complexes
- SAR Systèmes et applications réparties



For those you like

- Understanding the interactions between hardware and software, leaving no grey areas
- Practical as well as theoretical learning



Recommended combination with other tracks

- SD

solid knowledge in data science is therefore a major advantage to be able to design and develop modern embedded systems.

- SLR

many embedded systems have to communicate and cooperate and form a distributed system.

- Also TELECOM, SR2I, GIN

Thank you!

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