École Polytechnique is a leading French ‘Grande Ecole’ which combines top-level research, academics, and innovation at the cutting-edge of science and technology. Its curriculum promotes a culture of excellence with a strong emphasis on science, anchored in humanist traditions.

https://www.polytechnique.edu/en/about-ecole-polytechnique
Some facts about EP

• Teaching
  3000 students
  2000 polytechnic engineers - 20% international
  430 masters students - 60% international
  575 doctoral students - 40% international
  670 lecturers-researchers
  20% international lecturers
  6 members of the Académie des sciences
  27 masters disciplines
  10 teaching and research departments
Some facts about EP

• Research
  1608 people working in the Research Centre
  981 of which are researchers
  572 PhDs
  21 laboratories
  22.5 M€ in research contracts
  Over 1250 publications a year

• International
  181 agreements with foreign universities
  786 international students
  65 nationalities
Some facts about EP

• Master of Computer Science degree operated by l’X and delivered by Université Paris Saclay

• Master’s programs in cooperation with its partner institutions:
  • Paris-Sud
  • ENSTA ParisTech
  • Télécom ParisTech
  • CEA/INSTN
  • CentraleSupélec

… makes things complicated …
Double Degree

... yet to be signed
... draft with the master‘s COMASIC (Master Conception, Modélisation et Architecture des Systèmes Industriels Complexes):

COMASIC aims at providing a training of excellence in the design, modeling and architecture of complex computer systems.

Usual frame:
• Master program
• 1 year at TUM, 1 year at EP + common master‘s thesis
Details of **COMASIC**

3 categories of computer systems are dealt with:

- **Embedded** systems, such as
  - primary flight computers in aeronautics
  - X-by-wire
  - Anti-Blocking Systems in the automotive industry
  - control of a nuclear plant in the energy industry
  - etc.

- **Cyber-physical** systems, such as
  - smart-grids, robot swarms etc.
  - mostly composed of embedded systems interconnected over a network, controlling and sensing heterogeneous physical apparatus.
COMASIC

- **Information** systems, such as
  - enterprise systems, billing systems etc.
  - information systems needed to manage and optimize big cyber-physical systems and their data (e.g. smart cities etc.)
Sample Courses

*Theme: Systems architecture and model-driven engineering*

- Systems modelling with objects
- Systems architecture
- Reliability
- Model-driven engineering for complex real-time systems
- Requirement engineering

*Theme: Verification and validation*

- Inductive validation of programs and hybrid systems
- Tests and test covering strategies
- Deductive verification of programs
- Software Model-Checking
Sample Courses

Theme: Software and hardware platforms
- Embedded systems electronic architecture
- Real-time kernels
- Synchronous and reactive systems
- Distributed and autonomous systems

Theme: Signal processing, optimisation and control
- Systems and signals
- Modelling and control by state representation
- Optimisation
Sample Courses

**Theme: Information systems architecture**

- Data mining for big data
- Modelling and analyzing security risks in complex systems
- Distributed algorithms

**Theme: Modelling applications**

- Information systems of telecom and banking companies
- Transportation systems
- Control of real-time systems
Sample Courses

Theme: Continuous time models and simulation

Modelling and simulation of dynamical systems
Continuous time modelling
Analysis and solving of DAEs
Modelica and Dymola

Note:
- each course 2.5 ECTS
- many courses equivalent to TUM courses
Contact Person

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• http://db.in.tum.de/people/sites/reiser/index.html?lang=en