The second year programme COMASIC

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Our “technological society” relies on computerized systems which are embedded, interconnected and more and more complex.

Our life is more and more in the hands of “cyberphysical systems”, i.e. interconnected control systems: ATM, Smart Buildings, Autonomous cars.
In practice

Dassault

Partially sponsored by the “Complex Systems Engineering” Ecole Polytechnique/ENSTA/Télécom/Thalès/Dassault Aviation/DCNS/DGA
Objectives

- Both for academic research and for the industry; alumni were hired at important technical positions in big industrial groups (Thalès, Airbus etc.) or went to academia (thesis, postdoc, academic positions at INRIA etc.)
- Main competencies: mathematical modelling and simulation of discrete-time and continuous-time systems, embedded systems, architecture, compilation, synchronous programming, distributed systems, fault-tolerant protocols, formal methods, validation etc.
- High scientific level and level of selectivity
Organization of the curriculum in M2

- 10 courses among the main scientific themes
- 3 compulsory courses: foreign language (in general, scientific English), project, “academic life” or “life in industry”
- And internship between 4 and 6 months in an academic laboratory or in industry
- Seminar, reading group, course by an invited professor (UNAM, Boulder etc.)
### Themes

- Systems engineering and model-driven engineering
- Distributed systems
- Security
- Signal processing, optimization and control
- Hardware and software platforms
- Verification and validation
- Continuous time models and simulation
- Applications

Courses from leading researchers in their field at Ecole Polytechnique, ENSTA ParisTech, Télécom ParisTech, Atomic Energy Commission, Paris-Sud, CentraleSupélec etc.
Curriculum

Systems engineering and model-driven engineering
- Object modelling for systems
- Systems architecture
- Dependability

Verification and validation
- Inductive validation of programs and hybrid systems
- Deductive validation of programs
### Curriculum

#### Software and hardware platforms
- Real-time kernels
- Synchronous and reactive systems
- Distributed and autonomous systems

#### Distributed systems
- Sensor networks
- Distributed algorithms

#### Security
- Modelling and analysis of the safety risks in complex systems
Curriculum

Signal processing, optimization and control (1)

- Signal Processing
- Modelling and control

(can be replaced by more advanced courses in case)

Continuous time modelling and simulation (1)

- Analysis and solving of differential-algebraic equations (Modelica)

Specialization (1)

- Transportation systems
- Real-time control systems
- Requirements’ engineering
- Course from an invited international professor