The second year programme COMASIC

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Rationale of COMASIC

Design, Modelling and Architecture of Complex Computerized Systems

- 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
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 (2.5 ECTS each)
- 3 compulsory courses: foreign language (in general, scientific English), project, “academic life” or “life in industry” (2.5 ECTS each)
- And internship between 4 and 6 months in an academic laboratory or in industry (25 ECTS)
- Seminar, reading group, course by an invited professor (UNAM, Boulder etc.)

www.master-comasic.fr
(online registration)
Organisation of the curriculum by themes

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 (2)
- Object modelling for systems
- Systems architecture
- Dependability

Verification and validation (2)
- Inductive validation of programs and hybrid systems
- Deductive validation of programs
## Curriculum

### Software and hardware platforms (2)
- Real-time kernels
- Synchronous and reactive systems
- Distributed and autonomous systems

### Distributed systems (1)
- Sensor networks
- Distributed algorithms

### Security (1)
- Modelling and analysis of the safety risks in complex systems
Curriculum

Signal processing, optimization and control (2)
- 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