2CC2000 – System modeling

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Department: DÉPARTEMENT GÉNIE INDUSTRIEL ET OPÉRATIONS
Language of instruction: FRANCAIS, ANGLAIS
Campus: CAMPUS DE PARIS - SACLAY, CAMPUS DE METZ, CAMPUS DE RENNES
Workload (HEE): 10
On-site hours (HPE): 6,00

Description
The aim of this class is to raise awareness of students for System modelling theories, process and techniques; in particular in the case of complex systems. Future development challenges need to be supported by the capabilities of engineers to identify factors underpinning a system, to represent them in a formal way to predict system's future behaviour; as well as to understand the use of results and sensitivity analysis in the implementation phase. Through different case studies, the students will be introduced to system modelling (the need for multidisciplinary approaches, issues and challenges in system modelling, etc.)

Quarter number
ST5

Prerequisites (in terms of CS courses)
"Modelling" cours (ST2)

Syllabus
The two sessions will be organised as following:
1. Invited introductory conference that will though a case study illustrate the needs and challenges of system modelling
2. Introduction to the key notions for system modelling (using a industrial illustration or case study)

Class components (lecture, labs, etc.)
Case studies

Course support, bibliography
Recommended text books :
- "A practical guide to SySML: the system modeling language", Friedenthal & Steiner
- « Model-Based Systems Engineering with OPM and SysML », Dori, Dov,

(2016).

- « Structural complexity management », Lindemann, Maurer and Braun, (2009).
- « The limits to growth », Donella Meadows, Dennis Meadows, Jorgen Rangers, Wiliam Behrens III

Learning outcomes covered on the course

At the end of this class, students will raise awareness for :

- Systems thinking and system approaches to solve engineering problems
- Needs and advantages of multidisciplinary approaches for complex system design
- Key points for system modelling such as system perimeter definition, system interfaces definition and management, etc.

Description of the skills acquired at the end of the course

C1.1 Examine problems in their entirety and beyond their immediate parameters. Identify, formulate and analyse the scientific, economic and human dimensions of a problem

C1.5 Bring together broad scientific and technical concepts in a core structure contained within the framework of an interdisciplinary approach.

C9.2 Identify, within a given structure, the scope of liability as well as socio-ethical and environmental responsibilities.