



Courses	Level of studies	SEMESTER	Number of hours taught	Number of ECTS delivered	Synopsis
Discrete-event simulation	Master academic studies	1 - Fall Semester	16	NO ECTS	This course is devoted to discrete simulation, and more particularly stochastic discrete event simulation. Students will learn the main concepts and they will also use and develop simulation tools. Implementation problems including concerns of parallelism will be discussed and practiced on a local computing grid.
High performance computing	Master academic studies	1 - Fall Semester	20	NO ECTS	High Performance Computing (HPC) has moved from a selective and expensive endeavor to a cost-effective technology within reach of virtually every budget with the arrival of many cores processors. The purpose of this course is to present the main concepts of HPC: computing, storage and networking resources with their accompanying software and their deployment on various distributes architecture.
Case studies in decision analysis	Master academic studies	1 - Fall Semester	30	NO ECTS	Examples of problems: <ul style="list-style-type: none"> - Modeling with integer or binary variables - Dynamic programming - Lagrangian Relaxation - Branch and Bound Method - Gomory cuts method Case study
Optimization techniques for complex systems	Master academic studies	1 - Fall Semester	20	NO ECTS	Introduction to large-scale systems and examples: <ul style="list-style-type: none"> - Multicommodity flows and network problems - Decomposition of large-scale problems - Decentralized decision-making - Decomposition Vs Complexity
Datamining and learning	Master academic studies	1 - Fall Semester	30	NO ECTS	Intoduction to Machine Learning and Data Mining: <ul style="list-style-type: none"> - Theoretical approach of induction - Data preprocessing (Feature selection or reduction, Instance selection, ...) - Learning by exploration (Case-Base Learning, or Concept lattices-based learning, ...) - Learning by optimisation (Decision tree, Neural Networks, HMM, or Bayes Networks, ...) - SVM or Reinforcement Learning - Ensemble methods - Active or Proactive Learning - Incremental and Online Learning - Clustering - Association rules and Sequential patterns - Machine Learning and Data mining tools



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Manufacturing systems modeling and logistics	Master academic studies	1 - Fall Semester	24	NO ECTS	<ul style="list-style-type: none"> • Supply Chain Management Fundamentals • Master Scheduling and Forecasting • Inventory Management, MRP and Capacity Planning • Production Scheduling, Implementation and Shop Floor Control
Database management	Master academic studies	2 - Spring Semester	30	NO ECTS	<p>What's a DBA ?</p> <ul style="list-style-type: none"> - Internal architecture: the case of the DBMS Oracle - Instance creation and management - Physical storage and administration of databases - Introduction to database tuning - Database security - Backup and recovery - Query execution and optimization
Information Integration	Master academic studies	2 - Spring Semester	20	NO ECTS	<ul style="list-style-type: none"> • Introduction to information integration • Basic issues • Mediation-based approaches • Query answering in mediation-based systems • Research issues
Network security	Master academic studies	2 - Spring Semester	30	NO ECTS	<ul style="list-style-type: none"> • introduction to security • fundamental security algorithms • securisation of the network architecture • securisation of the lower layers - securisation of the upper layers • SET (secure electronic transactions)
Wireless sensor networks	Master academic studies	2 - Spring Semester	14	NO ECTS	<ul style="list-style-type: none"> • Introduction • Key features of wireless technologies • Wireless network architecture • Wireless routing algorithms • Different wireless networks: IEEE Standard • Wireless sensor network applications
Invited professor lectures - Industry 4.0	Master academic studies	2 - Spring Semester	20	NO ECTS	<ul style="list-style-type: none"> • Research and Development. • Industrial perspectives • Product life cycle management • Product life cycle quality assurance • Product life cycle efficiency • Success factor innovation • Process automation security • Technology transfer