

### Discrete and Continuous Systems Optimisation



ECTS
5 crédits



Hourly volume

## Introducing

### Description

### **Objectives**

At the end of this module, the student will have understood

and be able to explain (main concepts):

- different approaches to analyse, evaluate the performance of discrete event systems through different

models (deterministic or stochastic, graphs) and to optimise them (linear programming)

- the optimisation methods for continuous systems :
- -static (first and second order conditions)
- dynamic (dynamic programming)
- their applications to optimal or model predictive control mainly for linear systems

The student will be able to:

- to analyse, model and solve an optimization problem of

discrete systems by a linear programming or a graph, by

applying relevant algorithms (simplex, usual graphs and

networks algorithms, combinatorial optimization)

- to model and to characterize: stationary Makovian processes with discrete state space (chains) and continuous or discrete time, queuing systems, to

#### analyse

their transient and stationary behaviours, to evaluate their

performances

- to model a discrete event systems by Petri nets and to analyse the properties by enumerative and structural approaches.
- to formalise and solve a quadratic criterion, nonlinear,

without or with constraints optimisation problem in the

of systems with real variables

-to develop and design an optimal control law (LQG) for a

linear or linearized process.

### Necessary prerequisites

Linear algebra ¿ Probabilities ¿ Dynamic systems (state concept) - Basic elements in logic systems and Petri nets.

### Évaluation

L'évaluation des acquis d'apprentissage est réalisée en continu tout le long du semestre. En fonction des enseignements, elle peut prendre différentes formes : examen écrit, oral, compte-rendu, rapport écrit, évaluation par les pairs...





# Practical info

## Location(s)



Toulouse

