

IDENTIFICATION

Course code : E2CP418
ECTS : 3

DURATION

Lectures : 14
Tutorial classes : 24
Labs : 0
Total : 38

Project :
Personnal work :

ASSESSMENT

2 Written exams (1h/1h)

TEACHING MATERIALS

Course slides + TD handouts + TP handouts available on Moodle

LANGUAGE

English

CONTACT

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UE : INFORMATIQUE

COURSE : Mathematics for Computer Science

SCOPE OF THE COURSE

OBJECTIVES

Provide engineering students with the essential mathematical foundations required to solve common problems across all optimization domains in computer science.

COMPETENCE AND SKILLS

- Ability to model a real-world problem (logistics, networks, machine learning, etc.) as an optimization problem (choice of variables, objective function, constraints) and express this model in appropriate mathematical language.
- Master discrete/combinatorial optimization issues : modeling via linear programming, integer programming, graphs, flows.
- Analyze the algorithmic complexity of optimization problems and distinguish easy vs. hard cases (e.g., NP-complete, pseudo-polynomial).

PROGRAM

- Mathematical modeling of optimization problems.
- Graph Theory.
- Landau notation and complexity theory.
- Linear optimization (linear programming, ILP, gradient descent).
- Dynamic programming.

BIBLIOGRAPHY

An Introduction to Linear Programming and Game Theory, Third Edition (2008)
- Paul R. Thie, G. E. Keough - Wiley

REQUIREMENTS

Set theory and algebra