Université Paris-Saclay
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M2 Optimization

Master's degree
Specialisation Mathematics and applications
Enrolment type
Formation initiale
Language(s) of instruction
English

Optimization is a field at the crossroads of mathematics, computer science, and economics, whose importance is steadily growing both academically and in its applications to socio-economic problems. The M2 program *"Optimization, Games, and Control"* covers all components of optimization in a broad sense, with particular focus on those specific to the research context of the Saclay area.

The program is organized into three trimesters of coursework, followed by a long internship in an academic or industrial research laboratory. The topics covered are diverse: optimal control (discrete and continuous time, deterministic and stochastic), game theory (theory, modeling in economics and networks), calculus of variations (and more generally optimization in analysis and PDEs), stochastic optimization and stochastic methods for optimization, operations research. A significant portion of the courses is shared with other tracks and specializations in mathematics, computer science, and economics.

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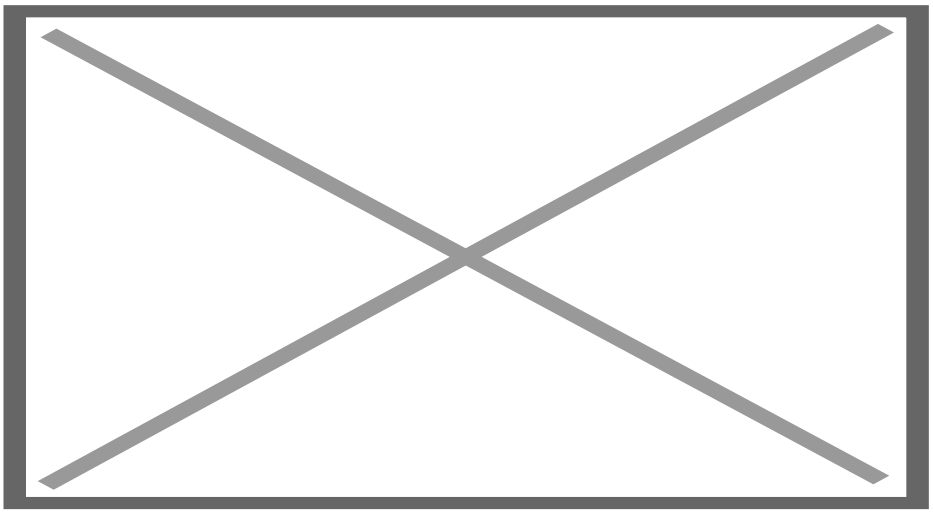

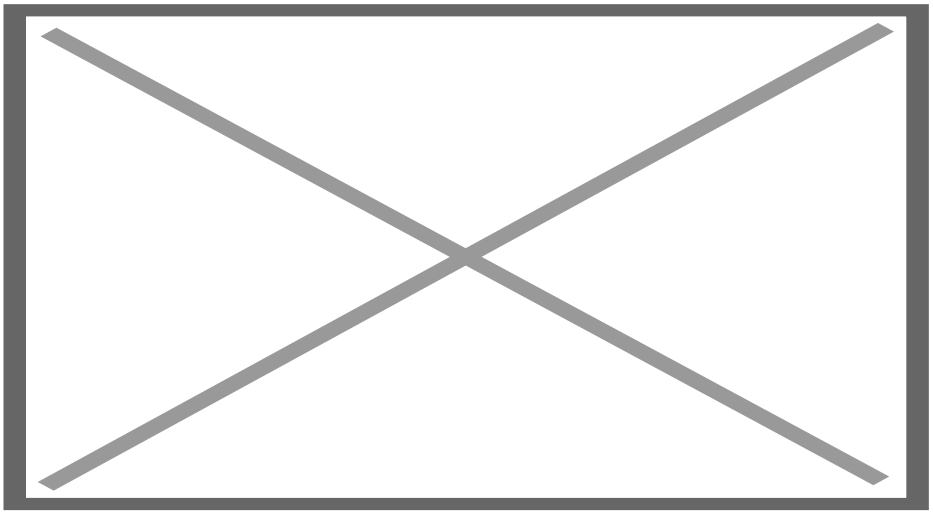

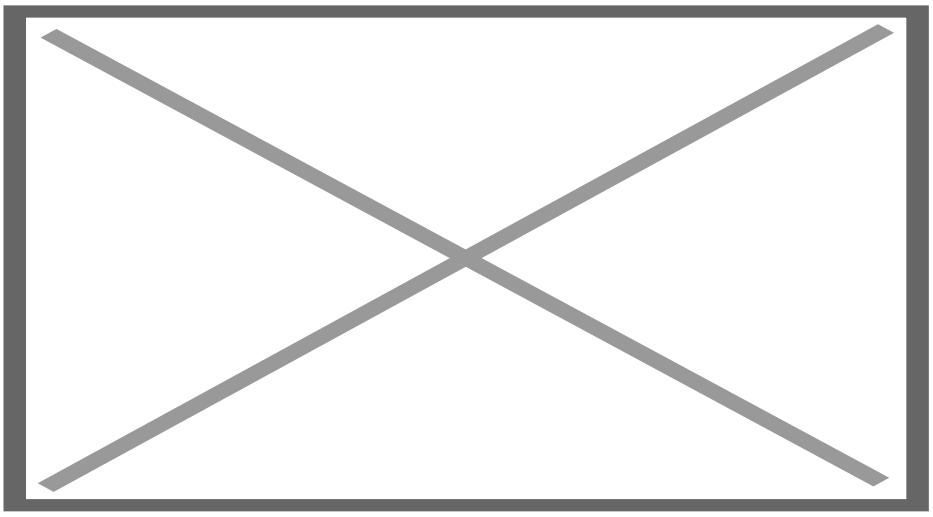

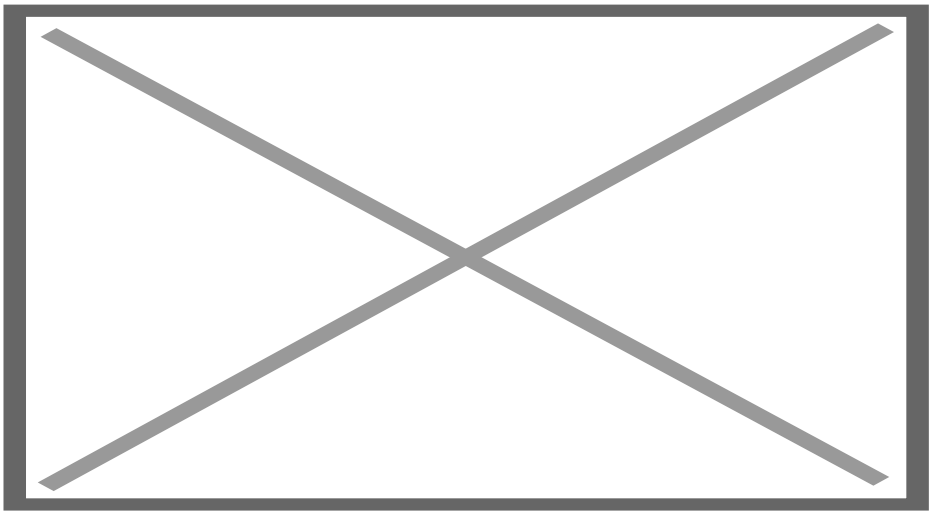

Information

- Overview
- Application requirements
- Schedule

Présentation

Skills

Understand and mathematically model a problem in order to solve it

Objectives

The M2 program "Optimization, Games, Control" aims to provide students with a solid foundation in both the theoretical and numerical aspects of mathematical optimization, covering topics from fundamental principles to advanced research developments. The program trains students to understand, model, and solve complex problems at the interface of mathematics, computer science, and economics. By combining rigorous theory with practical applications in areas such as optimal control, game theory, calculus of variations, machine learning, and PDE methods, it prepares graduates for cutting-edge research and high-level careers in both academia and industry.

Calendar

Start of programme (indicative date)
31/08/2026
End of programme (indicative date)
17/09/2027
Admission

Capacity

Available Places

30

Target Audience and Entry Requirements

M1-level in mathematics or applied mathematics.

Période(s) de candidature

Inception Platform

From 01/03/2026 to 17/07/2026

Supporting documents

Compulsory supporting documents

Motivation letter.

All transcripts of the years / semesters validated since the high school diploma at the date of application.

Curriculum Vitae.

Additional supporting documents

Supporting documents (TOEFL, TOEIC, certificate of a teacher ...) of a level of a foreign language.

VAP file (obligatory for all persons requesting a valuation of the assets to enter the diploma).

Document indicating the list of local M2 choices available here : https://urlz.fr/i3Lo.

Supporting documents :
- Residence permit stating the country of residence of the first country
- Or receipt of request stating the country of first asylum
- Or document from the UNHCR granting refugee status
- Or receipt of refugee status request delivered in France
- Or residence permit stating the refugee status delivered in France
- Or document stating subsidiary protection in France or abroad
- Or document stating temporary protection in France or abroad.

Programme

Subjects	ECTS	Semester	Lecture	directed study	practical class	Lecture/directed study	Lecture/practical class	directed study/practical class	di le
Theoretical aspects of linear programming	5	Semester 1	30						
Charger le détail									
Advanced game theory and applications	5	Semester 1	30						
Charger le détail									
Théorie des Jeux	5	Semestre 1	30						
Charger le détail									
Dynamic programming	5	Semester 1	30						

Subjects	ECTS	Semester	Lecture	directed study	practical class	Lecture/directed study	Lecture/practical class	directed study/practical class	di le
Charger le détail Stochastic optimization	5	Semester 1	30						
Charger le détail Derivative-free optimization	5	Semester 1	30						
Charger le détail Tropical algebra, optimization and games	5	Semester 1	30						
Charger le détail Introduction à la recherche opérationnelle	5	Semestre 1	24						
Charger le détail Optimal control of ODEs	5	Semester 1	30						
Charger le détail Convex analysis and optimisation	5	Semester 1	30						
Charger le détail Calculus of variations and geometric measure theory	5	Semester 1	30						
Charger le détail									

Subjects	ECTS	Semester	Lecture	directed study	practical class	Lecture/directed study	Lecture/practical class	directed study/practical class	distan learn cour
Internship or Report	21	Semester 2							
Charger le détail									

Subjects	ECTS	Semester	Lecture	directed study	practical class	Lecture/directed study	Lecture/practical class	directed study/practical class	di le c
Sequential Learning, Optimization, and Games	4	Semester 2	20						
Charger le détail									
Mean-field games	3	Semester 2	15						
Charger le détail									
Transport optimal	3	Semestre 2	18						
Charger le détail									
Geometric control	3	Semester 2	18						
Charger le détail									
Cours invité PGMO	2	Semestre 2	10						
Charger le détail									
Français Langue étrangère	2	Semestre 2	24						
Charger le détail									
Coooperative optimization and learning	3	Semester 2							
Charger le détail									
Algebra and geometry in optimization	3	Semester 2	18						
Charger le détail									

Teaching Location(s)

ORSAY
GIF SUR YVETTE
PALAISEAU

Academic Partner(s)

Polytechnique, ENSTA, CentraleSupélec

Training campus

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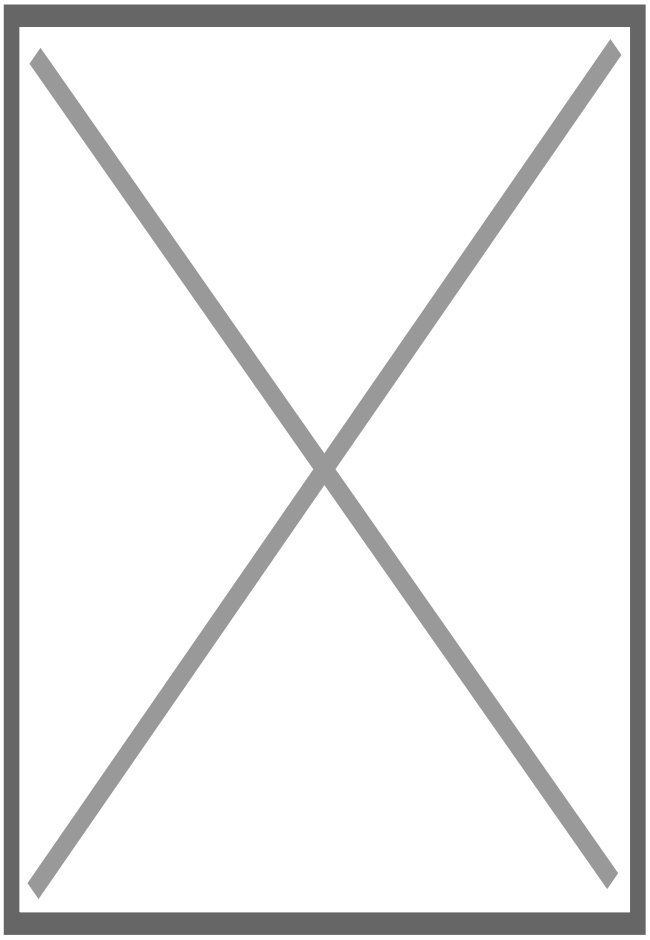

Orsay Bures

Orsay / Bures-sur-Yvette
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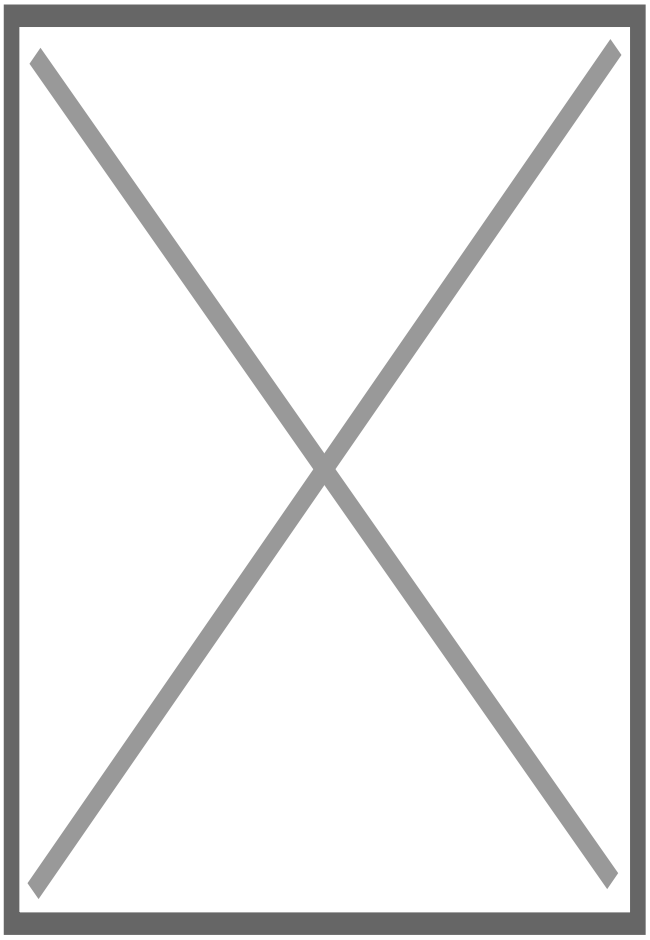
Voir
Library
Community center



Saclay Corbeville

Saclay / Palaiseau
Bus 4606, 4627, 5154, 9105, 9108
RER B Palaiseau, Palaiseau villebon ou Lozère
Voir
Student restaurant (CROUS)
Student residence
Sports facilities

Contact

- **Quentin Mérigot**

http://www.universite-paris-saclay.fr/formation/master/mathematiques-et-applications/m2-optimisation-jeux-et-controle