Université Paris-Saclay

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Add to Compare

M2 Systems and Synthetic Biology

Master's degree

Specialisations Biologie-AgroSciences | Biologie moléculaire et cellulaire

Enrolment type

Formation initiale

Formation continue

Language(s) of instruction

English

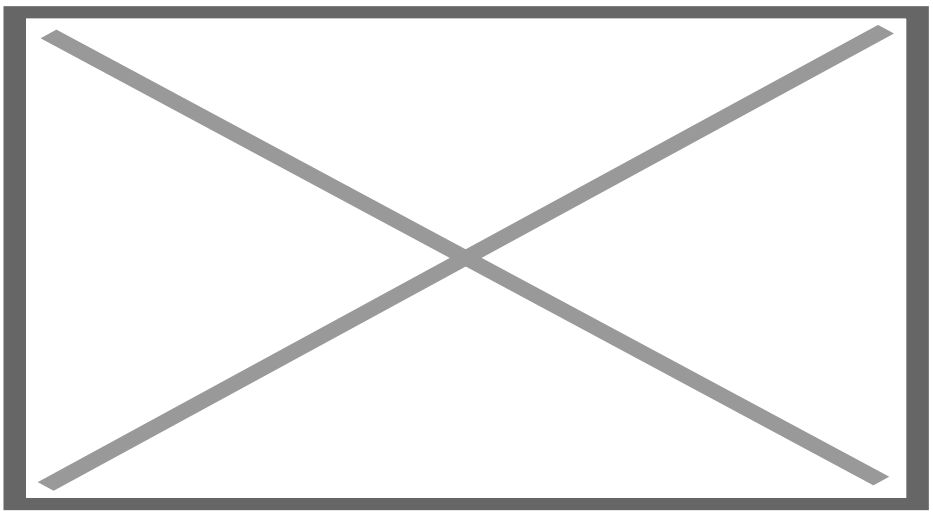
The vigorous development of Systems and Synthetic Biology constitutes a huge challenge that must be met both from the research and education perspectives. M2 SSB represents the first step towards nurturing a new brand of researchers and engineers to face up to the challenge.

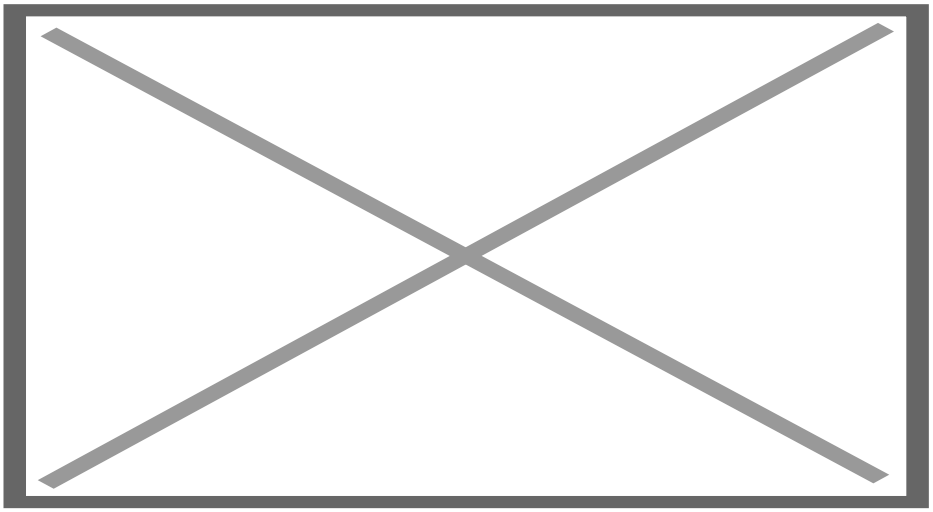
During the first semester, from September to end of January, students must attend 5 core compulsory modules and 5 elective modules (chosen among 12), for a total of 30 European Credits (ECTS). Refresher courses in either biology or mathematics and computer science are also proposed.

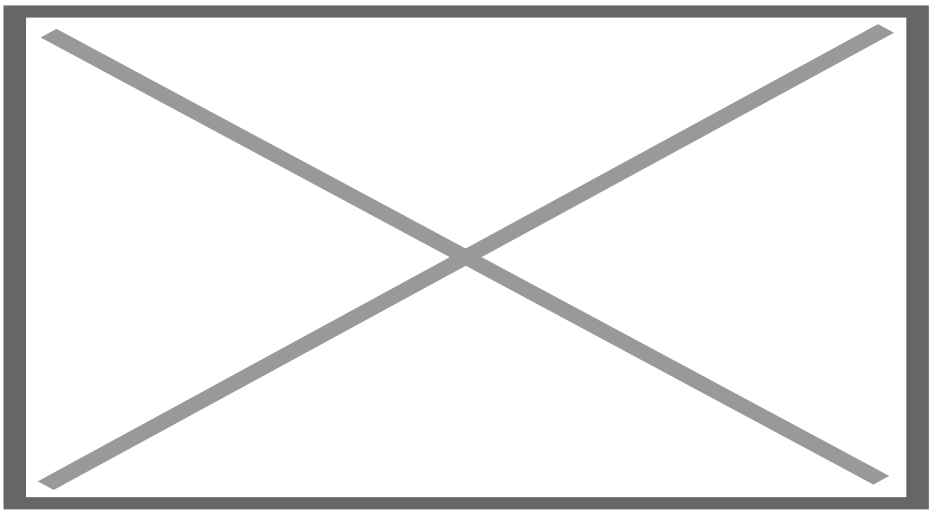
The second semester, from February to end of July, consists in a 6–months research training. Students may perform this internship in one of the academic laboratories or biotechnology companies located on site or elsewhere in France or abroad.

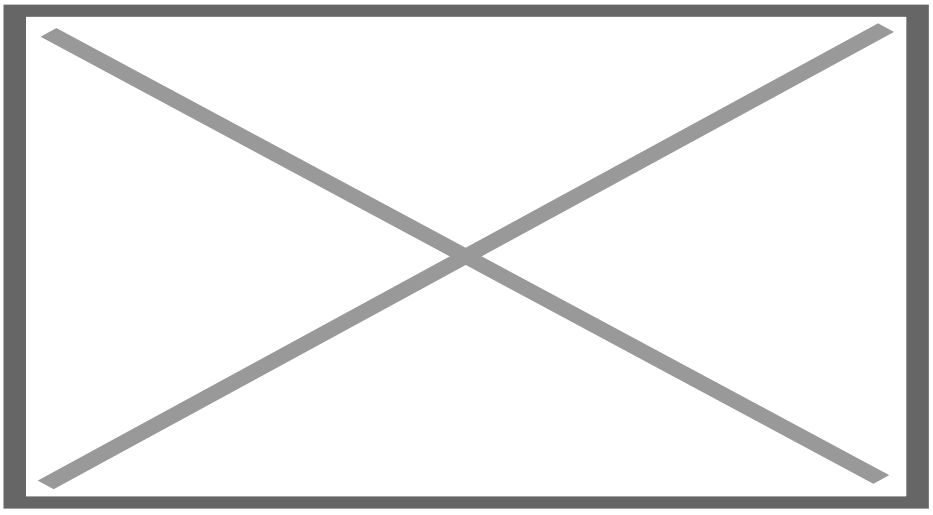
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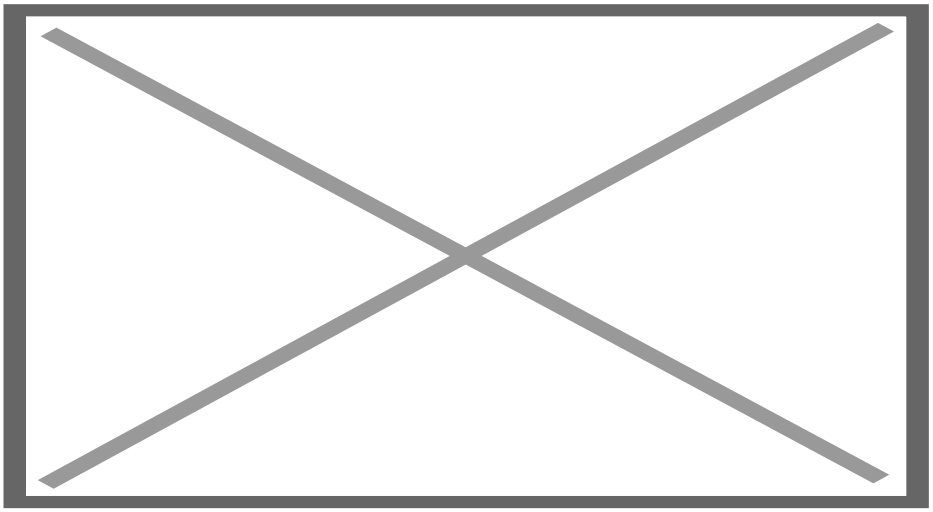
Apply Now











Information

- Overview
- Application requirements
- Schedule

Présentation

Skills

- Apply engineering approaches to biology.
- Design, model and predict the behavior of biological synthetic parts, circuits and chassis.
- Recommend and execute experimental plans to engineer and test synthetic biological systems.
- Integrate concepts and technologies across disciplinary boundaries.
- Conceive and develop collaborative research work within interdisciplinary teams with applications in Systems & Synthetic Biology (iGEM).
- Anticipate the economical and societal challenges of synthetic biology to plan future career paths.

Objectives

The aim of M2 SSB is to provide students from the Life Sciences, Mathematics, Engineering, Chemistry, Physical and Computer Sciences a mean to fruitfully engage in collaborative work across disciplinary boundaries, with applications in Systems & Synthetic Biology. Students undertaking the course will gain hands-on experience in experimental biology, modeling and designing. They will also enhance transversal capacities including planning a project, giving a seminar, perceiving the industrial, economical and ethical issues associated with these developing fields.

Débouchés

Career prospects

After a Master's or Master's + PhD: engineer (R&D, control, production, etc.)
After a Master's or Master's + PhD: researcher or lecturer
After a Master's or Master's + PhD: engineer (research and development, control, production, etc.) in the fields of health, pharmaceuticals, agri-food, biotechnologies, instruments and reagents, cosmetics, pollution control and the environment.
Sectors of activity: fundamental or applied research in Biology, Health or Ecology in academia or the private sector
After a Master's + PhD: researcher or lecturer
After a Master's or Master's + PhD: engineer (Research & Development, control, production, etc.)
Design/research engineer in an R&D department in the ophthalmic industry
After a Master's degree: Data scientist
After a Master’s degree: Research analyst
R&D Engineer
R&D Project Manager
R and D Project Manager
Project Manager
Design engineer in the industrial sector
Design engineer in the research / scientific sector
Design engineer industry / public research
Academic staff
Design Engineer
Research & Development Engineer
Research and Innovation Manager
Project Manager

Production Engineer
Project manager in biotechnologies, biotherapies or healthcare innovation
Research & Development Engineer
Private-sector companies, including agricultural production
Manufacturing Process (CAM) Technician
Production Technician
Product Development Technician
Laboratory Manager
Research or Design Engineer
Research professions
Lecturer (after a PhD)
Design Engineer
Research Engineer
Design Engineer
Research Engineer
Development Engineer

Further Study Opportunities

Biology-Agrosciences
PhD in Chemistry / Biology
PhD in Bioinformatics
PhD
Interdisciplinary PhD in Sustainability Science (many disciplines possible)
PhD thesis
Students with a 2nd year Master's degree have the possibility to pursue doctoral research.
Engineering, research and development
Data Scientist, Data Analyst, Ingénieur·e en Machine Learning dans des secteurs innovants (tech, finance, santé, énergie, etc.) ;
R&D researcher or data modelling and analysis expert in leading-edge companies or laboratories.

Admission

Admission Route

Life Sciences

Capacity

Available Places

15

Target Audience and Entry Requirements

Applicants may come from Universities or from Engineering schools. After a first year of master (M1), or an equivalent qualification (4 years of successful higher education after finishing high-school), in either Biology, applied Mathematics, Computer Science, Chemistry or Physics. Bi-disciplinary curriculums including biology is favored, but highly-achieving and motivated students in any of the cited disciplines can apply.

Période(s) de candidature

Inception Platform

From 21/01/2026 to 04/07/2026

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

Letter of recommendation or internship evaluation.

or the names and addresses of 2 referees

Document at your convenience.

any other document that you consider important for the evaluation of your application

Every documents and achievements which could support the candidacy (report, case study, partnership prospectus, event creation, etc.).

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

Recommendation letters.

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
Introduction to Biology Charger le détail	0	Semester 1	16	16	8			
Introduction to Mathematics and Computer Science for Biology Charger le détail	3	Semester 1	15	7.5				
Advanced introduction to Mathematics and Computer Science for Biology Charger le détail	0	Semester 1	7.5	10				
Innovation and entrepreneurship in biotechnology (IEB) Charger le détail	3	Semester 1	22.5					

Subjects	ECTS	Semester	Lecture	directed study	practical class	Lecture/directed study	Lecture/practical class	directed study/practical class	di le c

Biological Parts and Devices	3.5	Semester 1	11	9				
Charger le détail								
Genome Engineering	3.5	Semester 1	11		9			
Charger le détail								
Metabolic Engineering	3.5	Semester 1	12	8				
Charger le détail								
Synthetic Biology Practical Course	5	Semester 1			45			
Charger le détail								
Biosafety and Epistemology Questions on Synthetic Biology	2	Semester 1	10					
Charger le détail								

Subjects	ECTS	Semester	Lecture	directed study	practical class	Lecture/directed study	Lecture/practical class	directed study/practical class
Cell Factory Design	2.5	Semester 1	11	3	6			
Charger le détail								
Chips for Molecular Evolution	2.5	Semester 1			20			
Charger le détail								
Computational DNA Nanotechnology	2.5	Semestre 1	18					
Charger le détail								
Computational Protein Design	2.5	Semester 1	12	8				
Charger le détail								

Subjects	ECTS	Semester	Lecture	directed study	practical class	Lecture/directed study	Lecture/practical class	directed study/practical class
Machine Learning in Synthetic Biology and Metabolic Engineering	2.5	Semester 1	20					
Charger le détail								
Environmental Biotech and Upstream Processing	2.5	Semester 1	20					
Charger le détail								
Downstream Processing for Industrial Biotechnologie	2.5	Semester 1	9	6				
Charger le détail								
Nanobiology	2.5	Semester 1	12		8			
Charger le détail								
Network Systems: Modeling and Analysis	2.5	Semester 1	20					
Charger le détail								
Rational Protein Engineering	2.5	Semester 1			20			
Charger le détail								
Experimental Design and Statistical Analysis for Next Generation Sequencing	2.5	Semester 1	10	10				
Charger le détail								
Cell-Free Systems	2.5	Semester 1	8		12			
Charger le détail								

Subjects	ECTS	Semester	Lecture	directed study	practical class	Lecture/directed study	Lecture/practical class	directed study/practical class	distan learn cour
Research Internship	30	Semester 2							

Charger le détail

Teaching Location(s)

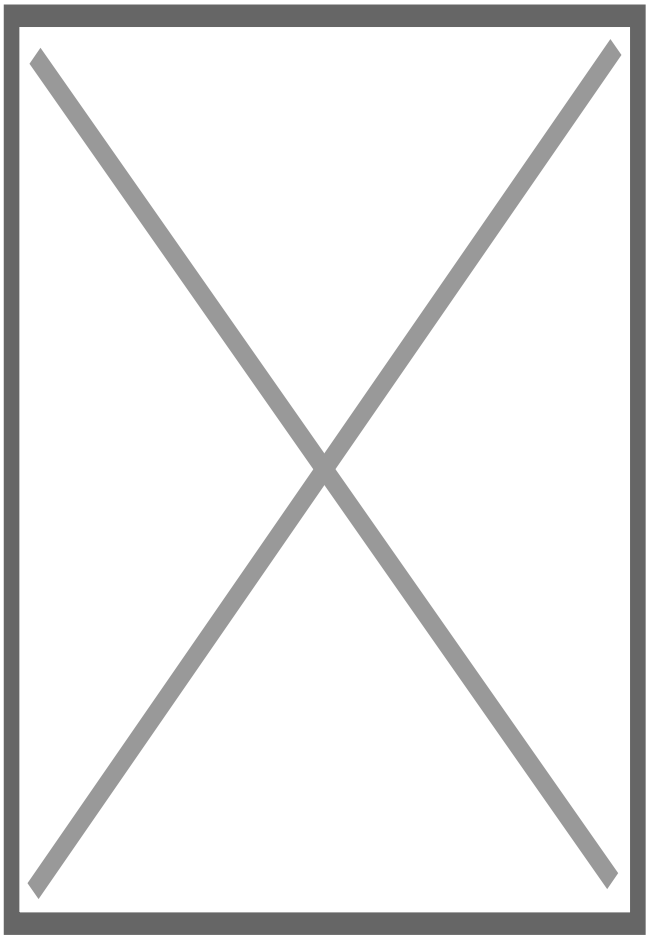
EVRY

Academic Partner(s)

Univ. Evry Paris-Saclay, AgroParisTech, CentraleSupelec, Univ Paris-Saclay

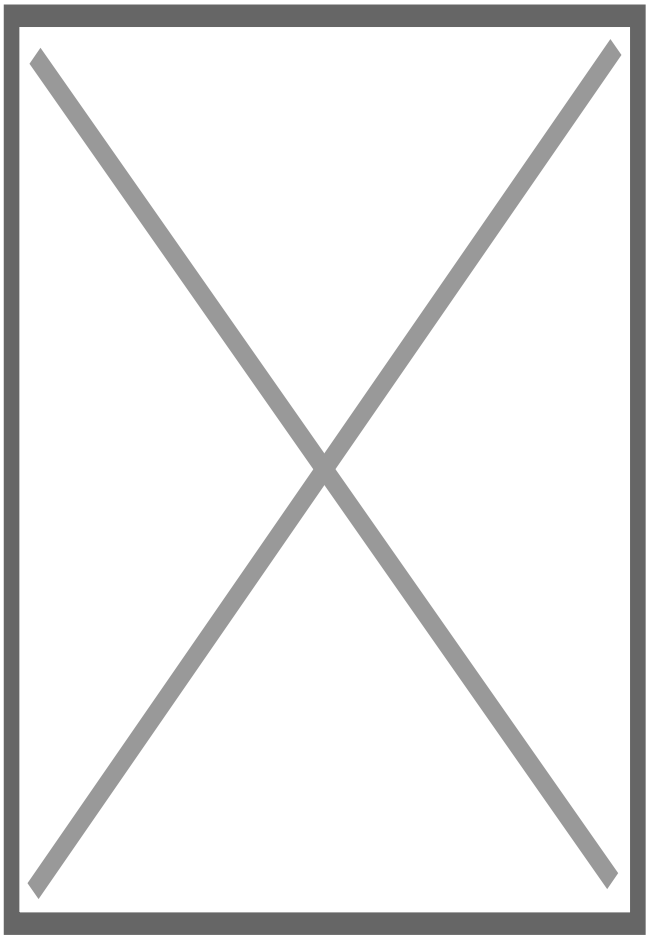
Training campus

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Saclay Moulon

Saclay / Gif-sur-Yvette / Orsay
Bus 4606 / 4609 / 4611 / 5154
RER B Le guichet
Voir
Student restaurant (CROUS)
Library
Sports facilities
Student residence



Evry

Evry
Bus 9105, 4504
RER D Evry Courcouronnes
Voir
Student restaurant (CROUS)
Library
Student residence
Sports facilities

Contact

- **Matthieu JULES**
- **Jean-Loup Faulon**
- **Ioana POPESCU**

http://www.universite-paris-saclay.fr/formation/master/biologie-agrosciences/m2-systems-and-synthetic-biology-ssb