Master Optique, Image, Vision, Multimédia Parcours Intelligent Photonics for Security Reliability Sustainability and Safety (iPSRS)

Diplôme Master
Domaine d'étude Sciences, Technologies, Santé
Parcours Intelligent Photonics for Security Reliability Sustainability and Safety (IPSRS)

Objectifs

Le programme de Master conjoint Erasmus Mundus iPSRS (Intelligent Photonics for Security, Reliability, Sustainability and Safety) est une initiative visant à tirer parti des synergies entre la photonique et l'intelligence artificielle (IA) pour répondre aux défis sociétaux et industriels actuels et futurs.

Coordonné par l'Université Jean Monnet (UJM) à Saint-Étienne, ce programme est aussi dispensé par l'Université d'Eastern Finland (UEF), l'Université de Vilnius (VU) en Lituanie et l'Université Paris-Est Créteil (UPEC) en France et implique de nombreux partenaires associés tant académiques qu'industriels.

Il est conçu pour offrir aux étudiants une formation inégalée en « photonique intelligente », domaine qui allie les technologies de pointe utilisant la lumière et les ondes à la puissance de l'IA pour le traitement de grands volumes de données. La formation couvre les sujets fondamentaux autant que les applications et s'appuie sur des cours, des projets, des séminaires et des stages. Les étudiants acquerront ainsi des connaissances à l'état de l'art, une expérience pratique précieuse en industrie et en laboratoire de recherche et des opportunités de réseautage. L'objectif du consortium est de préparer les futurs ingénieurs et chercheurs à exceller dans des domaines en évolution rapide stimulant l'innovation et les avancées technologiques.

English
The Erasmus Mundus Joint Master (EMJM) programme iPSRS (Intelligent Photonics for Security, Reliability, Sustainability and Safety) is an initiative aimed at harnessing the synergies between photonics and artificial intelligence (AI) to meet current and future societal and industrial challenges.

Coordinated by the Université Jean Monnet (UJM) in Saint-Étienne, the programme is also delivered by the University of Eastern Finland (UEF), the University of Vilnius (VU) in Lithuania and the Université Paris-Est Créteil (UPEC) in France, and involves numerous associated partners from both academia and industry.

It is designed to offer students unrivalled training in 'intelligent photonics', a field that combines cutting-edge technologies using light and waves with the power of AI to process large volumes of data. The course covers fundamental subjects as well as applications, and is based on courses, projects, seminars and placements. Students will acquire state-of-the-art knowledge, valuable practical experience in industry and research laboratories and networking opportunities. The consortium's objective is to prepare future engineers and researchers to excel in rapidly evolving fields that stimulate innovation and technological advances.

Pour qui ?

Conditions d'admission

Les candidats doivent être titulaires d'une Licence (ou de tout diplôme de premier cycle reconnu au niveau national et équivalent à 180 ECTS), de préférence dans les domaines de l'ingénierie, de l'informatique ou de la physique. Bien que cette condition doive nécessairement être remplie au moment de l'inscription, le consortium accepte les candidatures d'étudiants en dernière année de leur diplôme de licence au moment de la candidature. Les candidats devront démontrer lors de leur candidature une compétence en anglais équivalente au niveau B2 du Cadre européen commun de référence pour les langues (CECR).

Pour candidater, merci de vous rendre uniquement sur la plateforme des masters internationaux dédiée

English
Applicants must hold a BSc (or any nationally recognised first cycle degree equivalent to 180 ECTS), preferably in the fields of engineering, computer science or physics. While this condition must necessarily be fulfilled at the time of enrolment, the consortium accepts applications from students in the last year of their BSc degree at the time of application. Applicants will have to demonstrate during application an English language proficiency equivalent to level B2 in the Common European Framework of Reference (CEFR).

You may apply to this master degree only on the international master platform

Et après ?

Poursuites d'études

Le parcours iPSRS est conçu pour répondre aux besoins et aux défis des industries. Il ouvre également sur des opportunités de carrières internationales et stimulantes, puisque le besoin d'étudiants diplômés de master avec une double compétence en photonique et en intelligence artificielle est croissant sur le marché international du travail. Les étudiants ont aussi l'opportunité de poursuivre leurs études en doctorat.

> Préparer sa candidature en master

English
iPSRS opens up for international and challenging career opportunities, the demand for postgraduates with double skills in photonics and artificial intelligence or micro-nano-technologies being very high on the international job market. This master programme also qualifies the postgraduates for PhD studies.
https://www.master-photonics4security.eu/

Programme

SEMESTER 7 - Jean Monnet University - FRANCE

August to early January
Jean Monnet University (UJM)
Campus Manufacture
ECTS 30

Core Teaching Modules: ECTS 30

Major units: ECTS 20

- Physical and Fourier Optics: ECTS 5
  1. Physical and Fourier Optics: ECTS 3
  2. Digital Holography: numerical simulation & reconstruction: ECTS 2
- Scientist of Tomorrow: ECTS 5
  1. Industrial and Research Workshop: ECT 1
  2. Energy and environnement workshop: ECTS 2
  3. Scientific methodology and project management: ECTS 2
- Digital Image Processing and Analysis: ECTS 5
- Algorithmic and Programming (Python): ECTS 5

Elective units, select among the following 10+ ECTS

- Digital Innovation and Entrepreneurship: ECTS 5
- Lasers: ECTS 5
  1. Laser physics: ECTS 4
  2. Fiber lasers: ECT 1
- Scientific Computing with Python: ECTS 2
- Optical Engineering: ECTS 3
- Data Analysis: ECTS 6
- Introduction to guided optics: ECTS 2

Extra credits, select among: ECTS 2

- English language and culture: ECTS 2
- French language and culture: ECTS 2

SEMESTER 8 - University of Eastern Finland - FINLAND

January to June
University of Eastern Finland (UEF)
ECTS 30

Core Teaching Modules: ECTS 30

Major units: ECTS 15

- Photonics laboratory: ECTS 8
- Light and Matter: ECTS 4
- Technologies in energy production and storage: ECTS 3

Elective units, select among the following: 15+ ECTS

- Material physics: ECTS 4
- Micro- and nanophotonics: ECTS 4

- Color Science: ECTS 4
- Basics of Signal and image Processing: ECTS 5
- Commercializing high-tech (only odd years): ECTS 4
- Advanced Biomedical Optics (only even years): ECTS 4
- Optical Design: Geometrical Optics): ECTS 4
- Components for Optical Telecommunications: ECTS 4
- Display Technologies: ECTS 5

Optional extra-credits:

- Finnish language: ECTS 2
- Participation in a scientific workshop/conference/event: ECTS 1-3
- Summer internship (3 months from March to August): ECTS 5

SEMESTER 9 - Jean Monnet University - FRANCE

September to February
Jean Monnet University (UJM)
Campus Manufacture
Spec. Photonics & Machine Learning
ECTS 30

Core Teaching Modules: ECTS 30

Major units: ECTS 20

- Micro-nanophotonics 2: ECTS 6
  1. Electromagnetic modeling of micro-nano-structured surfaces: ECTS 3
  2. Nanoplasmonics applications of micro-nano- photonics: ECTS 2
  3. Applications of micro-nanophotonics: ECT 1
- Advanced Photonics: ECTS 5
  1. Non-linear Optics: ECTS 2
  2. Quantum Light sources for secure communications in photonics: ECTS 3
- Deep learning and applications to nano-photonics: ECTS 5
- COIL Project (collaborative, online, international leraning project with students from UPEC&VU) : ECTS 4

Elective units, select among the following: 10+ ECTS

- Environmental Remote Sensing: ECTS 5
- Laser Processing and characterization: ECTS 6
  1. Laser processes for material structuring: ECTS 2
  2. Temporal and spatial shaping of the laser pulse: ECT 1
  3. Analytical instrumentation: ECTS 3
- Image-based security: ECTS 5
  1. Color reproduction: ECT 1
  2. Security printing project: ECT 1
  3. Security Printing: ECTS 2
  4. Visual Cryptography: ECT 1
- Colour and spectral imaging: ECTS 5
- Advanced Image Processing: ECTS 5
  1. Markovian models: ECTS 2
  2. Deconvolution: ECTS 3

Extra credits:

- French or English language and culture: ECTS 2
- Scientific Workshop: ECTS 2

SEMESTER 9 - Paris-Est Créteil Val de Marne University - FRANCE

September to February
Paris-Est Créteil Val de Marne University (UPEC)
Spec. Biometrics and Intelligent Vision
ECTS 30

Core Teaching Modules: ECTS 30

Major units: ECTS 30

- Biometrics II: ECTS 6
- Computer vision and machine learning: ECTS 6
- Artificial intelligence and innovation workshop: ECTS 6
- Research and professional culture: ECTS 3
- Emerging Technologies (VAR): ECTS 3
- Project III: ECTS 6
  1. Local Project: ECTS 2
  2. COIL Project: ECTS 4

Extra-curriculum credits:

- Software Integration: ECTS 6
- French language and culture: ECTS 2

SEMESTER 9 - Vilnius University - LITHUANIA

September to February
Vilnius University (VU)
Spec. in Condensed Matter Photonics
ECTS 30

Core Teaching Modules: ECTS 30

Major units: ECTS 20

- Renewable energy solutions: ECTS 5
- Scientific Project: ECTS 10
  1. Research Activities: ECTS 6
  2. COIL: ECTS 4
- Semiconductor optics: ECTS 5

Elective units, select among the following: 10+ ECTS

- Advanced methods of microscopy: ECTS 5
- New materials and technologies: ECTS 5
- Methods of data analysis: ECTS 5
- Technologies of organic optoelectronics: ECTS 5
- Solid-state lighting technology: ECTS 5
- Physics and technology of disordered materials: ECTS 5

Extra credits:

- Lithuanian language and culture: ECTS 2
- Participation in a scientific conference/event (optional, in connection with the the compulsory course Scientific Project course): ECTS 2

SEMESTER 10

February to August
ECTS 30

Master's Thesis (company or research center): ECTS 30

Coût de l'inscription

9000€

Détail coût d'inscription

9 000 € par année universitaire
Possible exonération des frais d'inscription à 100 % quelle que soit la nationalité.
80 bourses EMJM (1400 € par mois pendant 2 ans) proposées aux meilleurs étudiants sur la période 2024-2030).

9000€ per year
-100% fee-waiver is possible whatever the nationality
80 EMJM scholarships (1400€ per month for 2 years) delivered to the best ranked students between 2024 and 2030.

Contact

Contact(s) scolarité

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