

4 WEEKS
AT CLA
UNIVERSITÉ
MARIE ET
LOUIS PASTEUR
BESANÇON
DIJON - BELFORT



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MICRO, NANO & SMART TECHNOLOGY

For industrial applications

The Center for Applied Linguistics (CLA) of Marie and Louis Pasteur University in Besançon has partnered with Campus France and the EIPHI Graduate School of Bourgogne Franche-Comté to offer a French + Sciences program in Besançon. The program provides linguistic, cultural and scientific immersion, with a focus on micro- and nanotechnology for industrial applications.

UNIVERSITÉ
MARIE & LOUIS
PASTEUR



Graduate school
eIPHI

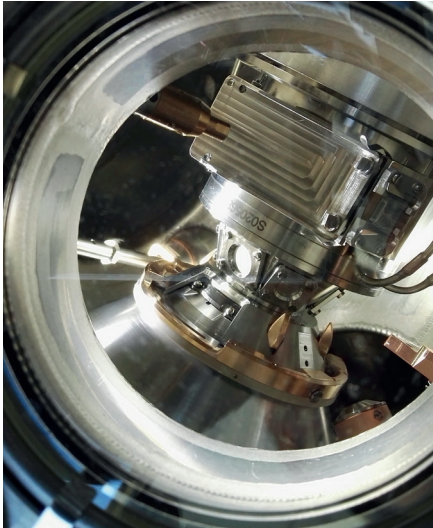
Designed for English-speaking science students, the program includes French as a Foreign Language (FLE) classes from A1 to B2 level, meetings with researchers, laboratory visits (including FEMTO-ST and ICB) organized by PhD students, as well as a wide range of excursions and cultural activities.

Founded in 1958, the CLA was one of the first university language centers to develop practical foreign language programs based on linguistics research applied to educational sciences and active learning methods.

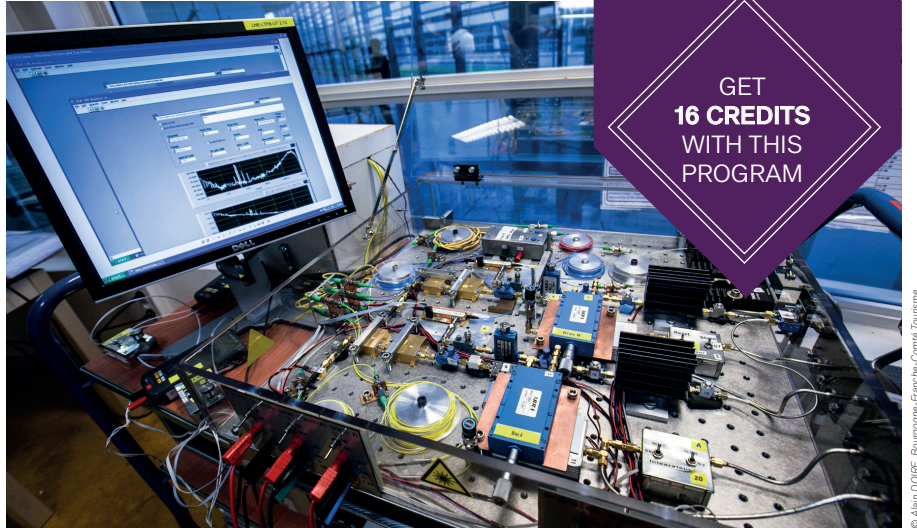
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PROGRAM



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With 2,000 international students each year, the CLA is the largest university language center in France. It has been awarded the highest level of the "Quality FLE" label granted by the French government.

The EIPHI Graduate School (Engineering and Innovation through Physical Sciences, High Technologies, and Cross-disciplinary Research) is responsible for the scientific component of the program. It is based on seven internationally recognized research laboratories: FEMTO-ST, ICB, IMB, UTINAM, ICMUB, IMVIA and LMB.

EIPHI offers international Master's and PhD programs in fields such as mathematics, physics, micro- and nanosciences and systems, computer science, mechatronics, materials science and energy. Research activities range from fundamental to applied research, generating regular socioeconomic impact. These institutes rely on high-level technologies, equipment and advanced technological platforms.

The Bourgogne-Franche-Comté region is a French Tech-labeled region, with three centers of excellence: HealthTech, IoT and FoodTech.



COURSE CONTENT

**30
HOURS
PER WEEK**

■ French as a foreign language: 15 hours per week

- > Acquisition of oral and written communication skills;

- > Development of intercultural competence.

■ Micro, Nano and Smart Technology: 15 hours per week

- > Introduction to 8 topics of scientific research in the Bourgogne Franche-Comté region;
- > Participation in tutorials and lab works;
- > Visits to state-of-the-art laboratories and meeting with

- researchers;
- > Cultural tours.

■ Student performance will depend on 3 points:

- > Quality of the student's weekly journal and subsequent progress report;
- > Degree of participation in program activities;
- > Progress in French as a foreign language.

Non-contractual program, subject to change. A minimum of 10 students is required.

Duration

4 WEEKS



Location

BESANÇON
BELFORT **DIJON**

PERIOD: June

French ⊕ Sciences & University housing

€1,960

4 WEEKS

AT CLA
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WEEK

1

MONDAY & TUESDAY

- > **Morning French class**
- > **Afternoon Challenges of Micro and Nano Systems:**
This course addresses the challenges of miniaturizing increasingly complex and powerful systems. From nanorobots capable of non-invasive surgery to smart mechatronic systems that are becoming part of everyday life, micro and nanostructures play a key role in upcoming industrial revolutions. Understanding and mastering manufacturing at these scales is a major challenge.
Students will visit the **MIMETO technological platform**.

WEDNESDAY & THURSDAY

- > **Morning French class**
- > **Afternoon Non-linear Fiber Optics:**
This dynamic research field covers applications ranging from high-bit-rate telecommunications to optical sources for material processing, environmental sensing and medicine. The course presents recent advances in nonlinear fiber optics, focusing on optical frequency combs with broad spectral ranges extending into the mid-infrared. These disruptive technologies enable remote detection of volatile compounds and medical diagnostics.
Visits to **FEMTO-ST research facilities** will be offered.

FRIDAY

- > **Morning French class**
- > **Afternoon Visit of UMLP-UTBM laboratories in the city of Belfort (FC-Lab and the Thermal Energy Laboratory)**

SATURDAY

- > Excursion to the **Haut-Doubs**: guided tour of the Château de Joux, lunch at a traditional Franche-Comté inn, boat trip on the Doubs River and visit to the Saut-du-Doubs waterfall at the Swiss border.



WEEK

2

MONDAY & TUESDAY

- > **Morning French class**
- > **Afternoon Artificial Intelligence & Complex Systems:**
This course explores the fundamentals of AI, machine learning, and deep learning, using concrete examples like image classification, while examining their societal applications, benefits, and challenges. A hands-on MNIST dataset tutorial concludes the session, providing practical insight into image classification.

WEDNESDAY & THURSDAY

- > **Morning French class**
- > **Afternoon Artificial Intelligence, Neural Networks & Quantum Computing:**
Conventional digital computing is reaching performance limits due to physical constraints and the limits of Turing computation. These challenges are especially significant for quantum simulations and neural network emulation. This course introduces quantum information processing and neural networks, highlighting their shared principles and relevance for future hardware.

FRIDAY

- > **Morning French class**
- > **Afternoon Evaluation**

SATURDAY & SUNDAY

- > **FREE WEEK-END:**
students are free to travel or to follow the organizers' activities in Besançon (Festival Grandes Heures Natures, visit of the Citadel, visit of the Arc-et-Senans historical site...)





WEEK

3

MONDAY & TUESDAY

- > Morning **French class**
- > Afternoon **Smart & Green Mechanics:**
This course focuses on innovative solutions for vibroacoustic control (NVH), structural health monitoring (SHM), shape control and energy harvesting. Topics include smart materials with multiphysical behavior, embedded sensors and actuators in acoustics, heat transfer and electromagnetics.

The program includes lectures, lab work and a visit to the **S.MART** technological platform.

WEDNESDAY & THURSDAY

- > Morning **French class**
- > Afternoon **Time-Frequency Metrology & Quantum Physics:**
France has long played a major role in time-frequency metrology. This course presents fundamental tools, state-of-the-art developments and key applications, including oscillators, atomic clocks (microwave and optical), quantum phenomena and superradiance.

FRIDAY

- > Morning **French class**
- > Afternoon **Evaluation**

SATURDAY

- > Excursion to **Lausanne (Switzerland)**

WEEK

4

MONDAY & TUESDAY

- > Morning **French class**
- > Afternoon **Innovative Drugs & Nanotechnologies:**
Nanoscience and nanotechnology have seen unprecedented growth in recent years. Their application to medicine is expected to significantly improve diagnosis and treatment through drug delivery systems, diagnostics, cell therapy and biocompatible materials. This course presents the state of the art and local research activities.
A visit to **ICB research facilities** will be offered.

WEDNESDAY & THURSDAY

- > Morning **French class**
- > Afternoon
Wednesday:
Micro, Nano and Soft Robotics Laboratory Visit
Thursday:
Clean Room Laboratory Visit

FRIDAY

- > Morning **French class**
- > Afternoon **Evaluation**

