



# Master

 Teaching in English

## Study at the Faculty of Physics and Engineering

Our faculty provides a comprehensive range of courses in the fields of physics and engineering sciences. These courses span a wide spectrum, covering the study of elementary particles, condensed matter, material-and nano-sciences, while also extending to applications in mechanics and electronics.

Teaching takes place across three distinct locations: the Historical Campus, the CNRS Campus in Cronenbourg, and the Technology Hall in Illkirch-Graffenstaden.

Our diverse training offers include approximately twenty degree programs, featuring alternatives such as work/study apprenticeship contracts, internships, international partnerships, and dual-qualifications with engineering schools.

What sets our program apart is its close affiliation with nationally and internationally acclaimed laboratories, as well as collaborations with the regional industrial sector.

This connection provides students with valuable opportunities for hands-on learning and professional experience and provides our faculty with significant visibility in the field of physics and engineering.

## Sciences and technology major in physics

### Quantum technologies European program | QTEP

**A training that trains highly qualified quantum physicists and technologists in one of the most dynamic high-tech fields for the industries of the future.**

This Master programme sits at the interface of physics and engineering, with elements of mathematics and computer science. It combines lectures, tutorials and advanced practicals spanning complementary fields such as quantum science, physics of devices, atomic, molecular and optical science, quantum information theory, quantum computing and applications.

The Master QTEP graduates thus acquire a broad corpus skills aligned with the European competence framework for quantum technologies and the needs of the growing quantum industry.

**European Master Certification in Quantum Technologies** : students will have the opportunity to participate to the European DIGIQ project which provides access to a European professional network, complementary courses, digital teaching modules, and international master internship in research laboratories in Europe.



[More information on physique-ingenierie.unistra.fr](https://physique-ingenierie.unistra.fr)

# Training

 **Duration of the course: 2 years**

## Programme and courses

### M1 (Taught in English)

#### Semester 1 (S1)

- Quantum mechanics and statistical mechanics (112h)
- Programming and actual research (58h)
- Experimental physics (60h)
- Project

#### 1 free UE + 2 optional courses (56h) :

- Mechanics of continuous media (in French)
- Astrophysical objects and their observations
- Group theory, Ionizing radiation and detection methods
- General relativity
- Direction of time & Advanced statistical mechanics
- Variational principles and analytical mechanics
- Elements of quantum theory of collisions
- Photonics for quantum science and technology
- Soft condensed matter

#### Semester 2 (S2)

- Nuclear physics and elementary particle-Solid state physics (112h)
- Computer programming and numerical simulations (22h)
- Laboratory physics (16 days)
- Project

#### 1 free UE + 1 optional course (56h) :

- Particles and astroparticles
- Stellar physics
- Atomic and molecular physics
- Intro. to physics of living systems
- Relativistic quantum mechanics
- Numerical methods in physics
- Electronics for quantum science and technology
- Critical phenomena and non-equilibrium statistical physics

### M2 (Taught in English)

#### Semester 3 (S3)

- Quantum physics of devices & sensors
- Quantum technology and applications
- Advanced Laboratory Practicals

#### 1 free UE + 4 optional courses (80h) :

- Hybrid quantum devices
- Quantum systems of atoms and light
- Quantum information
- Computer science for quantum technologists
- Spin Technologies
- Many Body Physics and Quantum Simulation
- Open/Engineered quantum systems
- Advanced Topics in Quantum Technology  
# 1 : choose 1 DIGIQ Course
- Advanced Topics in Quantum Technology  
# 2: choose 1 DIGIQ Course

#### Semester 4 (S4)

- Laboratory Internship

#### Targeted skills and knowledge

- Acquire scientific skills in quantum physics and technologies, in computing and quantum information.
- Acquire transversal skills in project management and direction: act and communicate in large international collaborations.
- Participate in a research project in quantum sciences and technologies : physical description of experimental results, design of quantum technologies, manipulation of quantum information, data collection and analysis, modeling and interpretation of results.

#### Partnership →

- Télécom physique Strasbourg
- Digital Europe Programme
-  Aide de l'État par l'agence nationale de la recherche (France 2030 - ANR-22-CMAS-0001)
-  This project has received funding from the European Union's Digital Europe Programme under grant agreement no. 101084035

#### Partnership with laboratories →

- IPCMS | UMR 7504
- CESQ/ISIS | UMR 7006
- IPHC | UMR7178

**Merit-based grant →** the Master's program is an initiative of the Quantum Science and Nanomaterials (QMat) graduate school, which can provide financial support based on academic criteria. See [qmat.unistra.fr](http://qmat.unistra.fr)

# Internship

A prerequisite for thesis work or R&D laboratory position is an introduction to research at a private or public research facility. In S4, students can evaluate their degree of autonomy and demonstrate their capacity to integrate into a research team by participating in an internship **that lasts at least 16 weeks.** They can also synthesize problems and the results of their work.

The subject can be selected from submissions made by the Strasbourg laboratories (CESQ, ISIS, IPCMS, IPHC, etc.) or by French and foreign organizations and laboratories (such as the CNRS or CEA laboratories in France, or the DIGIQ network in Europe).

# Career opportunities

The aim of the Master is to train physicists who can hold senior positions in industries and public research institutions.

#### Functions

- Researcher
- Researcher-Teacher
- Research Engineer
- R & D engineers

#### Sectors

Public research, Education, Electronics industry, Semiconductor and Microelectronics industry, Computers, internet and telecommunications, Data scientists .

# Key figures

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Industrial Partners

Academic pan-european  
Partners

# Contacts

Program head

**Jean-Francois Dayen**

[dayen@unistra.fr](mailto:dayen@unistra.fr) | 03 88 10 70 74

**Shannon Whitlock**

[whitlock@unistra.fr](mailto:whitlock@unistra.fr) | 03 68 85 51 64

Head of internships

**Isabelle Huber**

[isabelle.huber@unistra.fr](mailto:isabelle.huber@unistra.fr) | 03 68 85 49 70

**Faculté de physique et ingénierie**

3 rue de l'université

67084 Strasbourg Cedex

Scolarité  | [assistance-etudiant.unistra.fr](mailto:assistance-etudiant.unistra.fr)

# Admission and applications

#### Entry level

→ First year admission : bachelor's degree or equivalent (French or foreign). Admission by application.

→ Second year admission : possibility of direct admission to M2 on application. M1 level required or equivalent.

 **Admission : [ecandidat.unistra.fr](http://ecandidat.unistra.fr) or Campus France**

