FIELD OF STUDY

ENGINEERING SCIENCES

RÉPUBLIQUE FRANÇAISE
Liberté Égalité Fraternité

CAMPUS FRANCE

Robotics

The field of robotics encompasses the design, programming, development and maintenance of robots and systems – combining engineering, mechanical engineering, computer science, electricity systems and electronics – that are implemented across the industrial, medical, agricultural, construction, and logistics sectors, among others. Mechatronic devices can accomplish tasks autonomously, as well as interact and collaborate with cobots designed through robotics.

From traditional applications in industries such as automotive, agri-food, manufacture of capital goods, and construction, robots have infiltrated other sectors, like agriculture, aerospace, defense, health, disability and household assistance, surveillance, as well as the service sector. Among mobile robots, drones have had the largest growth in manufacturing, in line with their use in a growing variety of business sectors. Collaborative robots (cobots), connected objects and personal robotics are also benefiting from the development of artificial intelligence.

Technical training focuses on the integration and maintenance of different robotizations. The implementation of robotics entails specializations in engineering for technological domains and specific software. Courses in engineering and industrial computing, automation and robotics, mechanics and mechatronics, and electronics are offered at the Licence (bachelor).

- **8th** in the world for the number of robots sold on its domestic market (2021)
- **8%** growth of the French robotics market (2022)
- The **3rd** largest robotics fleet in Europe (2020)

- **42,000** operational robots in France (2019)
- **100 million** euros invested in France (2013-2020)
- **800 million** (euros) invested in robotics, including 400 million for the implementation of France's 2030 AI plan

- **194** robots in the industrial sector per 10,000 employees (2020)
- **150** robotics and intelligent systems companies present in France (2022)

Sources: www.economie.gouv.fr - www.symop.com

International

The 2013 launch of France Robots Initiatives gave the country international recognition across several sectors: production, agricultural, industrial, services, naval drones, etc.

France is among the first five countries in terms of scientific publications on robotics, and is ranked 18th in the world due to its density of 194 robots per 10,000 employees.

RELATED FIELDS

• Communication • Electricity • Electronics • Industry • Information • Computer Science • Engineering • Mathematics • Mechanics • Nanoscience • Digital • Transport • Telecommunications

SUBFIELDS

• Automatons • Programmable automatons • Automatics • Automation • Vision sensors • Intelligent sensors • Cobotics • Cobots • Symbiotic combinations • Technological designs • Cybernetics • Dominant design • Electromagnetism • Computerization • Sensory equipment • Watchmaking • Hydroelectric • Computerization • Artificial Intelligence • Interactivity • Technological interrelations • Mechanization • Microprocessors • Motorization • Multifunctionalization • Optoelectronics • Robotic processes • Programming • Networks • Industrial local networks • Mobile robotics • Robotization • Collaborative robots • Industrial robots • Data storage • Laser systems • Optoelectronics systems • Technological systems • Digital transmission

Useful links

- CNRS - Robotics Research Group: **www.gdr-robotique.org**
- Robotics French Cup: **www.coupederobotique.fr**
- International Federation of Robotics: **https://ifr.org**
- Cachan Robotics Festival: **www.festivalrobotiquecachan.fr**
- RoboCup Federation: **www.robocup.org**
- RoboCup 2023 (Bordeaux): **www://2023.robocup.org**
- Robotics Place: **www.robotics-place.com**

LEVEL Licence

BREVET DE TECHNICIEN SUPÉRIEUR (BTS)

NATIONAL DIPLOMA – 2 YEARS OF POST-SECONDARY EDUCATION – L2
120 ECTS credits

> The Industrial control and automatic regulation and design and automatic systems development BTS (*Brevet de technicien supérieur*, or senior technologist's certificate.)

> Other BTS-level diplomas are also related to the fields of robotics in electronics, system maintenance, engineer technical assistance, industrial products design.

LICENCE (BACHELOR'S)

NATIONAL DIPLOMA – 3 YEARS OF POST-SECONDARY EDUCATION – L3
180 ECTS credits

The Computer science curriculum at the Licence level includes the Robotics prototyping program.

LICENCE PROFESSIONNELLE (VOCATIONAL BACHELOR'S DEGREE)

NATIONAL DIPLOMA – 3 YEARS OF HIGHER EDUCATION – L3
180 ECTS credits

Several curricula are offered with programs in robotics in universities, in agriculture or agronomy in engineering schools, or in high schools in partnership with a university:

- **Technology and maintenance:** Industrial control with Vision for industrial robotics program; Multi-technical systems with farming automatization and robotization program.
- **Industrial occupations:** Industrial automatization and robotics; Design of industrial products and process improvement with Mechanics, Mechatronics program; Development and improving maintenance of mechatronic systems; International installation of industrial equipments; Maintenance of robot installations; Mechatronics, engineering of automated and robot systems; Robotized and automated industrial production; Automated production of electronic systems; Industrial robotics, automatization and vision; Mobile and collaborative robotics; Connected robotics; Industrial robotics; Robotics and industry of the future; Intelligent robotics; Service robotics; Robotics and industrial vision; Technical customer support – machine-tools; Automated systems with robotic maintenance option; Mechatronic intelligent systems for industry and space.
- **Automated systems, industrial networks and computing:** Automatization and robotics; Automatization; Industrial computing; Robotics; Industrial robotic integration; Industrial robotics and automatization; Robotics and future industries.

The *Bachelor Universitaire de Technologie* (B.U.T.) program also touches on Robotics with some specializations: Electrical engineering and industrial computing; Mechanical engineering and computer-integrated manufacturing; Industrial engineering and maintenance.

The Industrial engineering *classe préparatoire Adaptation Technicien Supérieur* (ATS) prep program is accessible in a year at the third year of Licence level.

www.campusfrance.org > Students > Studying in France > Find your program

LEVEL Master

Robotique

MASTER'S

NATIONAL DIPLOMA – 5 YEARS OF POST-SECONDARY EDUCATION – M2
120 ECTS credits

Several universities offer a Master's with curricula and programs applied to Robotics:

- **Automatization Robotics:** Automatization, robotics, signal; instrumentation; Advanced systems and robotics; Intelligent systems.
- **Electronics, electrical energy, automatics:** Automatization, processing of image signal; Sensors, electronics and connected objects; Computer engineering, signal processing, automatization, electronics and telecom; Automatization engineering for transportation and energy; Photonics, microwave and communication systems; Virtual reality and intelligent systems; Mobile radio communication networks; Robotics; Robotics, assistance and mobility; Robotics and artificial vision; Surveillance and control of complex systems: robotics and electrical energy; Mobile automatic systems; Integrated and embedded electronic systems; Embedded systems and information processing; Electrical systems for energy and mobility; Intelligent automotive and aeronautical systems.

www.campusfrance.org > Students > Studying in France > Find your program

Programs taught in English: Advanced Wireless Communications Systems; Control for Green Mechatronics; Control, Signal and image Processing; Smart Aerospace and Autonomous Systems

https://taughtie.campusfrance.org

Some engineering schools also offer Master's degree, with the **Automation Robotics** curriculum and different programs: Artificial perception and robotics; Advanced robotics; Mobile robotics for marine applications; Autonomous robotics and intelligent transport; Embedded systems

Programs Taught in English: Advanced Robotics; Control and Robotics; Control Systems; Embedded Real Time Systems; Industrial Robotics; Mobile, Autonomous and Advanced Robotics; Robotics and Control; Marine and Maritime Intelligent Robotics; Robotics and Transport Signal and Image Processing

https://taughtie.campusfrance.org

ENGINEER CERTIFICATION

MASTER'S DEGREE – 5 YEARS OF POST-SECONDARY EDUCATION – M2
120 ECTS credits

French engineering schools deliver Engineering certifications backed by the CTI (*Commission des Titres d'Ingénieur*), with several specializations: Automatization and computer science; Automatization and robotics; Electronics and industrial computing; Environment and production; Electrical engineering and robotics; Industrial engineering and computer science with Automatization program: advanced control and robotics; Computer science Mechanics and production; Mechatronics; Robotics; Production and automation; Industrial systems; Computer systems and robotics; Telecommunications.

www.cti-commission.fr/accreditation

LEVEL Post-M

MASTÈRE SPÉCIALISÉ® (MS)

INSTITUTION DIPLOMA – 1 YEAR OF POST-SECONDARY EDUCATION

This Label from the *Conférence des Grandes Écoles* (CGE) certifies a number of higher-education diplomas: Expert in collaborative Robotics for the industry of the future; Digital engineering of products and buildings; Digital money and secure transactions; Processes of the future and robotization; Mechatronics and Robotics.

- **www.cge.asso.fr/formations-labellisees/liste-formation-ms**
- **https://ressources.campusfrance.org/esr/diplomes/en/mastere_spe_en.pdfmastere_spe_fr.pdf**