



UNIVERSITY  
OF CALABRIA



The Pathway  
for your Career  
**International  
Master  
of Science  
Degrees**





Nicola Leone  
Rector

Since its foundation, the University of Calabria (UniCal) has had a **strong international vocation**. It is a lively and open environment where students can enjoy several social activities that make the Campus a place of social cohesion and peaceful coexistence among people.

Our International Campus, which was **the first Italian residential campus** established in 1972, now includes over 950 students from 80 countries, and supports international study programs abroad such as Erasmus+, MOST – for extra-EU mobility – and Dual for double degrees.

Our International students enjoy Campus life from many different perspectives (teaching, research and leisure) fully supported by our modern infrastructures (libraries, laboratories, residential centre, sports/fitness centres and theatres). Every year, many international students apply via the **UnicalAdmission Call**, that is usually launched in March.

Last year, we received more than 1,500 applications from all over the world and 440 new international students were admitted.

For the next academic year, we will further promote our offer for international students by providing 12 international MSc-level degrees in English. **We offer 120 scholarships**, assigned on a competitive basis, which include tuition, dormitory, meals and allowance.

Moreover, for those students who do not get any scholarship, **we offer a favourable all-inclusive enrolment package**. We therefore look forward to welcoming new international students to enhance the international dimension of our University through their culture, enthusiasm and willingness to succeed.

# Master Degree Courses in

## Socio-Economics Area

– The Master’s Degree Course in **Finance and Insurance** aims to develop skills required for the management of complex financial products and to practice the profession of actuary.

## Engineering and Technology Area

– The European Master in **Advanced Solid Mechanics “STRAINS”** will train a next generation who will acquire essential skills in modelling materials and structures to face civil and mechanical engineering challenges.

– The Master of Science in **Artificial Intelligence and Computer Science** will train computer science professionals driving the ICT market with AI methods and tools.

– The Master’s Degree in **Computer Engineering for the Internet of Things** will train the next generation of designers, developers and managers of the Internet of Things systems.

– The Master’s Degree in **Environmental and Territorial Safety Engineering on Sustainable Management of Natural Resources** will train the new experts in sustainable and smart environments.

– The Master’s Degree in **Robotics and Automation Engineering** is geared to instruct robotics engineers aiming to deal with emerging human/machine interaction challenges.

– The Master’s Degree in **Telecommunication Engineering: Smart Sensing, Computing and Networking** will train the next generation of Telecommunication professionals who will design and manage complex networks with smart sensors and edge computing.

## Medical Health Area

– The Master’s Degree in **Health Biotechnology** will train the young biotechnologists providing them with the skills to apply biotechnology to human health.

– The Master’s Degree in **Nutritional Sciences** will train the next generation of nutrition professionals who will have the opportunity to find solutions to the world’s greatest public health challenges.


## Sciences Area

– The Master’s Degree in **Chemistry** aims to train chemists who will use chemistry to ingeniously optimize, conserve and make the wealth of resources worldwide sustainable.

– The Master’s Degree in **Mathematics** will train the next generation of mathematics professionals who will choose the teaching and industry career.

– The Master’s Degree in **Physics** will train the next generation of physics professionals who will work in challenging public and private sectors.

 For assistance [welcomeoffice@unical.it](mailto:welcomeoffice@unical.it)

 your pathway to the Italian education [unicaladmission.it](http://unicaladmission.it)

**All inclusive enrolment € 6000 x year (2 meals per day, accommodation, tuition fee)**

**1000 International students enrolled**



– Walking along the Ponte Bucci or through the Campus residences' lanes, it is common to hear many people speaking various languages and meet people from different cultures. This is because UniCal, thanks to the **UnicalAdmission program**, is home to over **950 students from 83 countries**, the highest number among Southern Italy universities. On the other hand, around 600 outgoing and incoming students participate in **Erasmus+, MOST (extra-EU mobility), or DUAL (Double Degree)** study abroad programs. Furthermore, two important outgoing and incoming mobility programs for teachers and researchers financed by the Calabria Region - TeMA and Vis - will be launched shortly.



– A total of **251 international cooperation agreements** have been signed with institutions of **54 countries** along with about **500 agreements in the Erasmus+ framework**.

– Over the past few years, UniCal has been one of the **30 Italian universities selected to participate in the largest higher education world fair, NAFSA, held in the USA. Recently, a university centre in Cuba and Santo Domingo - UniCaribe - and a research forum of 22 Italian and Ecuadorian universities in Ecuador - FUCSIE - have been created.**

**120 Scholarships per year (Boarding, Tuition and Allowance)**

**1500 applicants every year**



– UniCal is present in all the most important International **University Rankings: Times Higher Education (THE) World Rankings, QS World University Rankings (QS), Academic Ranking of World Universities (ARWU)**. It is also well-ranked in specific teaching & research areas such as Computer Science, Engineering and Physical Sciences.



– UniCal also supports **Technology Transfer and Start-up Creation and Incubation** via its **Liason Office and the Technest Incubator infrastructure**. The Start-Cup competition is organized every year to give opportunities to young Unical research students opportunities to start up their company.



– The majority of our international students live in our **Residential Centre** that provides furnished rooms and canteens preparing Italian and international dishes. **From the Leisure time perspective, international students can enjoy many different activities supported by our sport and fitness centres, as well as cinemas and theatres.**

## Socio-Economics Area

## → Master's Degree Course in **Finance and Insurance**



The Master's Degree Course in **Finance and Insurance** provides students with in-depth knowledge to design and manage complex financial and insurance products, operate in financial markets, for understanding in social security systems, and to assess the risks affecting financial and actuarial products. To this end, the degree program offers advanced courses in mathematical finance, financial econometrics, life and non-life insurance mathematics, banking, economics of financial markets, financial and insurance law, life and non-life insurance mathematics, banking.

The Master's Degree Course in **Finance and Insurance** met the eligibility requirements and it now appears in the list of Universities & Colleges with Actuarial Programs (UCAP) of the US Society of Actuaries (SOA). It was the first degree-course to be added to the list.

### **Context**

The Master's Degree Course in **Finance and Insurance** responds to the need to stimulate the creation of a study context with a clear international vocation, where national students can benefit from the cultural exchanges with foreign students, who are the witnesses and promoters of different educational experiences

### **Learning objectives and outcomes**

The Master's Degree Course in **Finance and Insurance** aims to develop skills required for the management of complex financial products and to work as an actuary.

In particular, graduates will:

- learn about the analytical and quantitative tools to deal with financial transactions characterized by investment risk;
- possess the necessary skills to design and manage complex insurance products, both in the public and the private sector;
- become familiar with the tools to analyze financial and insurance markets as well as with the legal knowledge for regulatory and market control purposes.

To achieve the above objectives, in addition to the courses planned in the degree program, students may choose to attend other activities, or laboratories in financial and actuarial sciences and to train in public and private institutions, professional firms, in Italy and abroad.

### **Main topics**

- Financial Markets
- Risk Management
- Quantitative Methods for Finance and Insurance
- Financial Economics

### **Employability and careers**

Graduates in Finance and Insurance will have expertise to hold high level positions within financial and insurance private institutions, market control authorities, social security institutions, or work as consultants for the evaluation and management of financial and insurance instruments, and for assessing the overall management activities of financial and insurance intermediaries. The degree in Finance and Insurance grants access to management positions in insurance companies, banks, brokerage firms, consulting firms, public and private pension institutions, and managing authorities of financial and insurance markets. Graduates in Finance and Insurance will have the possibility to take the qualification examination for the actuarial profession.

### **Keywords**

**Financial Markets. Insurance. Business & Management. Banking. Financial Economics, Econometrics.**



**Duration:** 2 years

**Start date:** October 1, 2021.

**Total number of hours (number of ECTS credits):** 3000 hours (120 ECTS credits)

### **Admission requirements:**

**To successfully attend with profit the master's degree course in Finance and Insurance students should have an adequate knowledge of mathematics, economics and statistics. A further requirement is a B2 level of English language. The knowledge and skills in the English language shall be tested as indicated in the Course Regulations and no English certificate is required. In addition to the requirements indicated above, admission to the course is conditional to the assessment of students' background.**



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## Engineering and Technology Area



## → Master's Degree Course in Advanced Solid Mechanics "STRAINS"



### Context

The Erasmus Mundus Joint Master's Degree STRAINS is a 2-year master's programme of excellence in English for students wishing to develop their knowledge and skills in the field of solid mechanics for the modelling of materials and structures. It was created by a consortium of six acknowledged European Universities (UNICAL, University of Lille, Ecole Centrale of Lille, the National Technical University of Athens, the Université Catholique de Louvain, the Wrocław University of Science and Technology) and associated partners. The STRAINS master's degree focuses on (theoretical, numerical or experimental) modelling in a process that goes from conceptualization to implementation. It paves the way to access the job market, thanks to the frequent contacts students and departments have with the world of industry within a network of industrial partners; students can also access doctoral studies, through a total immersion in the codes, atmosphere and methods of the international research.

To be awarded the Masters's diploma students should accrue 120 ECTS (4 semesters) of courses, practice and a Master's thesis. The master programme is based on 18 different educational paths (see Fig.1) which have to be attended in at least two universities of the consortium. It includes common core courses in

the 1st semester to be attended at the University of Lille, where all students start the courses, and a mandatory mobility scheme for a minimum of one semester (30 ECTS) which typically starts in the second semester. The programme leads to the award of a recognized joint diploma.

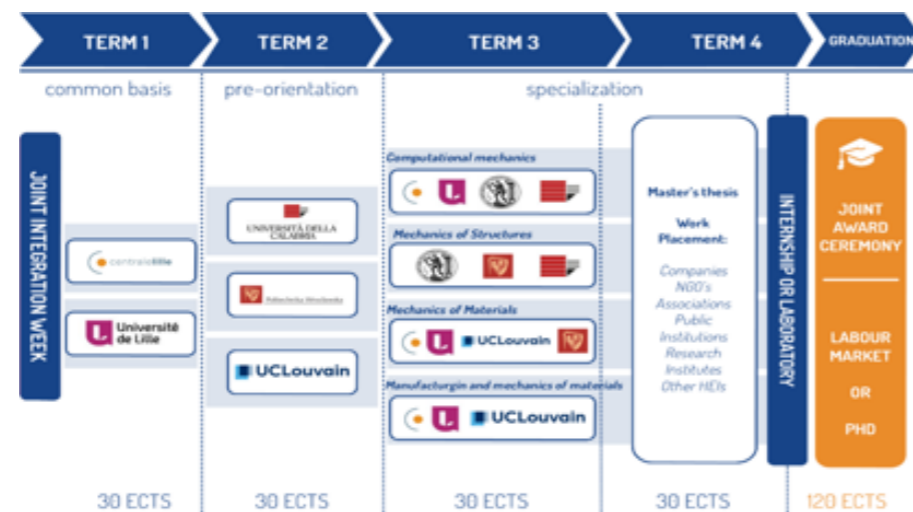
### Learning objectives and outcomes

The European Master of Science in Advanced Solid Mechanics (STRAINS) is designed for students wishing to develop their knowledge and skills in the field of solid mechanics for the modelling of materials and structures.

The range of issues encountered in complex real-life problems covers a wide range of scales, from the microstructure of materials to the macroscale of structures such as

robots, aircrafts, bridges, etc. The material strength and the structural behaviour, as well as the narrow links between them is studied in-depth. The centre of gravity of this training course is Mechanics, applied to materials and structures and, consequently, to a wide spectrum of applications in both Mechanical and Civil Engineering.

Course training is aimed at providing students with theoretical, experimental and numerical tools to solve advanced engineering problems. Additionally, the Master's degree emphasises the connections between these three aspects. The students will have interactive teaching experience, complemented with laboratory/practical training and internships in leading industries, companies and/or research centres. The network of associated partners



will offer students the opportunity to get in touch with the real world through case studies and work approaches and will offer them employment opportunities.

- At the end of the mobility period, "STRAINS" students will be able to:
- use theoretical, experimental and computational methods of the mechanics of materials and structures and master the interaction between these three aspects;
  - analyse and understand a complex problem in a multi-disciplinary environment, in order to propose solutions and create new processes, devices or structures;
  - apply specific knowledge and skills in the technological area related to each student's mobility path and the Master thesis;
  - communicate their conclusions to experts of the discipline as well as non-specialists;
  - acquire professional skills in civil engineering and/or mechanical engineering to find employment in companies;

- reach a level of skills and experiences that will allow them to undertake research activities.

### Main topics

The educational aim of the programme is to qualify students to a level of excellence among the four specialised fields of Advanced Solid Mechanics which are fully integrated within the degree catalogue:

- (1) Computational Mechanics,
- (2) Mechanics of Structures,
- (3) Mechanics of Materials and
- (4) Manufacturing and Mechanics of Materials.

The expertise acquired by graduates will allow them to engage in activities of all fields of structural mechanics with application to civil or mechanical engineering.

### Employability and careers

The main goal of the Joint Master's Degree is the creation of a breeding ground of students able to either continue in PhD training courses or to work in various industrial sectors. Thanks to the level of

expertise of the Master's programme, "STRAINS" graduates will be able to find jobs in European and non-European based industrial companies. Many "STRAINS" graduates will have the opportunity to pursue PhD theses, hopefully in the network institutions, but also in other research centres around the world. All "STRAINS" partners have a long-lasting tradition of strong relationships with industry companies. The Joint Master's Degree can be a specialised professional terminal degree for students to be recruited by big companies, research and development centres.

### Keywords

**Civil Engineering. Computational Mechanics. Mechanics of Materials. Mechanics of Structures. Material Design.**

**Duration: 2 years**

**Start date: October 1, 2021.**

**Total number of hours (number of ECTS credits): 3000 hours (120 ECTS credits)**

### Admission requirements

Degree in: **Mechanics, Mechanical Engineering, Civil Engineering, or equivalent with a strong background in Mechanics, Physics and Mathematics.**

Language skills in English:

**TOEFL: minimum score: 570 points (paper) or 87 points (computer based)**

**IELTS: minimum score: 6.5**

**Cambridge English First (FCE) - Grade A or B.**

**Certificate of a University Language Centre testifying that the student masters the necessary knowledge of English to access the course (specify CEF-level / minimum CEF-level B2.**

**How to apply: Instructions are available at:**

[www.master-strains.eu/how-to-apply/application-procedure](http://www.master-strains.eu/how-to-apply/application-procedure)

Tuition: **information is reported at:**

[www.master-strains.eu/fees-scholarship/tuition-fees](http://www.master-strains.eu/fees-scholarship/tuition-fees)

Scholarships: **instructions on how to get a scholarship are illustrated at the following link**

[www.master-strains.eu/how-to-apply/application-procedure](http://www.master-strains.eu/how-to-apply/application-procedure)

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## → Master's Degree Course in **Artificial Intelligence and Computer Science**



The Master's degree course in **Artificial Intelligence and Computer Science** extends the training of the Bachelor degree in Computer Science to a higher-level professional figures, who can cover high-level roles in new-technology companies, or public bodies, and who can continue their educational path by accessing research doctorates or specialization schools.

At a national level, the Master of Science in Artificial Intelligence and Computer Science of the University of Calabria is characterized by a sound background culture basically rooted in Artificial Intelligence (a sector of international excellence for the University of Calabria); this degree course pays particular attention to innovative technologies for data analysis (Data Science) and to technologies related to the security of information systems (Security). It includes in-depth studies of the methodological aspects for agile project management and managerial simulation, as well as external activities, such as training internships in companies, public administration institutions, and laboratories. Specifically, the Master's degree course in Artificial Intelligence and Computer Science includes two curricula organized as follows:

- **Data Science (DS)**: the course is designed to train experts in computer techniques of artificial intelligence and data analysis. In addition to acquiring the most advanced techniques of artificial intelligence, students will acquire advanced knowledge of techniques and tools for data analysis (Data Analytics); in particular, the curriculum responds to the growing demand for experts in the sector to support decision making processes, due to the spread of intelligent software systems that manage large amounts of data (Big Data).

- **Computer Security (SEC)**: the course is designed to train experts in computer techniques of artificial intelligence and security of computer systems. The curriculum responds to the growing demand for a professional figure capable of mastering both data analysis (Data Analytics) and processes, as well as designing and managing all aspects related to the security of infrastructures and software.

### **Learning objectives and outcomes**

Graduates from the Master's degree course in **Artificial Intelligence and Computer Science** will be able to carry out the planning, design, development, construction management, estimation, testing, and management of complex plants and systems for the generation, transmission, and intelligent processing of information, even when these involve the use of advanced, innovative or experimental methodologies. Graduates in Artificial Intelligence and Computer science are experts in computer techniques of data analysis and security of computer systems.

### **Main topics**

- Artificial Intelligence
- Data Analytics
- Computer Security

### **Employability and careers**

- Software analysts and designers
- System Analysts
- Computer networks and communications specialists
- Cyber Security Specialists
- Artificial Intelligence Specialists
- Data analytics specialist

### **Keywords**

**Artificial Intelligence. Data Science. Computer Security. Data Analytics. Deep Learning. Knowledge Representation.**



**Duration:** 2 years

**Start date:** October 1, 2021.

**Total number of hours (number of ECTS credits):** 120 ECTS credits

**Admission requirements:**

**Bachelor Degree in Computer Science or Computer Science Engineering. Knowledge of the English language (B2).**



for details [www.unical.it/international\\_degrees](http://www.unical.it/international_degrees)

## → Master's Degree Course in **Computer Engineering for the IoT**



### Context

The Internet of Things (IoT) is a global and dynamic network, with an extended and pervasive connectivity between conventional calculating devices and new generation daily objects (Smart Objects). Smart Objects give a digital alias to real identities, enabling their entrance into IoT and gradually blending the border between the physical and virtual world. In fact, we are witnessing a fundamental change of paradigm, moving from an Internet approach exclusively thought for human users to the IoT centred on autonomous, intelligent, adaptive and interoperable Cyber-Physical devices, which have become providers and users of innovative services at the same time. The IoT will revolutionize any applicative context taking advantage from synergic technologies and methodologies from sectors such as Big Data, Cyber-Physical Systems, Opportunistic Networking, Autonomic and Cognitive Computing.

The Master of Science (MSc) in **Computer Engineering for the IoT** provides students with in-depth knowledge and practical skills on the design, development and management of advanced Internet of Things systems from a computer engineering perspective. Thanks to its markedly cross-curricular approach, it provides a multidisciplinary training with innovative courses in the areas of development of the Internet of

Things, Big Data and cloud/edge computing. The program offers lectures (in English), and learning-by-doing teaching with laboratories, seminars and internships in Integrators, Telecommunication and Information Technology research centres and companies. The final thesis project offers students the opportunity to develop further specific skills in the framework of hands-on experiences in international ICT research labs.

### Learning objectives and outcomes

The MSc in **Computer Engineering for the IoT** aims at training new professional figures who can work in various fields such as: Embedded System Designers (experts developing software for embedded systems used in IoT systems), IoT System Designers (experts developing IoT innovative systems and complete IoT systems - heterogeneous too - in diversified application domain) and IoT Data Analytics Specialists (experts promoting solutions for Big Data analysis with particular reference to data produced by IoT systems).

### Main topics

- Low level and Embedded System programming
- Programming Internet of Things Systems
- Methodologies for IoT design
- IoT Security

- Cloud and Edge Computing
- IoT Networking
- Big Data Management
- Electronics for IoT Devices

### Employability and careers

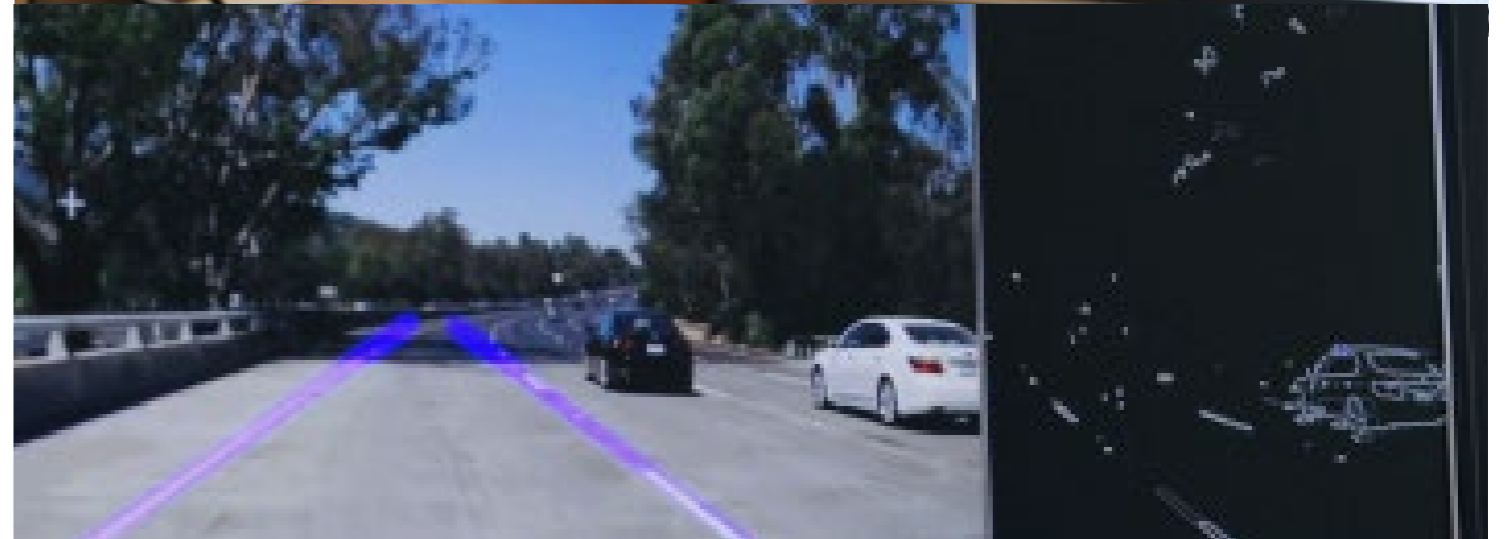
Graduates from a MSc in **Computer Engineering for IoT** can work as :

- Embedded System Designer (a computer engineer that designs and develops embedded systems software)
- IoT System designer (a computer engineer that designs and develops innovative IoT systems and provides solutions to integrate heterogeneous IoT systems in various domains)
- IoT data analytics specialist (a computer engineer that designs and develops big data analysis solutions specifically addressed to the IoT domain).

The skills and methodologies acquired in the study program, will enable graduates to either find employment or work as freelance for: companies specifically operating in the field of IoT systems development, system integrators and consulting companies, developers and providers of ICT applications and services.

### Keywords

**Internet of Thing. Big Data. IoT Security. IoT Interoperability. Embedded computing. Cloud/edge computing.**



**Duration: 2 years**

**Start date: October 1, 2021.**

**Total number of hours (number of ECTS credits): 3000 hours (120 ECTS credits)**

**Admission requirements: A minimum of three-year undergraduate degree (or equivalent) in a related field, with preference for graduates in Computer Engineering, Telecommunication Engineering, Computer Science, Electronics Engineering and Information Technology.**



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## Master's Degree Course in

# Environmental and Territorial Safety Engineering on Sustainable Management of Natural Resources



### Context

Sustainability is one of the most challenging and rapidly growing areas in both the public and private sectors. With the increasing awareness that our world is running beyond its possibility, the commitment to sustainable development to meet the needs of today's generations without jeopardising those of the future has never been more evident. The scope of the Master's Degree in **Environmental and Territorial Safety Engineering on Sustainable Management of Natural Resources** is to meet this challenge. This Master's Degree offers a genuinely interdisciplinary approach to sustainable resource management. It offers students the opportunity to acquire research skills, to develop theoretical understanding of key issues, and also important aspects of the practical and professional skills required by employers.

### Learning objectives and outcomes

The Master's Degree in **Environmental and Territorial Safety Engineering on Sustainable Management of Natural Resources** is characterized by a strong interdisciplinary nature of its training path, that has been designed to train professionally complex figures who can operate in multiple occupational areas of sustainability. The aim of the new Master's Degree is to train

master's graduates who will be able to conceive, plan, design and manage works, systems, plants and services in the various areas of interest of the environmental engineering such as:

1. sustainable management of water resources, quality monitoring and pollution prevention of environmental matrices (air, water, soil), the treatment of solid, liquid and gaseous emissions and the remediation of polluted sites;
2. use and management of natural resources, raw materials, by-products and energy resources, with particular attention to those from renewable sources, and the treatment, collection and disposal of civil and industrial waste;
3. land management and management of the built environment, the improvement of the functional, energetic and environmental performance of structures and infrastructures, and the assessments of the environmental impact of civil and industrial activities;
4. an interdisciplinary vision, useful for understanding environmental contexts and to design a sustainable territorial project aimed at the prevention and mitigation of environmental risks and adaptation to them (re-naturalization of urban areas, green and blue infrastructures, Nature Based Solution).

The specific skills which will be acquired by the end of the course include:

- a thorough knowledge of the theoretical-scientific aspects of engineering, mathematics and other basic sciences and the ability to use this knowledge to identify, formulate and solve extremely complex engineering problems for the environment and the territory, according to a systemic vision and an integrated and interdisciplinary approach;
- the principles and tools for the design of engineering works, systems, plants and services of interest in relation to the environment;
- ah-hoc awareness of the need for active protection of the natural environment, sustainable management of natural resources and reduction of the ecological footprint according to the principles of the circular economy;
- understanding of the complex interactions between anthropogenic activities and natural systems, recognizing the value of resources and ecosystem services, to ensure the protection of the environment through the minimization of elements of fragility and the optimization of resilience to climate changes, hydro-geological instability, seismic events and, more generally, extreme events;

- use of information and telecommunications technologies for the representation of the territory and for the acquisition, management and interpretation of data obtained from remote sensing and distributed monitoring networks;
- design, implementation and use of physical, mathematical and numerical models for the simulation of environmental phenomena and processes, and critical interpretation of the results;
- awareness of safety and health protection issues in natural, anthropic, civil and industrial environments.

### Main topics

This innovative Master's Degree programme is open to applicants from all disciplinary backgrounds; it promotes leadership and adopts action-based and experiential learning, facilitated through a series of lectures, work placements initiatives and group projects. The programme fosters critical thinking and promotes proactivity in problem-solving and decision-making in sustainable development.

### Employability and careers

Graduates in the Master's Degree in **Environmental and Territorial Safety Engineering on Sustainable Management of Natural Resources** will be able to find employment opportunities in the national and international work market in professional firms, consulting and design firms, construction companies; they could also work in the management and maintenance of civil works, infrastructures and plants, manufacturing or service companies, public and private entities, managers and concessionaires of works, networks and services, operating in various fields, such as:

- the planning, design, construction



and management of works, systems, plants and services for the protection of water bodies, remediation of natural and anthropogenic systems, remediation of contaminated environmental matrices, primary treatment of waste water and gas emissions in the atmosphere, management of water resources, raw materials, by-products and energy resources, waste cycle management;

- the planning, design, construction and management of environmental monitoring systems, infrastructures, systems and service networks;
- the assessment of the environmental impacts and compatibility of civil and industrial works and structures, the strategic environmental assessment of territorial plans and programs, work

and construction sites' safety and the protection of workers' health;

- the research, development and production of innovative technological solutions for the environment.

Master's graduates from this course will also be able to find employment:

- in universities and research institutions, in the field of higher education and research;
- in companies operating on the market through quantitative analyses of the value of the environment and its ecosystem services.

### Keywords

**Sustainability. Management of Natural Resources. Circular Economy. Environmental Impacts. Renewable Energies. Raw Materials.**


**Duration: 2 years**

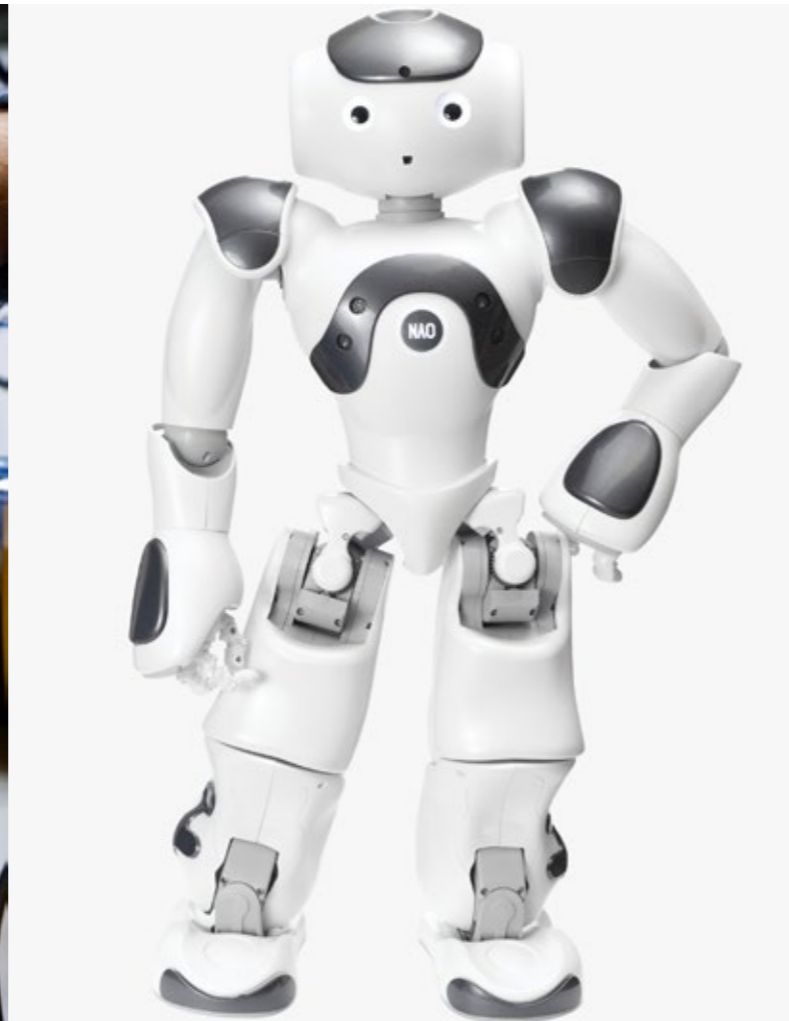
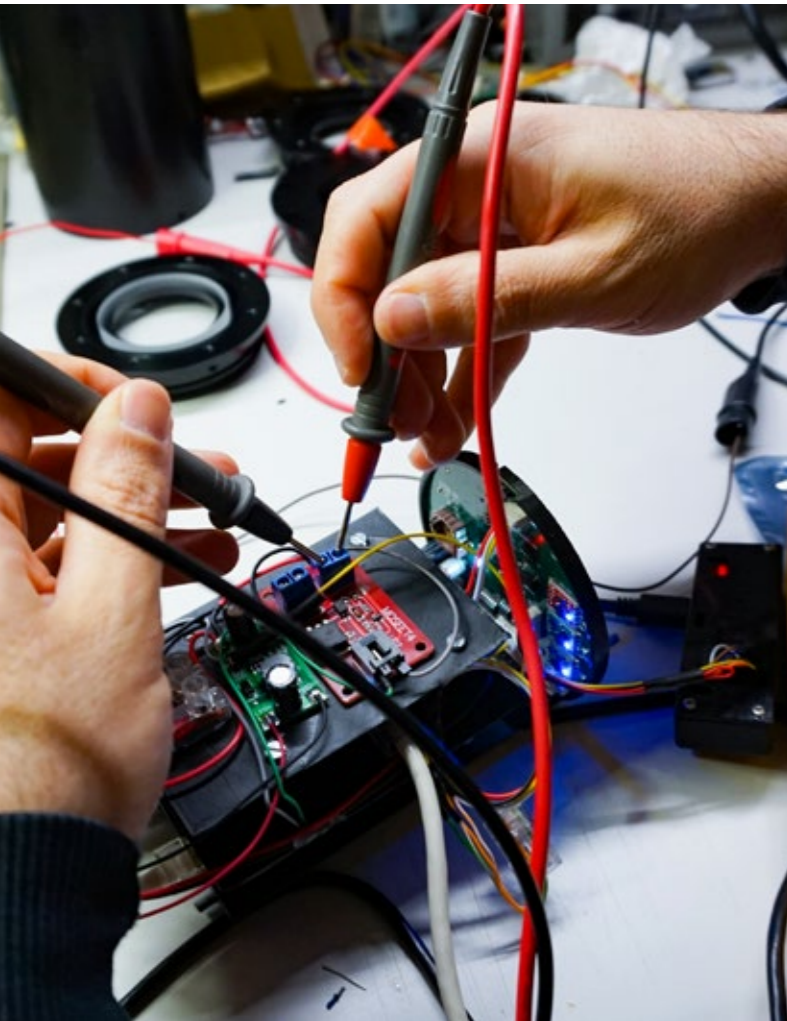
**Start date: October 1, 2021.**

**Total number of hours (number of ECTS credits): 3000 hours (120 ECTS credits)**

### Admission requirements

Master's Degree in: **Environmental Engineering, Civil Engineering, Earth Science, Environmental Science and/or equivalent.**  
 Bachelor's Degree in: **Environmental Engineering, Civil Engineering, Earth Science, Environmental Science and/or equivalent.**  
 Language skills in English: **B1 and/or higher levels.**

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## → Master's Degree Course in **Robotics and Automation Engineering**



### Context

The Master's Degree in **Robotics and Automation Engineering** is delivered in English. It provides multidisciplinary expertise in Automation, Autonomous Systems, Robotics, Mechatronics and Mechanical Engineering by training students on Control and Systems Theory, Optimization, Machine Learning, Mechanics, Computer Vision, Real-time Software and Artificial Intelligence. Lab and experimental activities complete the theoretical skills. Thanks to its interdisciplinary nature and methodological approach, this master degree fits for students with a technical/scientific background in the areas of information engineering, industrial engineering, computer science, mathematics, or physics.

### Learning objectives and outcomes

Robotics and Automation MS graduates will be able to:

- Design and monitor industrial plants: process control, component flows, machine safety and personal safety;
- Design industrial robot systems: robotic tooling, actuators, mechanics and sensors;
- Develop computer-aided production tools and data communication within industrial

robotics networks;

- Understand the key concepts of machine learning, including supervised learning, reinforcement learning, and deep reinforcement learning;
- Understand the key concepts of perception-planning-control pipeline for autonomous driving.

### Main topics

Robotics and Automation graduates will acquire advanced skills on industrial automation and process control; robotic systems; modelling and simulation of dynamical systems; data analysis; information systems; systems including artificial intelligence; design of hardware/software integrated systems; man-machine interfaces; human-robot interfaces.

### Employability and careers

The job opportunities of a **Robotics and Automation Engineer** fall within industries, public companies, financial institutions and research facilities, whose R&D divisions carry out activities in the fields of information systems, industrial automation and robotics. Furthermore, graduates can access PhD programs in the areas of Information Engineering. The training flexibility is a relevant asset of the **Robotics and Automation Engineer**, in view of the large variety of possible applications, of the continuous and rapid evolution of the technologies, as well of the job market.

### Keywords

**Cognitive robotics. Industrial automation. Autonomous driving. Automotive. Networked systems. Resilience in cyber-physical systems.**

**Duration: 2 years**

**Start date: October 1, 2021.**

**Total number of hours (number of ECTS credits): 3000 hours (120 ECTS credits)**

**Admission requirements: Bachelor Degree in Automation Engineering, Computer Engineering, Electrical/Electronic Engineering, Industrial Engineering, Mechanical Engineering.**

**Language skills in English: B2 and / or higher levels.**

**Scholarships: A number of scholarships covering all tuition fees will be assigned to applicants according to their degree and courses learning scores.**



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## → Master Degree's Course in **Telecommunication Engineering: Smart Sensing, Computing and Networking**



### Context

The Master of Science (MSc) in **Telecommunication Engineering: Smart Sensing, Computing and Networking** provides students with in-depth knowledge and practical skills on the design, development and management of advanced telecommunication systems. Thanks to its markedly cross-curricular approach, it provides a multidisciplinary training with innovative courses in the areas of waves communication, computer science and telecommunication networks and systems. The program offers lectures (in English), and learning-by-doing teaching with laboratories, seminars and internships in Telecommunications, Wavefield and Information Technology research centres and companies. The final thesis project offers students the opportunity to develop further specific skills in the framework of hands-on experiences in international ICT research labs.

### Learning objectives and outcomes

The MSc in **Telecommunication Engineering: Smart Sensing, Computing and Networking** aims to provide the necessary skills to work in all areas of Telecommunication Engineering. Its main objective is to train high-level professionals, with a solid background, a multidisciplinary knowledge on modern technology development, and the capacity to face the challenges for the development of a smart society. In particular, graduates will possess high expertise in IoT systems and applications, smart systems, wireless sensors, next-generation mobile networks (5G/6G), smart antennas, modern radar systems, machine learning, IoT security, cloud/edge computing, programmable networks and devices.

### Employability and careers

Graduates with a MSc in "Telecommunication Engineering: Smart Sensing, Computing and Networking" find employment as experts in the:

- design, production and management of 5G and 6G telecommunication networks and systems;
- design, production and management of radar systems for smart mobility and localization;
- development of advanced ICT

applications aimed at different vertical markets (such as smart home, smart city, environmental monitoring, smart health and telemedicine).

Skills and methodologies acquired in the study program will enable graduates to either find employment or work as freelance for: network and telecommunication system operators and manufacturers, radio system operators, system integrators and consulting companies, developers and providers of ICT applications and services.

### Main topics

- Simulation and Performance Evaluation
- Networking aspects of the Internet of Things
- Antennas and Propagation
- IoT Sensor Device Programming
- IoT Mobile Device Programming
- Wireless Devices and Networks
- Telecommunication Systems Measurements

### Keywords

**Smart sensors. Smart systems. 5G/6G networks. IoT. Radar systems. Wireless and mobile propagation.**



**Duration:** 2 years

**Start date:** October 1, 2021.

**Total number of hours (number of ECTS credits):** 3000 hours (120 ECTS credits)

**Admission requirements:** A minimum of three-year undergraduate degree (or equivalent) in a related field, with preference to graduates in Computer Engineering, Telecommunication Engineering, Computer Science, Electronics Engineering and Information Technology.



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## Medical Health Area

## → Master's Degree Course in **Health Biotechnology**



### Context

The Master's Degree course in **Health Biotechnology** stems from an Italian degree currently offered by the University of Calabria. Its aim is to meet the demands of an innovative training programme as part of the internationalization policy envisaged by the University of Calabria. The master's Degree maintains the continuity with the Bachelor Degree in Biological Science and Technology offered by the same university ensuring that a wider spectrum of graduates interested in biotechnology can achieve an adequate master level preparation to undertake their careers at an international level. 20 places will be available for the 2021-2022 academic year.

### Learning objectives and outcomes

The Master's Degree Course in **Health Biotechnology** will provide students with advanced knowledge, skills and ability to use the latest biotechnological methodologies for operating in the field of diagnostics, basic and applied research and therapeutic innovation. In addition, graduates will be able to interact with healthcare facilities and companies in the biomedical and pharmaceutical sectors dealing with drug-discovery. The course gives access to level III training: Specialization Schools, Level I and Level II Masters Courses, Research Doctorates.

### Main topics

Structure and functions of the human body organs and organ's molecular composition; research investigation in the biomedical and animal fields, applying "in vivo" and "in vitro" models; research investigation in the diagnostics field, through the management of bio-molecular technologies; structural and dynamic aspects of molecules aimed towards potential biotechnological interests.

Bioinformatics for molecular modelling and access to databases, with particular reference to genomics and proteomics and discovery of drug targets.

### Employability and careers

Graduates in Health Biotechnology can work as Biotechnologists in: research and development laboratories in the biotechnology field, in particular in the pharmaceutical, diagnostic, biomedical and food sectors;

public and private companies oriented towards biological and microbiological analysis and to the quality control of organic products; companies in charge of drafting patent regulations on the exploitation of biotechnological products and processes; universities; other public or private research institutes; hospitals; and biotechnological companies. After passing the national qualification exam, graduates can become professional Senior Biologists in Italy.

### Keywords

**Diagnostics. Biotechnology. Drug-discovery. Healthcare. Basic research. Applied research.**



**Duration: 2 years**

**Start date: October 1, 2021.**

**Total number of hours (number of ECTS credits): 3000 hours (120 ECTS credits).**

**Admission requirements:**

**Degree in: Biotechnology, Biology**

**Language skills in English: B2 and / or higher levels.**

**Degree in other disciplines or other qualifications obtained in Italy or abroad, recognized as suitable according to the law in force, provided they possess basic knowledge in the disciplines and credits listed below:**

**Mathematics / Physics / Informatics: 10 ECTS credits**

**Chemistry: 10 ECTS credits**

**Physiology: 6 ECTS credits**

**Biochemistry and Molecular Biology: 15 ECTS credits**

**Genetics / Microbiology: 6 ECTS credits**

**Other Biology Areas excluding the previous ones: 6 ECTS credits**

**English language: B2 level knowledge.**



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## → Master's Degree Course in Nutritional Sciences



### Context

The Master's Degree course in **Nutritional Sciences** originates from a rational change made to the degree currently offered by the University of Calabria. Its aim is to meet the demands of an innovative training programme as part of the policy for developing the internationalization process envisaged by the Project "Department of Excellence" (Law 232/2016).

On the one hand, the training pathway strives to maintain its continuity with the educational programme of the Bachelor Degree in Nutrition Sciences offered by the same university and to attract graduates from other fields (e.g., biologists, biotechnologists etc.); on the other, its English-Medium-Instruction (EMI) curriculum ensures that a wider spectrum of graduates willing to work in this specific field achieve an adequate tertiary-level preparation, which will allow them to pursue their careers at an international level.

### Learning objectives and outcomes

The Master's Degree course in **Nutritional Sciences** is characterized by a strong interdisciplinary nature of its educational pathway, which is tailored to train professionally complex figures, such as Nutritionists, who are expected to operate in multiple occupational fields. The overall learning objective is to

train a professional figure as a non-medical nutritionist, with in-depth knowledge in the following fields: the influence of food and nutrients on health at molecular-level; their role in the prevention of diseases with high epidemiological impact (e.g., chronic degenerative diseases); the nutritional value of micro and macro nutrients of Mediterranean Diet food, as a model of health pedagogy, thus allowing the prevention of a wide spectrum of chronic-degenerative pathologies featuring the epidemiology of the Third Millennium.

The specific skills which will be acquired upon completion of the course include:

1. Evaluation of the chemical characteristics of nutrients, their bioavailability in food and food supplements, their modifications by technological and biotechnological processes and their biological effects.
2. Checking of proper food intake to reach the recommended levels of nutrients to maintain a healthy state.
3. Application of the main laboratory techniques for assessing nutrition state, in relation to macro and micronutrients and knowledge on how to interpret results according to the clinical-physio-pathological correlates.
4. Design of dietary techniques depending on the different endocrine-metabolic pathophysiology conditions.
5. Collaboration in food consumption

surveys aimed at monitoring the nutritional trends of the population.

6. Application of methods to assess food quality and safety and its suitability for human consumption..
7. Collaboration in accreditation and surveillance procedures of clinical laboratories and health facilities for food preparation, storage and distribution.
8. Information and education of institutional operators and of the general population on food safety principles.

### Main topics

- Nutrigenomics, nutrients and cellular processes
- Food science and food supplements
- Biochemistry of applied nutrition
- Laboratory of Food Commodities
- Applied human nutrition
- Food toxicology
- Anatomy of the gastroenteric apparatus
- Clinical microbiology laboratory

### Employability and careers

- Public and / or private health institutions: in the context of international, national and regional health programmes, participation in projects for the prevention of health conditions and design and management of nutritional assessment and surveillance programmes.
- Food, dietary and pharmaceutical companies: design, development



- and enhancement of food products with high nutritional impact (functional foods); management of labelling and information relating to nutrition and health claims; development of certification systems.
- Catering and hospital catering

- companies: implementation of integrated management systems to ensure quality of the services offered.
- Co-management of food control and analysis laboratories, as well as testing of new technologies for new foods.

### Keywords

**Mediterranean Diet. Nutritional Assessment. Food Quality. Nutrition Claims. Health Claims. Dietary Supplements.**

**Duration: 2 years**

**Start date: October 1, 2021.**

**Total number of hours (number of ECTS credits): 3000 hours (120 ECTS credits)**

### Admission requirements

Master's Degree in: **Pharmacy, Pharmaceutical Chemistry and Technology, Medicine and Surgery, Veterinary Medicine and / or equivalent.**

Degree in: **Nutritional Science, Pharmaceutical Sciences and Technologies, Biotechnologies, Biological Sciences, Agricultural and Food Sciences and Technologies, Chemical Sciences and Technologies and / or equivalent.**



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## Sciences Area

## → Master's Degree Course in **Chemistry**



### Content

The MSc Degree in **Chemistry** aims to train chemists who can use chemistry to ingeniously optimize and conserve, the wealth of resources at the heart of the Mediterranean as well as render them sustainable.

The MSc Degree course offers two curricula:

– **The Chemistry of Environment, Health and Local Resources:**

theoretical and practical applications of advanced methods of chemical analysis; processes of transport and diffusion of substances; modern methodologies and techniques in applied analytical chemistry (e.g. for quality control of foods, soils, industrial waste, etc.).

– **Chemistry of Sustainable**

**Materials:** environmentally friendly organic synthesis methods; metal catalysis; smart materials; spectroscopic and diffractometric analysis of materials; synthesis of functional materials.

### Learning objectives and outcomes

- Mastery of advanced-level knowledge and laboratory skills in chemistry;
- Creative application of advanced knowledge and skills to solve problems in environmental chemistry, chemistry of materials and chemical issues in the life sciences;
- Design and operation of environmentally sustainable processes;
- Understanding of molecular structures and interactions to monitor and shape macroscopic properties;
- Effective communication of chemistry knowledge and processes, both in oral and written form;
- Identification of chemical solutions to local issues such as the optimization of local agro-food resources and reuse of waste materials of local industries.

### Main topics

- Analytical Methods for Environment, Health and Agro-food Products
- Environmental Physical Chemistry
- Molecular and Nanostructured Materials
- Chemistry of Organic Materials
- Analytical Chemistry of Materials
- Materials and Devices for Renewable Energy
- Structure and Intermolecular Interactions
- Catalysis and Sustainable Chemistry

### Employability and careers

- Clinical laboratories in public or private health structures
- Research & Development and/or Production & Control of new materials in chemistry-specific sectors such as pharmaceuticals, cosmetics, construction, textile laboratories, etc.
- Research & Development in other companies/corporations;
- Education.

### Keywords

**Green Chemistry. Clean Energy. Renewed and Renewable Materials. Local Resources. Sustainable Development. Smart Materials.**



**Duration:** 2 years

**Start date:** October 1, 2021.

**Total number of hours (number of ECTS credits):** 3000 hours (120 ECTS credits)

**Admission requirements:**

– Admittance to the MSc Degree in Chemistry requires knowledge in maths, physics and chemistry appropriate for those with first-level University degrees; at least B1-Level English competence.

– Preference will be given to students with Bachelor Degrees in Chemistry, Industrial Chemistry or comparable degrees (evaluated by the Department Council on a single case basis).

– Students holding other Bachelor Degrees/Three-year Diplomas who attained at least 60 ECTS coursework in the following areas are also encouraged to apply: Analytical Chemistry, Inorganic Chemistry, Organic Chemistry, Industrial Chemistry, Biochemistry, Clinical Biochemistry, Molecular Biology, Chemical Physics, Physics of Fundamental Interaction, Applied Physics, Mathematics, Pharmaceutical Chemistry, Food Chemistry.



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## → Master Degree Course in **Mathematics**



### **Context**

The Master's Degree in **Mathematics** is one of the Masters provided by the Department of Mathematics and Computer Science of Unical. It has a very long tradition, being one of the first courses of our University. Lectures are held at the Department and the Campus area offers a variety of facilities to students.

### **Learning objectives and outcomes**

The Master's Degree in **Mathematics** provides students with advanced knowledge of pure and applied mathematics, history and didactics of mathematics, and computer science. Students will develop

abilities in mathematical reasoning, problem solving and mathematical modelling. Students have also several opportunities of studying abroad, one option being the Erasmus+ mobility programs. At the end of the course, graduates can be employed in several working sectors such as banks, I.T. companies and insurance companies. Graduates can also continue their training towards teaching mathematics and science and doing research in public and private institutes.

### **Main topics**

The Master's Degree in Mathematics offers courses in: Algebra, Geometry and Topology,

Real and Functional Analysis, Differential Equations, Mathematical Physics, Operational Research, Statistics, Numerical Analysis, Informatics, History of Mathematics and Didactics of Mathematics.

### **Employability and careers**

More than 90% of the graduates are employed within three years.

### **Keywords**

**Pure and Applied Mathematics. Didactics and History of Mathematics.**



**Duration: 2 years**

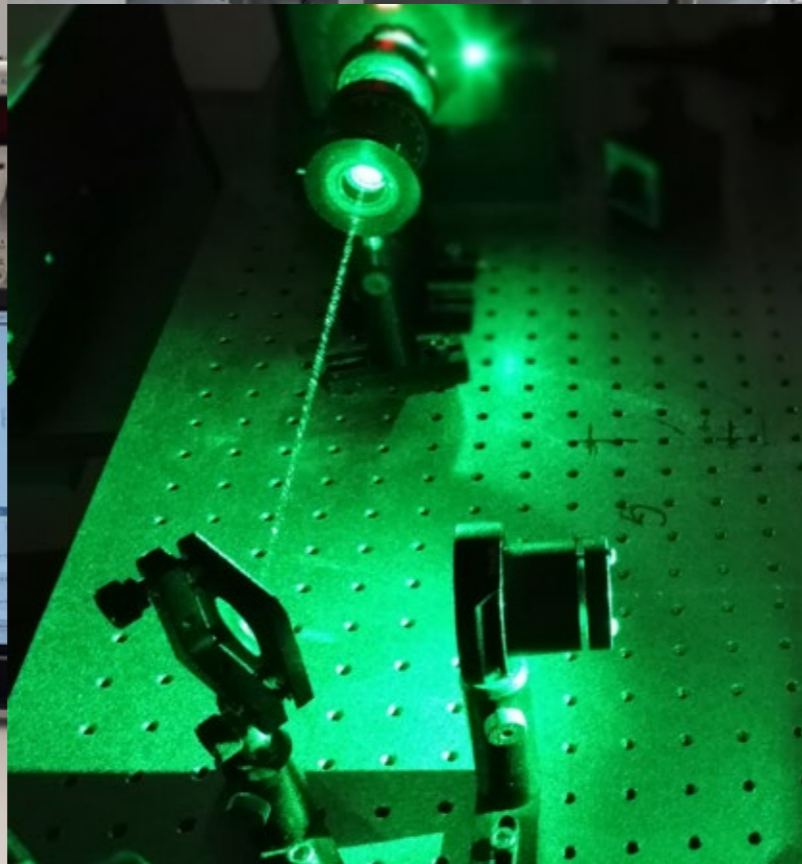
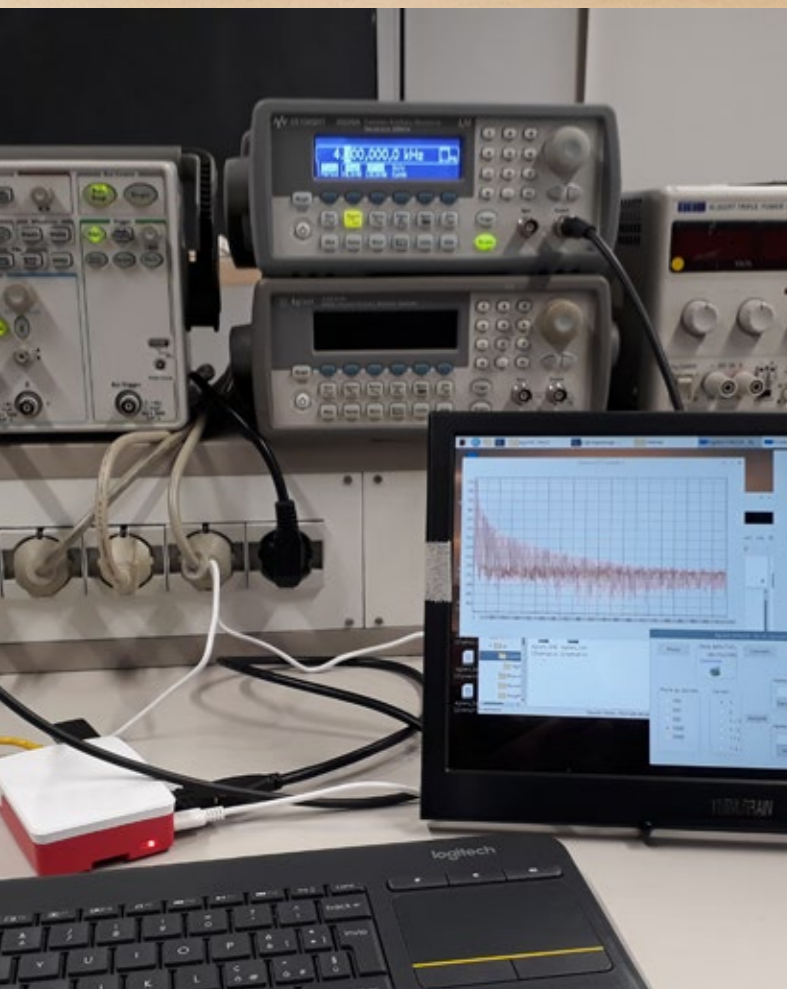
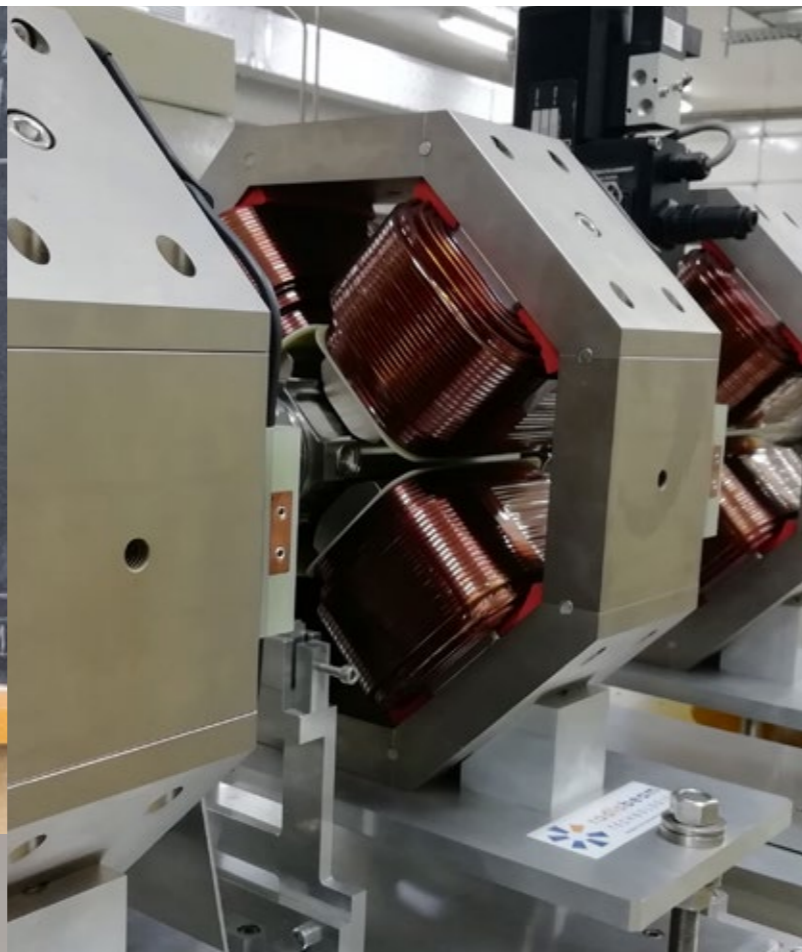
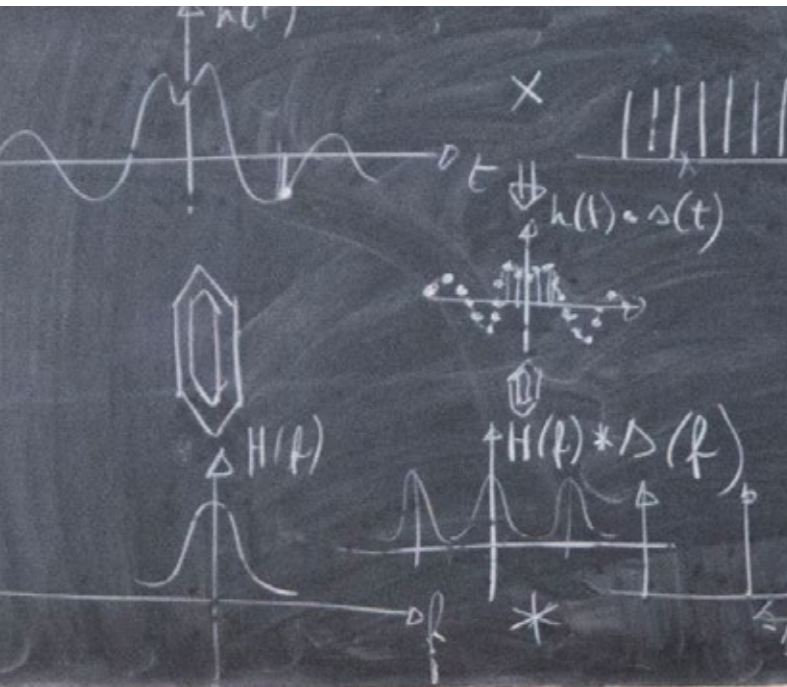
**Start date: October 1, 2021.**

**Total number of hours (number of ECTS credits): 3000 hours (120 ECTS credits)**

**Admission requirements: Bachelor Degree in Mathematics. We also accept applications by students with a Bachelor**



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## → Master Degree Course in **Physics**



### Context

The Master's Degree in **Physics** aims at completing the general basic training acquired in the Bachelor's Degree and at offering an advanced specific training in core areas of frontier Physics. More specifically, it strongly supports a multidisciplinary approach, which is reflected in several curricula.

### Learning objectives and outcomes

Graduates in Physics will be able to

- describe quantitatively phenomena of the physical world and build theoretical interpretative models;
- use and develop advanced laboratory equipment;
- master programming languages for physical applications and big data analysis;

and to

- use self-learning tools for rapid and continuous updating;
- work in a team, while possessing a high-level of autonomy, and smoothly join a workplace;
- present oral and written dissertations in a proficient English.

### Main topics

The educational offer consists of a common training area encompassing Computer Science, Mathematics, Chemistry, Physics and five specific areas covering:

- theoretical study and data analysis from Earth and Space, numerical simulation of astrophysical systems and Sun-Earth relations, **plasma physics**;
- theoretical, experimental and applicative study of **matter physics**, with particular reference to solid state physics, surface physics, biophysics and biomedicine;
- **physics and technology of materials**, with particular reference to soft matter, liquid crystals, optics and photonics, and the related characterization techniques;
- theoretical and experimental study of the **physics of fundamental interactions**, including the physics of elementary particles and the theory of quantum fields;
- physics of the atmosphere and weather and climate systems, in accordance with the Organization World Meteorology.

### Employability and careers

Graduates will be able to undertake PhD and post-graduate specialization schools or to enter the professional world. Career opportunities include research in Physics and Applied Physics in public and private institutions; technological applications in industries (optics, mechanics, electronics, etc.); radiation protection in healthcare companies and analysis laboratories; software development, data analysis and modeling of complex systems in banks, insurance and consulting companies.

### Keywords

**Astrophysics, geophysics and plasma physics.**  
**Matter physics.**  
**Physics and technology of materials.**  
**Nuclear and subnuclear physics.**  
**Physics of the atmosphere, meteorology and climatology.**

**Duration: 2 years**

**Start date: October 1, 2021.**

**Total number of hours (number of ECTS credits): 3000 hours (120 ECTS credits)**

**Admission requirements:**

- Bachelor Degree in Physics
- other degrees with at least 50 ECTS in Physics and 24 ECTS in Mathematics
- English language at the level B2



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