

# Engineering at the University of Padova



UNIVERSITÀ  
DEGLI STUDI  
DI PADOVA

SCHOOL OF ENGINEERING

since 1876

[ingegneria.unipd.it/en/](http://ingegneria.unipd.it/en/)

# The University of Padova Eight Centuries of History

The University of Padova, one of the most ancient and prestigious in the world and number one in Italy for the quality of its research results (ranking by the National Research Assessment Committee), dates back to 1222, and, thanks to the total freedom of thought in study and teaching it has consistently granted its students and faculty, it has always been a workshop of new ideas and the home of personalities who changed the cultural and scientific history of humanity. These include: Erasmus of Rotterdam, Nicolaus Copernicus, the father of modern astronomy, Andreas Vesalius, the founder of modern human anatomy, Galileo Galilei, the father of modern science, who taught in Padova from 1592 to 1610, and Elena Lucrezia Cornaro Piscopia, the first woman in the world to obtain a degree (in 1678).

Today Padova is a large multidisciplinary University which aims to provide its 61,000 students with both professional training and a solid cultural background.

The University of Padova consists of 8 Schools, that offer potential students 77 Bachelor's Degree Programmes, 92 Master's Degree Programmes, 39 Ph.D. Programmes, as well as a vast array of post-graduate courses.

Programmes are constantly updated in order to meet the ever-changing needs of the contemporary world, and a qualification from the University of Padova means having achieved an ambitious objective, recognised and valued in the labour market.

The University participates in various EU-funded international projects, as well as in the "Ciência sem Fronteiras" programme of the Brazilian Government and the Italy-China "Marco Polo" project.



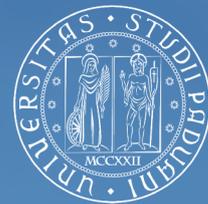
# The School of Engineering

Founded in 1876, the School of Engineering of the University of Padova is one of Italy's largest, with over 11,000 registered students, as well as being a leading institution in terms of teaching and research quality. It offers 12 Bachelor's, 19 Master's and 9 Ph.D. Degree Programmes, as well as International Summer and Winter Schools in the areas of Architectural, Civil, Environmental, Industrial and Information Engineering. It is member of the T.I.M.E. network, gathering 53 of the world's leading Technical Universities and Engineering Schools, and promoting academic excellence and relevance to the international labour market in the form of Double Degrees in Engineering and related fields. The School has its own team in the Formula SAE, an international student car design and racing competition, and its students have been awarded the first prize for "Business Plan" on the Hockenheim circuit (2009 and 2014), the first prize for "Acceleration" (2013) on the Silverstone circuit, as well as the first prize for "Skidpad" (2015) and "Engineering Design" (2016).

## Some Universities we have Co-operation Agreements with

- University of Melbourne, University of New South Wales, University of Sydney (Australia)
- Universidade de São Paulo (Brazil)
- École de Technologie Supérieure de Montréal, University of British Columbia (Canada)
- Dalian University of Technology, Harbin Institute of Technology, Shanghai Jiao Tong University, ShanghaiTech University, Southeast University, Tongji University (People's Republic of China)
- Aalborg University, DTU - Technical University of Denmark (Denmark)
- University of the South Pacific (Fiji)
- École Centrale de Lille, École Centrale Lyon, École Centrale de Marseille, École Centrale Nantes, École Centrale Paris, Université Pierre et Marie Curie - Paris 6 (France)
- Karlsruhe Institute of Technology, RWTH Aachen, TU Dresden, TU München (Germany)
- University of Tokyo, Waseda University (Japan)
- Universiti Putra Malaysia (Malaysia)
- COMIMSA - Corporación Mexicana de Investigación en Materiales (Mexico)
- Eindhoven University of Technology (Netherlands)
- NTNU - Norwegian University of Science and Technology (Norway)
- Instituto Superior Técnico Lisboa (Portugal)
- Lomonosov Moscow State University, Magnitogorsk State Technical University, Novosibirsk State Technical University (Russian Federation)
- Sungkyunkwan University (South Korea)
- Universitat Politècnica de Catalunya, Universidad Politécnica de Madrid, Universitat Politècnica de València (Spain)
- Chalmers University of Technology, KTH - Royal Institute of Technology (Sweden)
- École Polytechnique Fédérale de Lausanne, ETH Zürich (Switzerland)
- Imperial College London, University College London, University of Southampton (U.K.)
- Boston University, Duke University, Pennsylvania State University, Texas Tech University, University of Michigan (U.S.A.)

# A guide to Engineering studies



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## Degree Programmes in the Civil, Architectural and Environmental Engineering Area

### BACHELOR'S DEGREE PROGRAMMES (three years)

CIVIL ENGINEERING

ENVIRONMENTAL AND LAND PLANNING  
ENGINEERING

### MASTER'S DEGREE PROGRAMMES (two years)

CIVIL ENGINEERING

ENVIRONMENTAL  
ENGINEERING

MATHEMATICAL ENGINEERING

### SINGLE CYCLE MASTER DEGREE PROGRAMME (five years)

BUILDING ENGINEERING  
AND ARCHITECTURE



### CIVIL, ARCHITECTURAL AND ENVIRONMENTAL ENGINEERING

Civil Engineering historically aims at the training of technicians who can design, build and provide for the maintenance of civil works for the benefit of society. Civil Engineer's typical activities have expanded to an appreciable extent over the years, thanks to the advent of new technologies and increasingly powerful computing means, which allow to extend the prerogative of this professional figure to the formulation of proposals that are always original and in some respects unique, even when the design of interventions apparently similar to one another is addressed.

On the other hand, Environmental Engineering is a modern discipline that combines the demands derived from sanitary engineering with those related to water supply and to the protection from and prevention of natural disasters.

Environmental Engineers must grasp, in an organic way, the interrelationships between the various physical, biological and chemical processes occurring in the environment, in order not only to design infrastructure, but also to prevent situations of degradation and environmental risk, to remediate contaminated areas, and to assess and monitor environmental quality in its various forms.

Finally, Architectural Engineering, following a highly multidisciplinary approach aimed at integrating scientific-technical with technical-humanistic disciplines, deals with general aspects of building design and construction, conservation and restoration of existing buildings, (including historical and monumental) and analysis and design of land use changes.

## Degree Programmes in the Information Engineering Area

### BACHELOR'S DEGREE PROGRAMMES (three years)

INFORMATION ENGINEERING

BIOMEDICAL ENGINEERING

ELECTRONIC ENGINEERING

COMPUTER ENGINEERING

MECHANICAL AND MECHATRONIC  
ENGINEERING  
(mechatronic curriculum)  
*Vicenza campus*

### MASTER'S DEGREE PROGRAMMES (two years)

AUTOMATION ENGINEERING

BIOENGINEERING

ELECTRONIC ENGINEERING

COMPUTER ENGINEERING

TELECOMMUNICATIONS ENGINEERING

MECHATRONIC ENGINEERING  
*Vicenza campus*

Student Information Service:  
orientamento@dei.unipd.it



### INFORMATION ENGINEERING

Information Engineering identifies a galaxy of engineering disciplines to which the extraordinary development of acquisition, transmission and processing of information is due, together with the implementation and evolution of electronic technologies, micro and nano devices, and high integration circuits that made all this possible.

Moreover it also deals with the application of these techniques in many fields.

The world and the society in which we live are depending more and more on the new technologies that start and evolve thanks to information engineering. Just think for example of the huge progress made in the automotive field due to the integration of sensors, last generation electronic circuits with advanced control techniques and software applications that make the use of the machine more secure and versatile. We may also recall the impressive development of communications (through cables, wireless and satellite links, optical fibers, and cellular telephony) with the introduction of devices and electronic circuits that allow to transfer data at very high speed.

Think also to the development of computers, and most recently of smartphones, where the connection of electronic devices, computer science and telecommunications has allowed us to realize a multifunctional device that has changed our everyday life.

Pacemakers, implantable defibrillators, endoscopic capsules, high resolution image acquisition techniques are only a few examples of the impact that Information Engineering has had in the biomedical field. These are just a small sample of applications that are now of vital importance for science, research, health, life quality and for many services that we daily enjoy.

At the basis of these systems with high technology we always find Information Engineering, that has as objective the design, development, management and the innovation of these technologies. Considering the large amount of addressed topics, within the Information Engineering field, various disciplines have emerged, for which the University of Padova has always provided innovative courses.

## Degree Programmes in the Industrial Engineering Area

### BACHELOR'S DEGREE PROGRAMMES (three years)

AEROSPACE ENGINEERING

CHEMICAL AND MATERIALS  
ENGINEERING

ENERGY ENGINEERING

MECHANICAL ENGINEERING

ENGINEERING AND MANAGEMENT  
*Vicenza campus*

MECHANICAL AND MECHATRONIC  
ENGINEERING  
(mechanical curriculum)  
*Vicenza campus*

### MASTER'S DEGREE PROGRAMMES (two years)

AEROSPACE ENGINEERING

CHEMICAL AND PROCESS  
ENGINEERING

MATERIALS ENGINEERING

ELECTRICAL ENERGY  
ENGINEERING

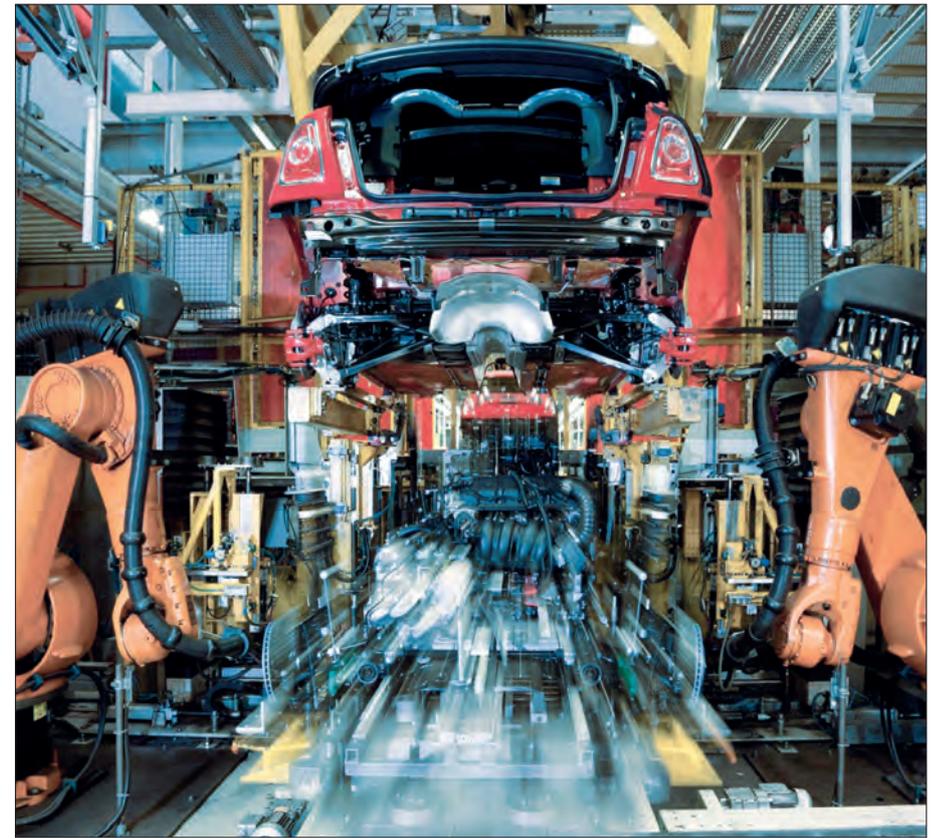
ENERGY ENGINEERING

MECHANICAL ENGINEERING

CIVIL AND INDUSTRIAL  
SAFETY ENGINEERING

ENGINEERING AND MANAGEMENT  
*Vicenza campus*

PRODUCT INNOVATION  
ENGINEERING  
*Vicenza campus*



### INDUSTRIAL ENGINEERING

The Industrial branch or Engineering is focused on activities, processes, components, materials and machines commonly associated with industry, but it has recently extended to other areas of application, such as service companies, public and private bodies and research centres.

It is the most variegated area of Engineering, divided into the following homogeneous sub-areas: Mechanics, Chemistry, Electronics and Management and Business Processes.

Within these sub-areas it is possible to identify further advanced and innovative sectors (Materials, Aerospace, Energy, Industrial Safety, Product Innovation, Mechatronics Operations).

The Industrial Engineer's educational path provides high-level competencies, suitable for the study and development of an extremely wide range of applications; from the synthesis of new compounds and materials, at the molecular scale, to the design of satellites and large plants, to the manufacturing and energy production industries, passing by many products of daily use, such as automobiles, mechanical and electrical components, engines, machinery and many more.

## CIVIL ENGINEERING



### Features and Aims

The Degree Programme provides a basic preparation in Physics and Mathematics, as well as technical training to interpret and solve Civil Engineering problems. It trains engineers able to design, build and provide for the maintenance of civil works (roads, bridges, railways, airports, hydraulic protection and regulation infrastructure). Specifically, the Programme teaches how to autonomously use both standardized and innovative design methodologies, as well as how to collaborate with technical experts from other disciplines in a multidisciplinary perspective.

### Classes

Mathematics, computing and numerical methods, statistical methods, rational mechanics, theoretical and applied physics, technical drawing, applied chemistry, structural analysis and design, engineering materials, topography and surveying, geotechnics, hydraulics and hydraulic engineering, technical architecture, a foreign language.

### Career Opportunities

Graduates may work in various professional fields such as computer aided design, manufacturing, management, and organization of technical and commercial structures; dealing with civil plants and infrastructure from an operational and designing point of view, with opportunities in private industry, consulting firms, and government.

## ENVIRONMENTAL ENGINEERING



### Features and Aims

The Degree Programme trains professionals capable of describing problems typical of land protection engineering, to set up and conduct experiments by analyzing and interpreting the data obtained, and to understand the impact of engineering solutions to the social and physical environment. In addition, Environmental Engineers cooperate in the design of components, systems and processes for environmental conservation and remediation, as well as in the design of interventions to protect and safeguard soil and land.

### Classes

Mathematics, physics, chemistry, technical drawing, programming and numerical computation, data analysis, applied physics, hydraulics, topography and surveying, structural analysis, elements of electrical engineering, hydrology, fluid machines, hydraulic engineering, sanitary engineering, systems for environmental quality management, geotechnics, environmental law, safety and risk analysis, phytoremediation.

### Career Opportunities

Graduates will be able to deal with systems for the control and monitoring of land and environment, waste treatment and collection, environmental remediation, management of water supply and other fluid networks, and evaluation of environmental impacts and compatibility of planning schemes and infrastructure.

## SINGLE-CYCLE DEGREE IN ARCHITECTURAL ENGINEERING



### Features and Aims

The Architect and Building Engineer studies the typological, architectural, structural and technological aspects of buildings: he/she is interested in their design, processing and restoration in relation to the natural, social, economic and productive environment in which they are located.

The approach is multidisciplinary and integrates scientific and technical disciplines with humanistic and architectural ones, so as to provide all the required tools for the design. Teaching is led through design and experimentation workshops, teamwork and interaction with the entire faculty.

### Classes

Mathematics, geometry, physics, building drawing, information technology, mechanics of materials and structures, structural analysis and design, science and structural engineering, hydrology for engineering, geotechnics, history of architecture, technical architecture, architectural and urban composition, restoration, estimate and economic evaluation of projects, industrial architectural components design, materials technology, building physics and indoor environment, urban planning and technical planning, foreign language.

### Career Opportunities

The Master graduate is involved in the advanced and innovative environment design in the fields of building works, planning and territorial management of complex systems, construction of infrastructural networks, design process and implementation of the recovery and restoration of the historic heritage. He or she works in professional engineering and architecture offices, in the industries of building materials and components, in management companies and in real estate services, in quality control, safety, coordination and planning services, in the technical offices of public authorities and industrial companies.

**Single-Cycle Master's Degree Programme, 5 years' duration**

## INFORMATION ENGINEERING



### Features and Aims

The Bachelor's Degree Programme in Information Engineering is the first main step for students that aim at pursuing a Master degree in the area of Information Engineering. This degree provide in-depth knowledge in physics and mathematics and in the area of information.

The student will acquire extensive knowledge of methodologies both in basic study subjects and in those characterizing Information Engineering, with design capabilities in the most innovative technological fields, based on the use of the most modern tools.

The degree programme also includes laboratories and application exams in order to allow the student to apply the acquired theoretical notions.

### Classes

Linear algebra and geometry, mathematical analysis, computer architecture, general physics, introductory computer science, data structures and algorithms, automatic controls, electronics, signals and systems, circuit theory, foundations of artificial intelligence, principles of telecommunications, history of information technology, commutative algebra.

### Career Opportunities

The professional outcomes are typical of the innovation and development of the production, of design, planning, programming and system management, both within manufacturing or service industries or within services in the public administration.

The graduates will find occupation in companies operating in the sectors of information technology, electronics, bioengineering, automation and telecommunications.

## BIOMEDICAL ENGINEERING



### Features and Aims

The curriculum provides knowledge on the engineering methodologies and technologies applied to health science, aimed at favouring a fast job placement. First-year classes (in common with all the other Bachelor's Degrees Programmes in the Information Engineering Area) provide basic knowledge in mathematics, physics and computer science, followed in the second and third years by more specialized classes focused on the foundations of information, mechanical and chemical bioengineering as well as of other disciplines in the area of Information Technology.

Thanks to his/her multidisciplinary preparation, the Biomedical Engineer is able to face problems related to the impact of technologies on human and biological world, working at different levels in industrial and service companies.

### Classes

Mathematics, physics, computer science (principles, computer architectures, data structures and algorithms), circuit theory, principles of automation, signals and systems, electronics (principles and instrumentation), principles of mechanics, data processing, biomedical signals and images, biomedical technology and instrumentation, biomechanics, biomaterials. Laboratory work is associated to several classes. Three classes are available for choice: chemistry of biological molecules, bioelectromagnetism, elements of mathematical biology.

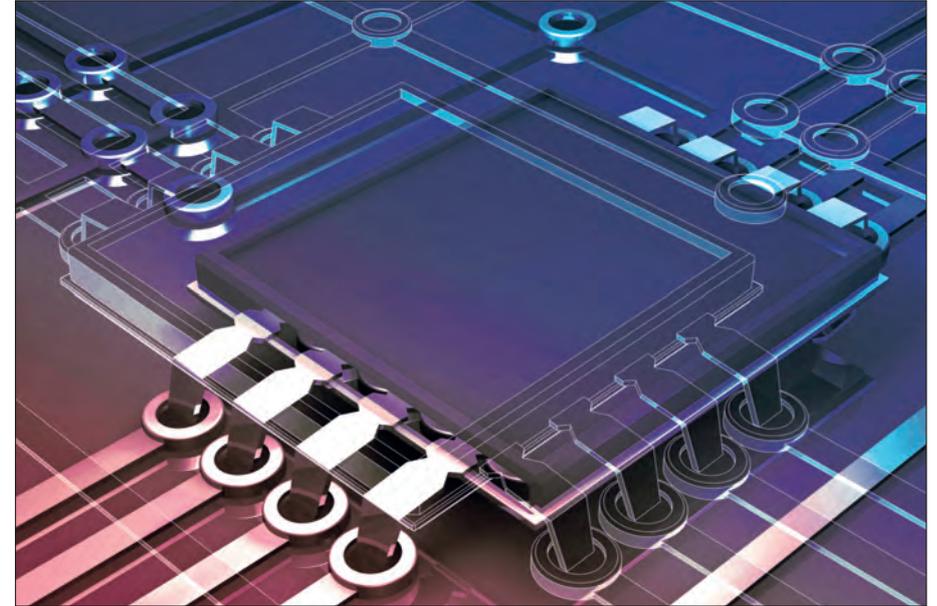
### Career Opportunities

Biomedical industrial companies (manufacturing and marketing of equipment and devices for diagnosis/health care/rehabilitation/monitoring, of biomaterials and biosensors, of robotic systems for biomedical applications, of artificial organs and of functional support systems for disables).

Healthcare systems and biomedical/clinical service companies (design of sanitary information systems, management of biomedical technologies and telemedicine applications).

Pharmaceutical, food, biotech and environmental companies.

## ELECTRONIC ENGINEERING



### Features and Aims

First-year classes (in common with all the other Bachelor's Degrees Programmes in the Information Engineering Area) provide basic knowledge in mathematics, physics and computer science.

The curriculum aims at training a junior Electronic Engineer in analyzing, planning, constructing, checking, assessing and modifying electronic devices. The curriculum is strongly multidisciplinary and includes basic classes on physics, mathematics and computer science, as well as more specialized classes on analog and digital electronic circuits design, microinformatics, microprocessors and microcontrollers, digital signal processing, power electronics, automation and control theory, computer networks, telecommunication systems.

### Classes

Linear algebra and geometry, mathematical analysis, computer architecture, general physics, introductory computer science, data structures and algorithms, automatic controls, electronics, signals and systems, circuit theory, foundations of artificial intelligence, principles of telecommunications, computer networks, elements of software engineering, digital electronics, training is extensively based on experimental work, carried out within the following teaching laboratories: industrial automation laboratory, electronic circuit simulation and design laboratory, FPGA digital electronic design laboratory, electronic measurement and instrumentation laboratory.

### Career Opportunities

Junior Electronic Engineers find employment in a wide number of different industrial companies manufacturing electrical, electromechanical and electronic systems and apparatus, telecommunication and computer network systems, control and automation systems.

A non-exhaustive list includes companies involved in the generation, control and management of electrical power; companies producing industrial electrical and electronic systems and power electronics; companies designing and manufacturing electronic devices and systems for biomedical applications; companies involved in the photovoltaic sector and in the design and manufacturing of solid state lighting systems using LEDs; engineering consultant companies, managing telecommunication systems and computer networks.

## COMPUTER ENGINEERING



### Features and Aims

The Bachelor's Degree Programme in Computer Engineering provides professional capabilities needed for the design, development and maintenance of systems for information processing and for various application scenarios. First-year classes (in common with all the other Bachelor's Degree Programmes in the Information Engineering Area) provide basic knowledge in mathematics, physics and computer science.

From the second year on, the curriculum focuses on the main methodologies and practical aspects (through lab work) of Computer Engineering, as well as on the foundations of the other disciplines in the area of Information and Communication Technology.

### Classes

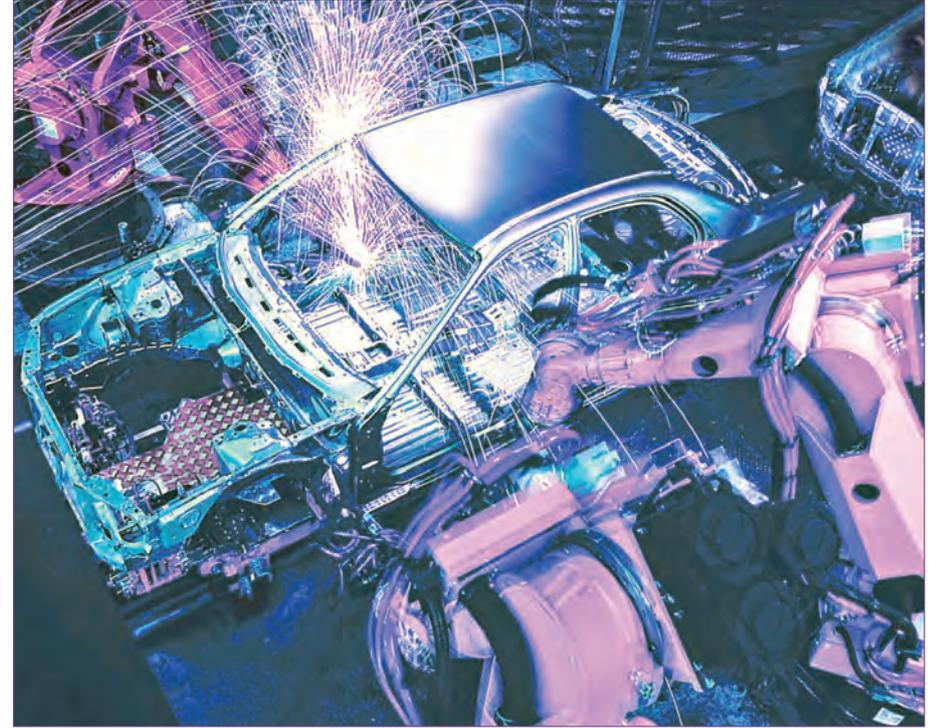
Linear algebra and geometry, mathematical analysis, computer architecture, general physics, introductory computer science, data structures and algorithms, automatic controls, electronics, signals and systems, circuit theory, foundations of artificial intelligence, principles of telecommunications, computer networks, elements of software engineering, digital electronics, embedded systems programming.

### Career Opportunities

Design and development of enterprise information systems; service automation in the private and public sector; development of distributed and multimedia applications with special focus to the Internet; deployment of general and special purpose computing systems; factory automation.

Graduates feature professional skills aimed at mastering current state-of-the-art technology.

## MECHANICAL AND MECHATRONIC ENGINEERING (Mechatronic Curriculum)



### Features and Aims

This Programme trains engineers to be able to implement the integration and control of mechanical and electronic components for the realization of automation systems for the mechanical and manufacturing industry. The Programme provides the fundamental knowledge required in the field of Information Engineering and Industrial Engineering, placing particular emphasis on interdisciplinary aspects. Practical training in laboratories and companies is foreseen.

### Classes

Mathematical analysis, business administration and organization, computer science, physics, linear algebra and geometry, chemistry and metallic materials, english, electrical science, applied thermodynamics and heat transfer, theoretical and applied mechanics, signals and systems, industrial plants, machine design, control theory, analog and digital electronics, fundamentals of electrical machines and drives, instrumentation and measurement for the automation, programming languages for industrial systems, electrical safety in mechatronic systems.

### Career Opportunities

Mechanical and manufacturing companies that design and manufacture machines and systems with integrated electronic devices; electromechanical and electronic companies that design and manufacture equipment and control systems for machines and mechanical systems; Industries in the fields of domotics, iron and steel processing, food processing, jewellery, textile, and paper making etc.

Campus: Vicenza

## AEROSPACE ENGINEERING



### Features and Aims

An interdisciplinary Programme aimed at designing, managing and testing space vehicles and their subsystems for civil, industrial and scientific applications. In space applications in particular, it's fundamental to have a grasp of the most relevant scientific concepts necessary to cooperate with other scientific environments such as astronomy, planetary sciences, biosciences, and condensed matter physics .

### Classes

Students have to obtain a solid science-based preparation by applying themselves not only to those fields common to Industrial Engineering (mathematics, physics, geometry, technical drawings, fluid mechanics, solid mechanics, thermodynamics, thermal exchange, electrical engineering etc.), but also to specific aerospace-oriented cultural threads such as aerodynamics, aerospace structures, flight dynamics and "on board installations and systems".

### Career Opportunities

Didactic experiences in Italy and abroad suggest that the formation of a well-rounded technician in the aerospace sector requires more than three years. However, as past students have shown, after a three-year Programme it will be possible to find jobs in the design, management and testing sectors of the best national and international aerospace companies.

## CHEMICAL AND MATERIALS ENGINEERING



### Features and Aims

The Programme offers a multidisciplinary scientific education, with a broad range of specializations: from chemical plant design to pollution prevention and management, from environmental assessment to industrial safety, from energy production to biotechnology applications, from innovative materials design to materials processing and production.

### Classes

General and inorganic chemistry, organic chemistry, mathematical analysis, linear algebra and geometry, numerical methods, physics, economics and business organization, physics, fundamentals of process engineering, English language, solid mechanics, fundamentals of materials science, thermodynamics, transport phenomena, physical metallurgy, science and technology of polymer materials, unit operations, industrial chemical processes, electrochemistry, internship.

### Career Opportunities

Chemical and Materials Engineers are employed by raw materials processing industries, fuel and power companies, engineering design & construction companies, public and private research and development centres, environmental service and waste treatment companies, safety and risk analysis service companies.

## ENERGY ENGINEERING



### Features and Aims

The Programme provides the basic knowledge necessary to operate in the production, distribution and use of energy in its various aspects (mechanical, electrical, thermal, chemical), and to evaluate its interactions with environment, economy and standardization. The areas of application and employment are related to different fields of application: economy and energy saving, transformation and utilization of energy by means of special machines and industrial and civil installations (electrical, mechanical, thermal), environmental impact, renewable energies.

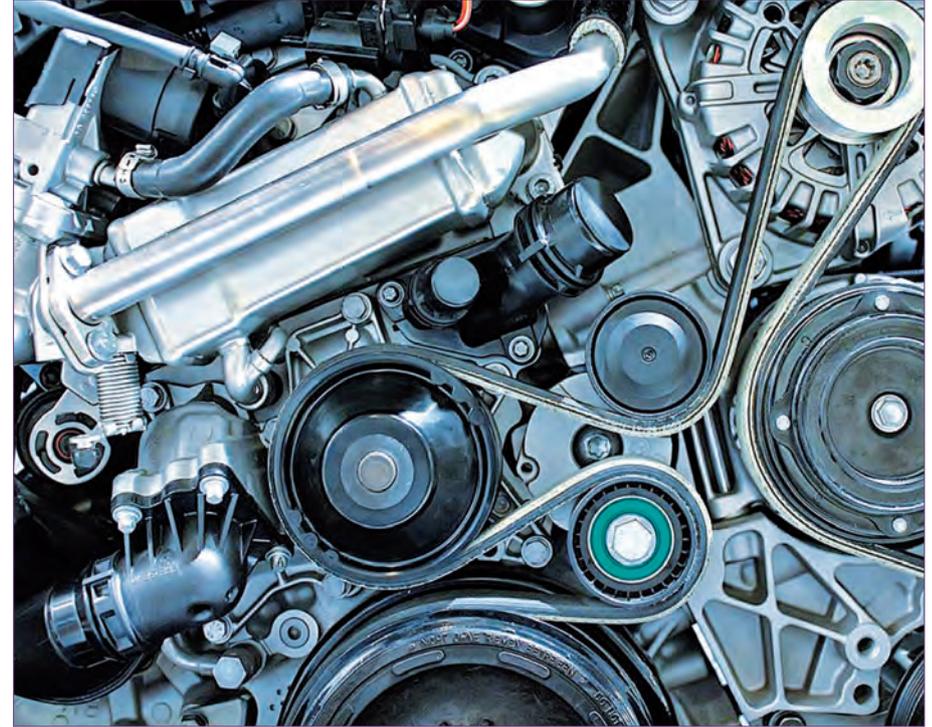
### Classes

Mathematics, numerical methods, physics, chemistry, industrial technical drawing, thermodynamic and heat transfer, electrical engineering, mechanical machines, electrical machines, mechanical engineering, electrical systems, power plants, energy economics, electronics and other courses chosen by the student, such as fluid mechanics, fuels and combustion, control theory and application, computer science.

### Career Opportunities

The Energy Engineer works for companies which produce and distribute energy as energy manager of the technical department of public administrations, for companies producing equipment for the use of heat and cold, for company dealing with energy transformation and utilization, and for companies which produce mechanical equipment and electrical systems.

## MECHANICAL ENGINEERING



### Features and Aims

The Programme foresees two curricula: one Industrial and one Educational.

The Industrial curriculum, thought for immediate employment in the labour market, provides education aimed to toward components, machines and mechanical systems design, production and management functions in the industrial field. The Educational curriculum aims to provide students with the sound theoretical background necessary for the Master's Degree Programme, in which competences in high-tech and innovative mechanical products and systems design and production will be developed.

### Classes

Mathematics, physics, engineering drafting, business administration and organization, materials, applied thermodynamics and heat transfer, applied mechanics, mechanics of solid materials, fluid mechanics, energy conversion systems and fluid machines, electrical science, industrial plants, machine design, manufacturing processes and systems, mechanical and thermal measurement systems, computer-aided design, computer-aided structural analysis, computer-aided manufacturing engineering, internship.

### Career Opportunities

A Mechanical Engineer can easily find employment in all the main industrial sectors, in engineering offices, and in technical departments of public and private bodies. Typical examples are the design and production of mechanical components, machines and plants; design of processes for mechanical industry; management of production or design departments; planning and organization of maintenance activities; participation in the executive staff of technical departments, generating stations, public utilities or similar companies; employment in engineer offices, in industrial laboratories, etc.

## ENGINEERING AND MANAGEMENT



### Features and Aims

The Programme is designed to play a key role in preparing the next generation of managers, professionals and entrepreneurs in the engineering and management field, who combine a strong and valuable scientific and technical knowledge with business and management acumen and capabilities. During the Programme, students will develop Industrial Engineering skills and expertise, alongside knowledge of business and management techniques, tools and best practices which make them able to cope with and solve complex and multidisciplinary problems.

### Classes

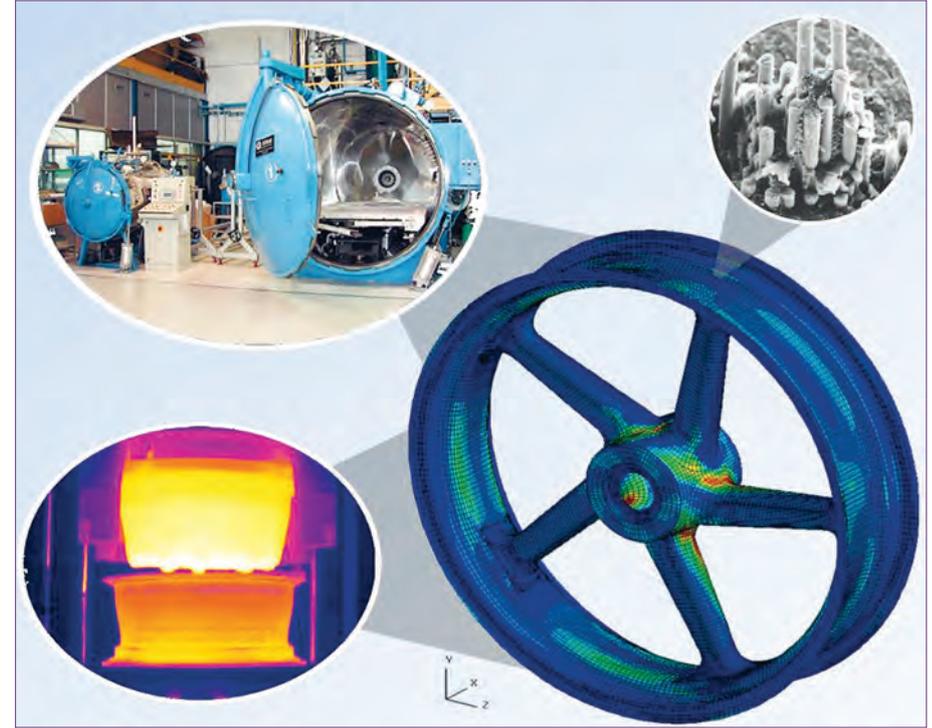
Mathematical analysis, chemistry and metallic materials, physics, applied thermodynamics and heat transfer, linear algebra and geometry, computer science, statistics, business administration and organization, theoretical and applied mechanics, principles of electrical science, industrial plants, control theory, energy conversion systems and machines, business and engineering economics, operations research, operations and supply chain management and manufacturing processes and systems, English B2. Student can also choose two classes out of: applied acoustics, production economics, information systems, machine design.

### Career Opportunities

Management Engineers work in different positions and have jobs in industrial and service companies, consulting firms, banking, insurance and public administration. A wide-reaching range of activities in areas such as new product and service design, production and logistics processes, purchasing, sales and marketing, cost management, technology and innovation, organization and human resources management, project management are their natural professional outlet after graduation.

**Campus: Vicenza**

## MECHANICAL AND MECHATRONIC ENGINEERING (Mechanical Curriculum)



### Features and Aims

This Programme is aimed at training engineers in the application of innovative and conventional approaches for the achievement of products and mechanical systems, from the design stage to the use of materials and manufacturing processes.

The Programme provides the fundamental knowledge in the field of Mechanical Engineering for product and process innovation, design of machines and systems, material selection, and process and plant management. Training experiences in laboratories and companies complete the curriculum.

### Classes

Mathematical analysis, business administration and organization, computer science, physics, linear algebra and geometry, chemistry and metallic materials, english, electrical science, engineering drafting, materials science and engineering, applied thermodynamics and heat transfer with laboratory, theoretical and applied mechanics with laboratory, industrial plants, metallic materials and heat treatments, machines and compressors, manufacturing processes and Cam, machine design with laboratory, fluid mechanics, mechanics of solid materials.

### Career Opportunities

Mechanical and manufacturing companies that design and manufacture machines and mechanical systems in the fields of mechanics and electromechanics, robotics and automation, foundry, jewellery, textile, paper, energy conversion, as well as in logistic and service companies.

**Campus: Vicenza**

## Master's Degree Programmes in the Civil, Building and Environmental Engineering Area

### CIVIL ENGINEERING

Starting from the classical theories and using the most modern computational methods, the Master's Degree Programme in Civil Engineering allows students to investigate the structural, hydraulic, geotechnical and transportation aspects of civil works, in order to devise interventions characterized by the highest efficiency and functionality and, at the same time, are well-placed in the context in which such interventions are made.

### ENVIRONMENTAL ENGINEERING

The Master's Degree Programme is the natural completion of the Bachelor's Degree Programme and aims at preparing graduates who, through a multidisciplinary approach that considers different legal, chemical and physical, geological and geotechnical, as well as hydraulic and hydrologic aspects, is able to design and manage engineering solutions with minimal impacts on the social and physical environment.

### MATHEMATICAL ENGINEERING

The Mathematical Engineer has the following competences: deep knowledge of applied mathematics and sciences along with advanced general aspects in Engineering and/or Finance; advanced competence to deal with the development and use of mathematical models; ability to cooperate in multi-disciplinary environments; ability to deal with advanced modelling problems in engineering and/or financial and/or physics applications.

## Master's Degree Programmes in the Information Engineering Area

### AUTOMATION ENGINEERING

Systems and Control Engineering has countless applications in virtually every industrial area and in everyday life. Its focus is the automatic management of processes, plants and resources with the aim of optimizing performances. Systems and Control Engineers are key figures in the information society and it is foreseeable that this trend will continue into the future.

### BIOENGINEERING

Biology and Medicine offer new and challenging problems to be faced with engineering methods. The bioengineer, thanks to her/his interdisciplinary-oriented education, is able to work in different areas: technological, industrial, scientific, clinical and healthcare, with the aim to describe, design and analyze systems and processes of biological-medical interest.

### ELECTRONIC ENGINEERING

Electronics is essential for the development of information technologies and of systems for high efficiency energy generation, control and conversion, as well as in information processing and communication, biomedical systems, photovoltaic plants, and LED solid-state lighting. An Electronic Engineer is a versatile professional, largely employed by industry for the design and testing of new components and systems.

### COMPUTER ENGINEERING

The Master's Degree Programme in Computer Engineering offers a thorough coverage of the theoretical foundations and applications of this pervasive discipline. Graduates will be able to design, analyze and manage complex and innovative information processing systems to be employed in several socio-economic contexts where computing plays a major role.

### MECHATRONIC ENGINEERING

The Master's Degree Programme in Mechatronic Engineering aims to train engineers who are able to integrate electronic and mechanical components, sensors, actuators and control systems. The Mechatronic Engineer is a versatile professional largely required by industry in the roles of design and/or implementation of advanced automation and production.

### TELECOMMUNICATIONS ENGINEERING

Communications systems and networks have become essential for our lives. Just think of the Internet, mobile devices, and multimedia (data, audio and video). A Telecommunications Engineer is a multidisciplinary and sought-after professional, able to optimally design and manage such systems.

## Master's Degree Programmes in the Industrial Engineering Area

### AEROSPACE ENGINEERING

The Master's Degree Programme aims to provide specific knowledge in the fields of design, management and technological advancements regarding space vehicles and their subsystems for industrial, civil and scientific applications. Students must possess the intellectual curiosity that will help them deal with all types of innovative technological requests.

### CHEMICAL AND PROCESS ENGINEERING

The Programme aims at educating professionals that know how to alter the chemical, biochemical or physical state of a substance, from the molecular scale to the plant scale. Chemical Engineers can design and operate the processes and plants that industrially manufacture the products we encounter in our everyday life (e.g., fuels, synthetic fibres, foodstuffs, pharmaceuticals, detergents).

### CIVIL AND INDUSTRIAL SAFETY ENGINEERING

The Programme aims to provide solid basic knowledge in safety, as well as specific skills in the field of analysis of the risk of industrial and civil installations, management of technical methods of quality, safety of civil structures, industrial processes and work environments. Graduates will feature professional problem solving skills.

### ELECTRICAL ENERGY ENGINEERING

The Programme provides in-depth, yet wide range, knowledge in both the conventional and the most innovative electrical energy applications (electrical plant and electromechanical engineering, generation from renewable sources, electrical propulsion, industrial applications, etc.), extending employment opportunities beyond the strict sector of Electrical Engineering.

### ENERGY ENGINEERING

The Master's Degree Programme in Energy Engineering has been developed to prepare a highly qualified engineer able to:

- operate in the field of advanced design,
- integrate conventional and renewable energy systems, be competent in the field of energy production and the optimization and management of energy facilities.

### ENGINEERING AND MANAGEMENT

The Master's Degree Programme in Engineering and Management educates the professional figure of an Engineer-Manager specialized in planning and managing systems, characterized by a high level of interaction between technical, economical and organizational variables. The Programme thus provides students with the knowledge and competences needed to cope with complex problems, where a multidisciplinary approach is required.

### MATERIALS ENGINEERING

The Master's Degree Programme in Materials Engineering allows the development of an Engineer endowed with specific knowledge, able to carry out high level activity of development, processing, and testing in the field of materials. Their expertise lies in understanding the properties and behaviours of different substances, from raw materials to finished products.

### MECHANICAL ENGINEERING

The Programme provides a sound knowledge of high-tech and innovative mechanical products and systems design, production and management.

Curricula: machine design, mechanical systems dynamics, energy conversion systems and fluid machines, systems for heating and refrigeration, manufacturing processes and systems, design and manufacture using polymers and composites.

### PRODUCT INNOVATION ENGINEERING

The Programme aims to train a Mechanical Engineer able to design and develop innovative products and industrial processes on the basis of the most recent innovation on advanced design methodologies and approaches, the use of conventional and innovative materials, new technologies and the most modern and advanced manufacturing processes.

## Departments of the School of Engineering

### Department of Civil, Architectural and Environmental Engineering - ICEA

Via F. Marzolo, 9- 35131 Padova  
EMAIL: [didattica@dicea.unipd.it](mailto:didattica@dicea.unipd.it)  
[www.dicea.unipd.it](http://www.dicea.unipd.it)

### Department of Industrial Engineering - DII

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### Department of Information Engineering - DEI

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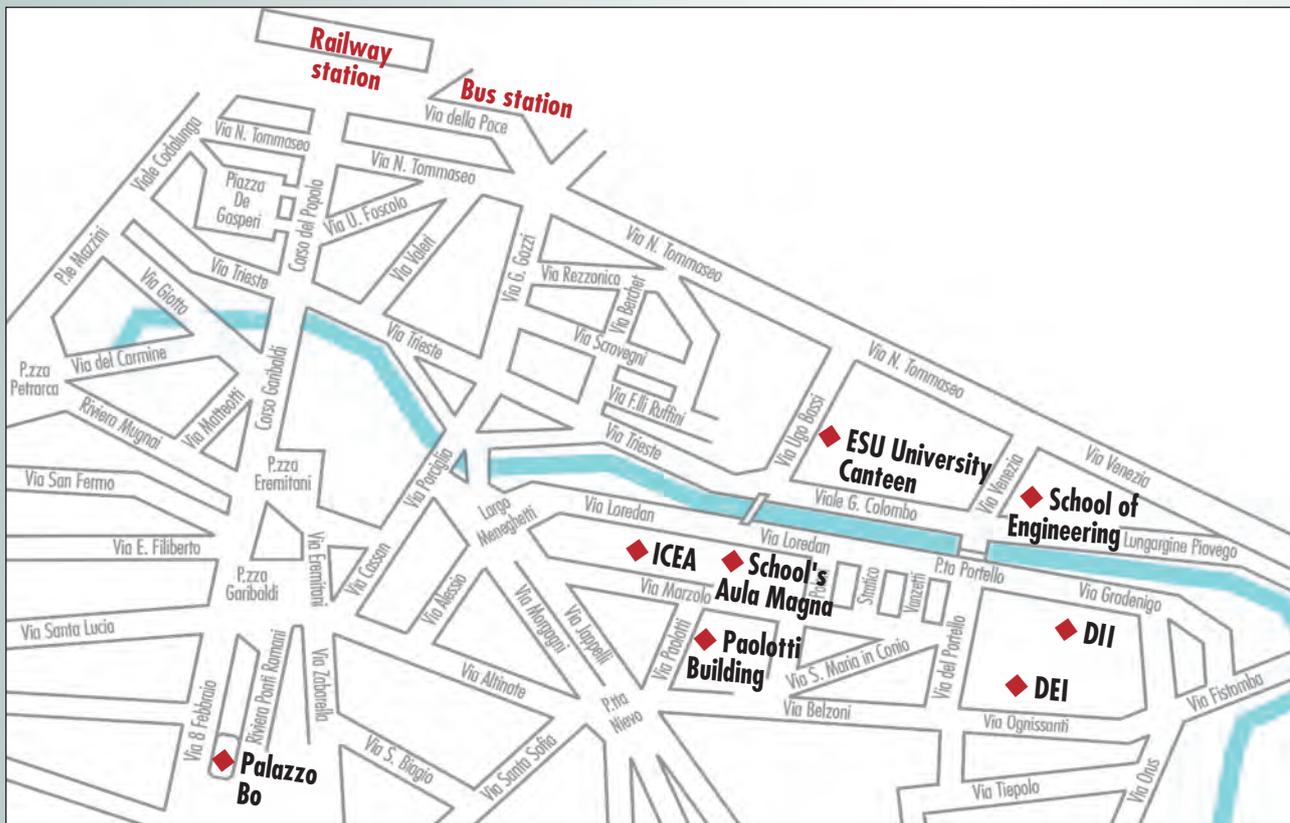
### Department of Management and Engineering - DTG

Stradella S. Nicola, 3 - 36100 Vicenza  
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[www.gest.unipd.it](http://www.gest.unipd.it)



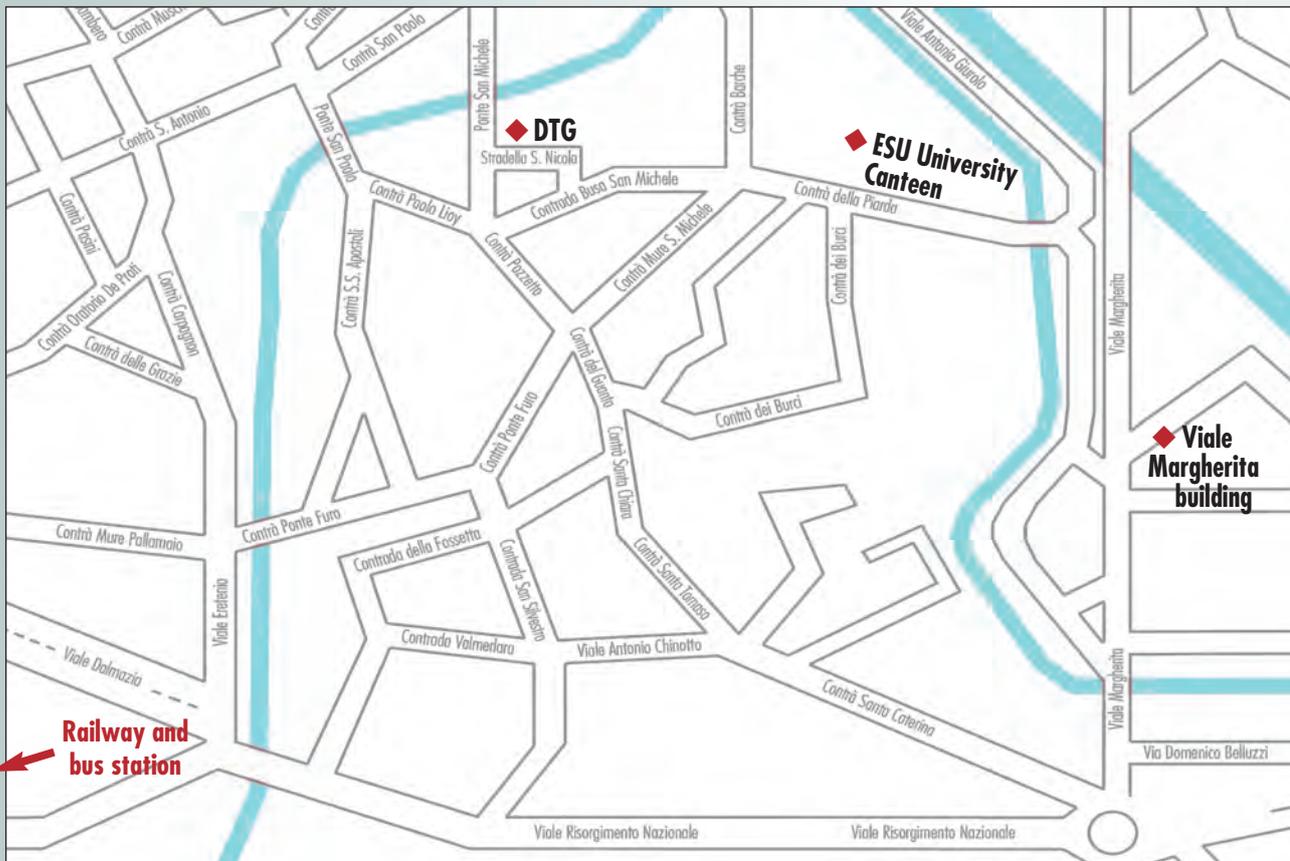
[ingegneria.unipd.it/en/](http://ingegneria.unipd.it/en/)





## Padova Campus

- ◆ School of Engineering
- ◆ DEI (Department of Information Engineering)
- ◆ Paolotti Building
- ◆ ESU University Canteen
- ◆ School's Aula Magna (Great Hall)
- ◆ DII (Department of Industrial Engineering)
- ◆ ICEA (Department of Civil, Architectural and Environmental Engineering)



## Vicenza Campus

- ◆ DTG (Department of Management and Engineering)
- ◆ ESU University Canteen
- ◆ Viale Margherita Building



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