

## Programmes :

### Master's Degrees ( 120 credits )

- in Biomedical Engineering
- in Chemical and Materials Engineering
- in Civil Engineering
- in Computer Science
- in Computer Science and Engineering
- in Cybersecurity
- in Data Sciences
- in Electrical Engineering
- in Electro-mechanical Engineering
- in Mathematical Engineering
- in Mechanical Engineering
- in Physical Engineering



[www.uclouvain.be/epl](http://www.uclouvain.be/epl)





## Belgian innovations shape our lives (and our smartphones)

At the heart of Europe with an entrepreneurial spirit and attractive teaching and research programmes, Belgium is a cradle of innovation. With its campus in one of Europe's first science parks, the Louvain School of Engineering (EPL) encourages rich partnerships between academia and industry. In the past 5 years, a dozen spin-offs have come out of the school. EPL is aware that its graduates not only need to be top engineers in their field, but that they have to develop the soft skills and management expertise necessary to become successful entrepreneurs.

To this end, EPL has developed a number of programmes introducing students to entrepreneurship and encouraging their creative thinking. Programmes such as Startech, CPME, and Innovation Classes are complementary to the already strong learning-by-doing culture at Université catholique de Louvain.

Finally, EPL is fully aware of the incredible pace at which technologies evolve and the challenge that this creates for the training of engineers. The Louvain School of Engineering has decided to take on this challenge by: 1) remaining a Polytechnic passing on to its students strong foundations in the core fields of Mathematics, Chemistry, Physics and Computer Science; and by 2) developing targeted programmes designed to fully embrace the opportunities and challenges linked to fast paced technological advances such as a Master's degree in Cybersecurity and a Master's degree in Data Sciences.

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## A top university...

UCL is one of Belgium's and Europe's leading universities. For almost 600 years, it has welcomed students from across the world regardless of their political or religious beliefs. The University strives to be multicultural, multilingual, open and tolerant.

- 30,000 students, of whom 5,700 come from abroad and represent 120 nationalities
- 5,800 academics, scientists, administrative and technical collaborators
- 185 Master's Degree programmes in all fields of study
- 22 doctoral schools
- 21 research institutes, 25 technology platforms
- 3 science parks, 61 spin-offs
- 150 million euros in research grants per year
- 150,000 alumni worldwide.

### ... RIGHT IN THE HEART OF EUROPE AND...

EPL is located on UCL's main campus, Louvain-la-Neuve, just south of Brussels. It is close to the European Union's Headquarters and, most importantly, conveniently linked to the main capitals of Europe. Walking to the small train station of Louvain-la-Neuve will get you to Paris by train in 2 hours, to London in 2 1/2 hours, to Amsterdam and Frankfurt in 3 hours! Furthermore, the campus is approximately 30 km away from Brussels South Charleroi, one of the largest European hubs of low-cost flights.

### ... NESTED IN A STIMULATING AND SECURE ENVIRONMENT

The pedestrian campus of Louvain-la-Neuve spans over a 2 km (1.3 miles) radius and is bordered by 300 hectares (750 acres) of woods. This calm yet connected environment has also been chosen to host offices of approximately 270 companies including world leaders such as AGC Glass Europe HQs, Ion Beam Application (IBA), Lhoist or GlaxoSmithKline (GSK).



While EPL's campus offers a stimulating environment for both students and researchers, it also favours one's personal development and well-being. Sport is a good way to meet others and integrate with the student population. With an offer of over 90 sports during the academic year, UCL gives you the opportunity to practice your favorite sports or discover new ones. The Blockry Center offers both indoor facilities - 24 sports halls, a major climbing wall (1900m<sup>2</sup>, 16m high- 6200 square feet, 52ft high) a new athletic track to be built in 2018- and 13 ha (32 acres) of outdoor fields. UCL students have access to all these infrastructures and services for only 30€ as the university covers part of the costs.

A strong emphasis is also placed on culture. Theatre, cinema, concerts, shows, exhibitions, conferences – cultural activities abound at UCL. This is hardly surprising as the university invests heavily in culture inviting each year an artist in residence and organizing a cultural season comprising as many as 50+ cultural events. Finally, our school is in close proximity to the university museum the "Musée L".

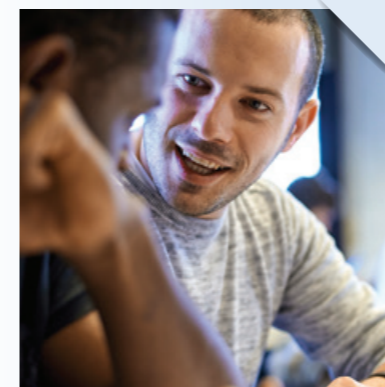


# Study Cycles and Programmes

## Three cycles: from a Bachelor's degree to a PhD

1 <sup>st</sup> CYCLE	2 <sup>nd</sup> CYCLE	3 <sup>rd</sup> CYCLE
BACHELOR	MASTER	PhD
180 credits - 3 years	120 or 60 credits 2 years ou 1 year	180 credits
	ADVANCED MASTER	
	60 credits - 1 year	

## The programmes of the Louvain School of Engineering



### BACHELORS



● Engineering

• Computer Sciences



### MASTERS



- Biomedical Engineering
- Chemical and Materials Engineering
- Civil Engineering
- Computer Science
- Computer Science and Engineering
- Cybersecurity
- Data Sciences
- Electrical Engineering
- Electro-mechanical Engineering
- Mathematical Engineering
- Mechanical Engineering
- Physical Engineering

• Computer Sciences



### ADVANCED MASTERS



- Nuclear Engineering
- Nanotechnology

PhD IN SCIENCES AND TECHNOLOGIES

### LEGEND

● Direct admission for EPL's Bachelors in Engineering

## ADMISSION FOR INTERNATIONAL STUDENTS AND SCHOLARSHIPS

While there is an admission exam to read for a Bachelor degree, there is no such examination for Master degrees. Yet applicants should satisfy the following requirements:

- To have successfully obtained a bachelor degree in engineering.
  - To have solid bases in all four domains: Applied mathematics, Chemistry, Mathematics, Physics.
  - Should English not be the applicant's mother tongue, it is highly recommended that she/he has a B2 score (IELTS 5.5-6; TOEFL IBT 65-78).
  - Proficiency in French is an asset.
  - EPL encourages excellence by awarding each year merit-based scholarships.
- For further information : [infohoistscholarship@uclouvain.be](mailto:infohoistscholarship@uclouvain.be).

Cti

Commission des Titres d'Ingénieur

EUR-ACE®

EPL has been awarded the EUR-ACE® which is the European quality label for engineering degree programmes at First Cycle (Bachelor) and Second Cycle (Master) level.



## Master in Biomedical Engineering

[120 credits]

<b>Programme:</b> <a href="http://www.uclouvain.be/en-prog-gbio2m">www.uclouvain.be/en-prog-gbio2m</a>	<b>Campus :</b> Louvain-la-Neuve	<b>Day schedule</b>
<b>Duration:</b> 2 years	<b>Language:</b> English	<b>Activities in other language:</b> YES
	<b>Internship:</b> optional	

### TO HELP PROVIDE BETTER DIAGNOSIS AND TREATMENT TOOLS

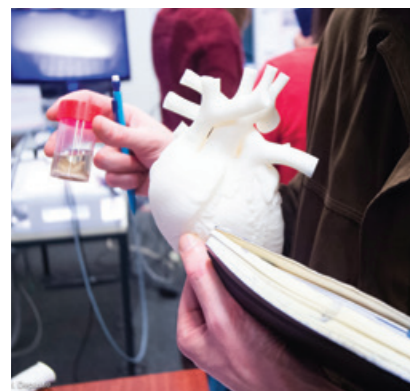
Engineers are capable of deploying analytical tools to interpret complex datasets, modeling interconnected systems capturing multiscale behaviors, and inventing new technologies to improve the environment. Over the last decades, the field of biomedical engineering progressively emerged next to more traditional segments of engineering. Biomedical engineers are able to apply their analytical, modeling, and inventiveness skills to projects involving living systems, like humans. They can develop tools to interpret large medical image datasets. They can also build models capturing complex human behaviors and simulating pathologies. They can further design advanced technologies to better treat cancers and to provide robot-assisted neuro rehabilitation. In short, they help provide better diagnosis and treatment tools for improving the quality of life of a wide variety of patients.

### BOTH GENERALISTS AND SPECIALISTS

At UCL, the Master in biomedical engineering is accessible to students holding a bachelor degree in engineering, if possible with a minor (or equivalent) in biomedical engineering. Building upon this mixed education in mathematics, physics, chemistry, information technology (IT) and life sciences (biology, physiology and anatomy), the Master offers both a panel of entry-level classes in all the main fields of biomedical engineering, and the possibility to specialize in an elected field. Degree holders are thus both "generalists", in the sense that they master the fundamental concepts of all biomedical engineering disciplines, and "specialists" in the field they have elected. Compulsory classes cover bioinformatics, bioinstrumentation, biomaterials, biomechanics, medical imaging, and the modelling of biological systems. The elective tracks correspond to fields in which our university developed a strong research expertise over the past years, namely clinical engineering, biomedical data analysis and bioinformatics, biomaterials, biomechanics and medical robotics, medical physics and medical imaging.

### INTERSECTING CLASSES AND INTERNSHIPS

Moreover, our Master students take part in several projects during their studies. Early in the Master, they carry out an industrial project covering all the non-technical aspects facing a biomedical engineer in an industrial context: management of intellectual property, medical certification, negotiation with the social security system to obtain financial support, etc. During the second year of their master, students complete a master's thesis bringing them in a research lab to work on a project related to their elected track. Last but not least, students can complete their programme with "Louvain-specific" multidisciplinary classes e.g. in management and creation of SMEs, student mentoring, innovation, etc. or with an internship in a biomedical company or in the clinical engineering department of a hospital. In this respect, UCL with its fully fledged medical sector and its 2 university hospitals (approx. 2 000 beds) offers great hands-on opportunities for students who have chosen this field.



## Master in Chemical and Materials Engineering

[120 credits]

<b>Programme:</b> <a href="http://www.uclouvain.be/en-prog-kima2m">www.uclouvain.be/en-prog-kima2m</a>	<b>Campus :</b> Louvain-la-Neuve	<b>Day schedule</b>
<b>Duration:</b> 2 years	<b>Language:</b> English	<b>Activities in other language:</b> YES
	<b>Internship:</b> optional	

### TO MEET GROWING ECONOMIC AND SOCIETAL CHALLENGES

In order to meet growing economic and societal challenges such as energy management, communication and information technologies, sustainable development and climate change issues, it is essential to foster scientific and technological advances in industrial materials and processes. The master programme is intended for students :

- who have acquired a solid knowledge of chemical and/or physical engineering and mathematics during their bachelor programme,
- who are interested in research and development as well as production and management in cutting edge industries in the fields of chemistry, organic or inorganic materials, electronics, or process technology,
- who want to take advantage of the most recent research advances in the corresponding fields.

### AN INTERDISCIPLINARY APPROACH

The master offers:

- a specialised training in an international environment as virtually all courses organized by the programme commission are taught in English with a "French-friendly" approach for French native speakers,
- an interdisciplinary approach to problem solving, rooted in physics and chemistry,
- research-based training : integration of students in experimental laboratories, research projects,
- exposure to industry through factory visits, industry internships, possible graduation projects at a company,
- the opportunity to earn an international dual degree if you are selected for the Master's degree programme "Functionalised Advanced Materials & Engineering" (FAME), part of the Erasmus Mundus+ programme.

### CAREER OPPORTUNITIES

Career opportunities are very extensive and range from research and development to production and marketing. You can become :

- A « systems » engineer who designs new products or devices with specific properties or functions, e.g. a mitral valve, an electroluminescent polymer for a flexible display, a metallic alloy or a light composite for aerospace applications, a nanomaterial applicable for memory storage, etc.
- A « process » engineer who develops new production processes or manages the operation of production units, e.g. a plastics extrusion line, a factory for the extraction of a pharmaceutical compounds, a water or waste treatment plant, a production line for electronic components, a production unit for a high purity chemical compound, etc.
- A combination of both : for instance, you develop a polymer material for the automotive industry and the synthesis/compounding process required for its industrial scale up.





## Master in Civil Engineering

[120 credits]

<b>Programme:</b> <a href="http://www.uclouvain.be/en-prog-gce2m">www.uclouvain.be/en-prog-gce2m</a>	<b>Campus:</b> Louvain-la-Neuve	<b>Day schedule</b>	<b>Duration:</b> 2 years
<b>Language:</b> French	<b>Activities in English:</b> optional	<b>Activities in other language:</b> NO	<b>Internship:</b> YES

### EVOLVING TECHNICAL CHALLENGES

Do you have your feet on the ground and a desire to understand and master sustainable development ?  
Do you dream of designing and constructing the key infrastructures of our daily lives?  
Are you a practical person willing to use your energy and skills to help improve our society and to actively work toward building a better world ?

We offer you a programme that will prepare you to respond to the evolving technical challenges of civil engineering in our changing world:

- What type of civil engineering structures will provide adequate responses to the new challenges of mobility, changing environment, new ways of life, in a context of limited resources?
- How do we build better with fewer resources ? What is the life cycle of existing and future infrastructures?
- How will we face the global consequences of climate change ? What will be the impact on the design and construction of civil engineering structures? How will we reduce the risks related to man-made or naturally occurring hazards ?

### TWO-MONTH INTERNSHIP

Thanks to a strong programme in the fields of structural, geotechnical and hydraulic engineering, you will learn to master the physical principles underlying all these technical challenges. Through an immersion in research labs and extensive hands-on experience, you will progressively discover the project approach and be challenged, with your group, to propose appropriate technical responses.

The master in Civil Engineering also includes a two-month mandatory internship in a company, in Belgium or abroad, to allow you to apply what you've learned and competences while discovering the daily reality of your future profession. Finally, numerous opportunities also exist to take some of your classes abroad, in Europe or worldwide through the existing exchange programmes.



## Master in Computer Science

[120 credits]

<b>Programme:</b> <a href="http://www.uclouvain.be/en-prog-sinf2m">www.uclouvain.be/en-prog-sinf2m</a>	<b>Campus :</b> Louvain-la-Neuve	<b>Day schedule</b>
<b>Duration:</b> 2 years	<b>Language:</b> English	<b>Activities in other language:</b> YES
		<b>Internship:</b> optional

### COMPUTER SCIENCE AT UCL

Do you dream of taking an active part in the digital revolution? Do you want to design innovative, robust and evolutive computer systems using advanced algorithms, relying on powerful computer networks.  
This Master's degree aims to train innovative professional designers, developers who adapt quickly to evolving technologies, managers who operate and maintain the systems they are responsible for and ensure their quality.

### STRENGTHS

The curriculum is based on a deep understanding of concepts, reflection and abstraction. These skills enable graduates to adapt quickly to the employer's needs. This adaptability is further enhanced by the importance attributed to the application of concepts. Indeed, the programme contains many projects, assignments, a master's thesis and internship possibilities. The programme also maintains a balance between technical skills and soft skills, striving for excellence and pragmatism.  
UCL is a place for teaching and research. The research conducted in the field of Computer Science within ICTEAM is internationally recognized. Through the elective tracks of the programme, students benefit from cutting-edge knowledge in artificial Intelligence, data science, networking and security, software engineering and programming systems and, for engineering students, at the frontier with electricity, applied mathematics and life sciences.

### JOB OPPORTUNITIES

The employment prospects are not lacking. Various international studies indicate a shortage of computer scientists in many countries. They will contribute to shaping tomorrow's world where computing will be omnipresent to design intelligent, connected objects and to manage more and more complex systems.  
The application fields are countless, in all sectors (industrial production, systems design, agriculture, culture / art, finance, etc.) and in different roles (designer, analyst, developer, project leader, technical sales, etc.)  
These studies can also lead to research activities and to a PhD.

### TWO MASTER'S DEGREES

The Master in computer science is intended for students with a specialisation in computer science.  
The Master in computer science and engineering leads to an engineer's degree and requires a bachelor's degree in engineering, including a broad background in science and technology (physics, chemistry, mathematics, etc.).  
Both require a solid mastery of the basic concepts of computer science: logic, data structures, computer system architecture, algorithms, networks, and programming languages.





# Master in Computer Science and Engineering

[120 credits]

<b>Programme:</b> <a href="http://www.uclouvain.be/en-prog-gbio2m">www.uclouvain.be/en-prog-gbio2m</a>	<b>Campus :</b> Louvain-la-Neuve	<b>Day schedule</b>
<b>Duration:</b> 2 years	<b>Language:</b> English	<b>Activities in other language:</b> YES
		<b>Internship:</b> optional

## FROM CONCEPTS TO APPLICATIONS

Beyond the mere acquisition of knowledge, the Master in Computing Science and Engineering is based on a deep understanding of concepts, reflection and abstraction. These skills enable graduates to adapt quickly to the demands of employers. This adaptability is further enhanced by the importance attributed to the application of concepts in the curriculum. It is inconceivable to master concepts at a theoretical level and not to be able to apply them to a practical problem. Therefore, the programme contains many projects, assignments, a master's thesis and the possibility to perform an internship. The programme also maintains a balance between technical skills and soft skills, striving for excellence and pragmatism.

## TRAINING BASED ON RESEARCH

UCL is a place for teaching and research. The research conducted in the field of Computer Science within the ICTEAM Institute is internationally recognized. Through the elective tracks of the programme, students in the Master in Computing Science and Engineering benefit from cutting-edge knowledge in information and communication technology (Artificial Intelligence, Data Science, Networking and Security, Software Engineering and Programming Systems) and at the frontier with electricity, applied mathematics and life sciences (Communication Networks, Cryptography and Information Security, Data Science and Applied Mathematics, Biomedical Engineering and Bioinformatics). Furthermore, these can result in further research and/or a Ph.D.

## OPENNESS TO OTHER DISCIPLINES

Every computer scientist must be able to interact with colleagues from other disciplines who do not share the same technical language, who are not sensitive to the same constraints. Elective tracks in the programme offer opportunities for training in economics and management (Business Risks and Opportunities, Small and Medium-Sized Business Creation).

## INTERNATIONAL OUTLOOK

The Master's programme is taught in English, which is widely used in business and especially used in computer science, giving the programme, an international outlook. It allows non-Anglophone students to acquire oral and written skills in English while at the same time immersing foreign students in a French-speaking environment. It also offers possibilities for exchange programmes and joint degrees with a number of distinguished universities worldwide.



# Master in Cybersecurity

[120 credits]

<b>Programme:</b> <a href="http://www.uclouvain.be/en-prog-cyse2m">www.uclouvain.be/en-prog-cyse2m</a>	<b>Campus:</b> Louvain-la-Neuve/Brussels/Namur	<b>Day schedule</b>
<b>Duration:</b> 2 years	<b>Language:</b> English	<b>Activities in other language:</b> YES
		<b>Internship:</b> NO

## AN INTERDISCIPLINARY PROGRAMME

Information security is an increasingly important concern of modern societies, and goes hand in hand with the development of information technologies in an increasingly large amount of applications. Dealing with the cybersecurity challenges requires an interdisciplinary approach, mixing mathematical tools from cryptography, secure software and hardware programming, applications to computer and embedded devices networking, but also ethics and law. The Master in Cybersecurity programme reflects this diversity with two focuses: the first one is oriented towards the design and analysis of cyber-systems, and the second towards the development of secure applications.

## A MASTER'S DEGREE TO TACKLE A CRUCIAL CHALLENGE

Strong cybersecurity can only come by matching the security requirements with the latest results in the field and the constraints from the application domain. As such, the Master in Cybersecurity includes classes reflecting the latest research advances from the field, and classes focusing on system management, reverse engineering and forensics. Furthermore, the programme also includes a mandatory internship. The Master programme is quite versatile and friendly to people looking for continued education, being accessible with a substantially reduced credit load for candidates already holding an other Master degree.

## A CROSS-INSTITUTION PERSPECTIVE

The Master's programme is taught in six institutions, in Brussels, Louvain-la-Neuve and Namur, and most students will be offered classes in at least four of these institutions, in English and in French. This ensures that student obtain a large perspective on the cybersecurity expertise available in higher education institutions from the Belgian French Community.





## Master in Data Science and Engineering

[120 credits]

<b>Programme:</b> <a href="http://www.uclouvain.be/en-prog-gbio2m">www.uclouvain.be/en-prog-gbio2m</a>	<b>Campus :</b> Louvain-la-Neuve	<b>Day schedule</b>
<b>Duration:</b> 2 years	<b>Language:</b> English	<b>Activities in other language:</b> NO
		<b>Internship:</b> optional

### DATA SCIENCE IS TRANSFORMING OUR WORLD

Data Science is an emerging field triggered by the huge accumulation of data of all sorts in science, engineering or business, by the ability to store them and the need to extract meaningful analytics. In the last couple of decades data science has transformed our world and the way we perceive it. Some examples of that are the web-based economy, the advances of artificial intelligence or the discovery of new particles or exoplanets, in which data science held a key role. The field is characterised by a trans-disciplinary set of techniques drawing on statistics, applied mathematics and computer science. This programme teaches the student a wide range of these techniques and allows the student to specialise further so as to be on the cutting-edge in one or several aspects of Data Science.

### TWO ELECTIVE TRACKS

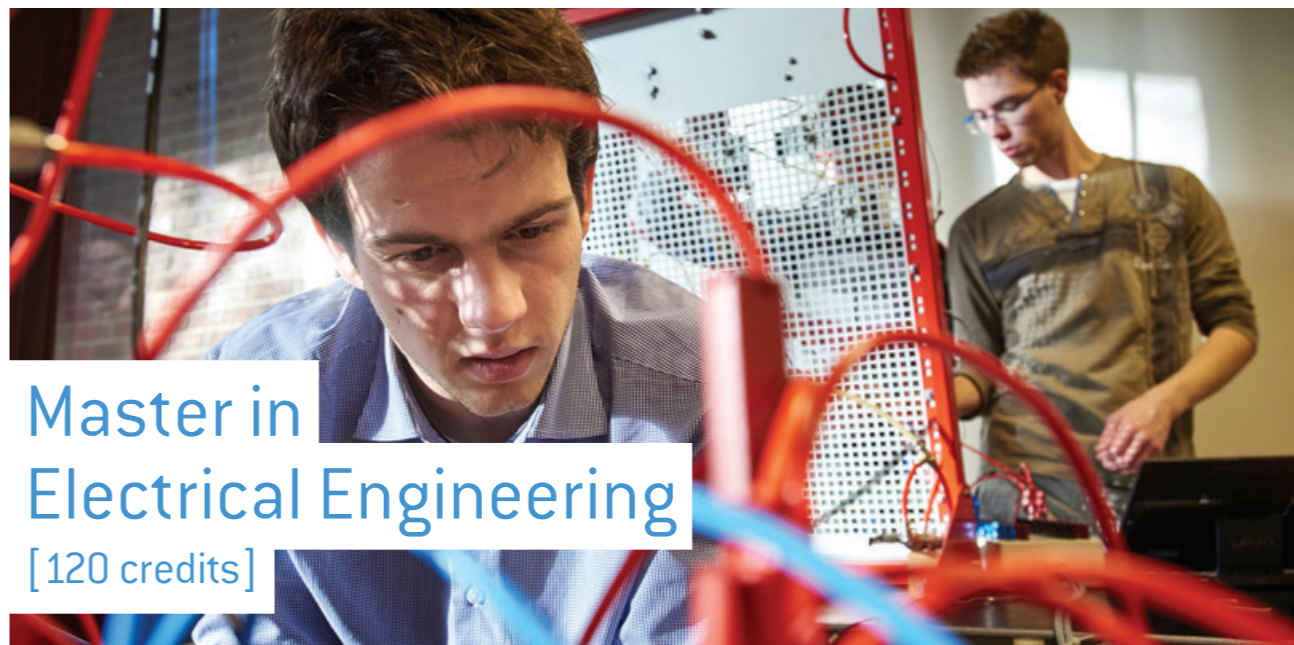
Specifically, the Engineering Master in Data Science at UCL, fully taught in English, proposes mandatory and elective courses in Data Algorithmics, Statistics, and Machine Learning. Students may specialise in Computer Systems or Numerical Methods And Optimisation, or pursue both. The track of Computer Systems teaches the organisational aspects of data storage and computation, such as cloud computing and cybersecurity. Numerical Methods And Optimisation explores the algorithmics of large numerical datasets, such as handling large matrices, and optimal decision-making, such as finding an optimal route for a travelling salesman incurring many stops with various constraints.

### JOB OPPORTUNITIES

Data Scientists are among the most highly sought profiles on the job market, and an engineer in data science will be valuable to large and small companies in the sectors of finance, marketing, management, consulting, computer science, and many others. Moreover, this young, burgeoning, ever-developing field offers tremendous opportunities for research in order to design the tools that will be widely used tomorrow. PhD studies in Data Science can be pursued at the internationally recognized labs of UCL.

### TWO MASTER'S DEGREES

EPL organizes two Master's degrees in Data Science. The Master in Data science is intended for students holding a Bachelor's degree in Computer Science (or other Bachelor's degrees, on application). The Master in Data Science and Engineering leads to an engineer's degree and requires a Bachelor's degree in engineering, including a large background in science and technology (physics, chemistry, mathematics, etc.).



## Master in Electrical Engineering

[120 credits]

<b>Programme :</b> <a href="http://www.uclouvain.be/en-prog-elec2m">www.uclouvain.be/en-prog-elec2m</a>	<b>Campus :</b> Louvain-la-Neuve	<b>Day schedule</b>
<b>Duration:</b> 2 years	<b>Language:</b> English	<b>Activities in other language:</b> YES
		<b>Internship:</b> optional

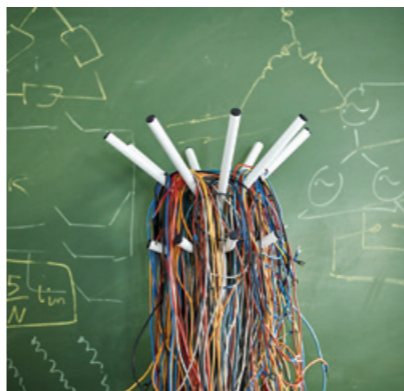
### TEAM PROJECT AND INDUSTRIAL TRAINING

The Master's programme in Electrical Engineering at UCL, which is internationally recognized by the EUR-ACE accreditation, trains engineers to address future technological challenges in the scientific and technical fields related to electricity and their wide range of applications.

The programme includes a set of compulsory courses in digital electronics, electromagnetics, electronic devices, embedded systems, signal processing and communications. These courses are complemented by a large set of diverse classes, covering six major topics: electronic circuits and systems, communication systems, information and signal processing, electrical energy, advanced electronic materials and devices as well as cryptography. In addition, the programme includes a team project in the area of communication and electronic systems, as well as elective industrial training and a master's thesis. The Master's degree in Electrical Engineering at UCL enables students to fully customize their education, depending on their profile and their career plans, from research to industry, and from a generalist training to in-depth specialisation, while providing them with state-of-the-art research equipment.

### INNOVATION

Thanks to the variety of their individual curricula, UCL electrical engineers lead innovation in many application fields, including wired and wireless communication, digital, analog and RF electronics, electric power generation and transmission, image processing, cybersecurity, healthcare systems, Internet-based information technology, etc.



# Master in Electro-mechanical Engineering

[120 credits]



<b>Programme :</b> <a href="http://www.uclouvain.be/en-prog-elme2m">www.uclouvain.be/en-prog-elme2m</a>	<b>Campus :</b> Louvain-la-Neuve	<b>Day schedule</b>
<b>Duration:</b> 2 years	<b>Language:</b> English	<b>Activities in other language:</b> YES
		<b>Internship:</b> optional

## ELECTRICITY AND MECHANICS

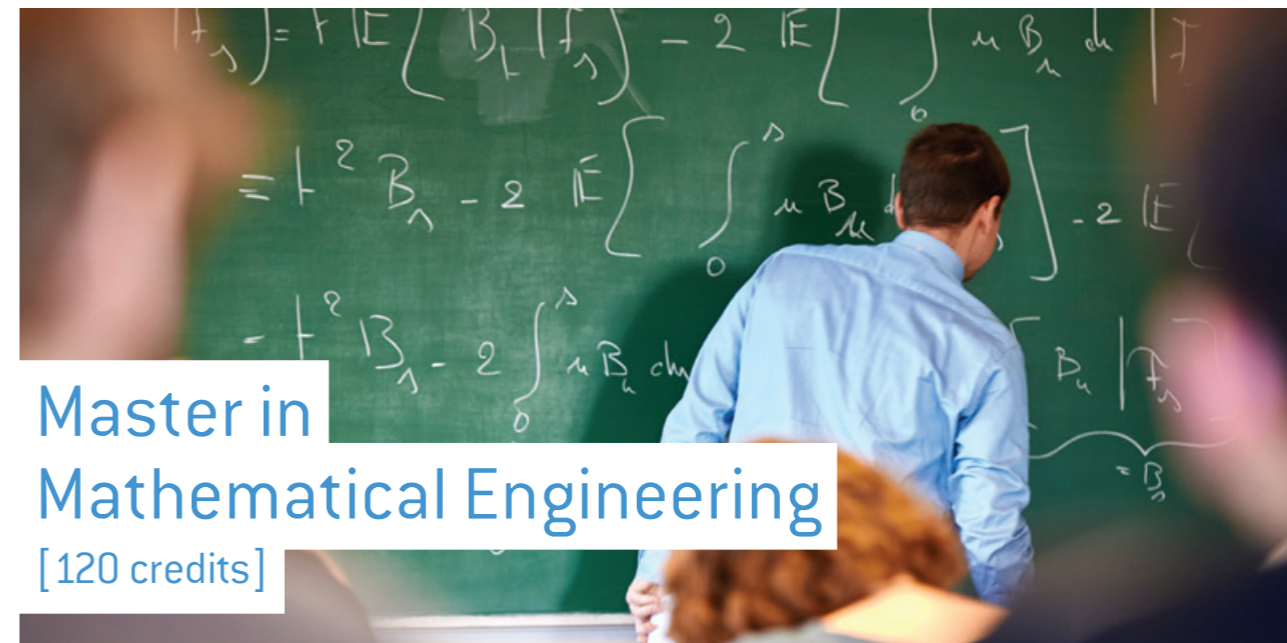
The Master's degree in Electromechanical Engineering integrates the disciplines of electricity and mechanics. The programme promotes general education through the mastery of basic knowledge in mathematical methods, electricity physics and mechanics ensuring a solid common part. The programme is divided into 2 tracks : mechatronics and energy. The first one emphasizes electronic training, mechanical production, automatics and robotics and the second one focusses on electricity training, thermodynamics and energy. Several elective tracks are possible (electronic circuits and systems, aeronautics, dynamic systems, dynamics and robotics, nuclear energy, etc...)

## INTEGRATED PROJECTS IN MECHATRONICS OR ENERGY

At UCL, the Master in Electromechanics relies on a highly interdisciplinary approach based upon integrated projects in mechatronics or energy, according to the goal. Project- or problem-based learning is used in some subjects in parallel with lab and practical sessions. This programme also relies on 2 research units (MEED for the mechatronics and electrical energy aspects and TFL for the energy and thermofluid aspects) carrying out advanced and internationally recognized work, whether in numerical modeling or experimentation. For their master's thesis, students have the opportunity to join a research group and contribute to the work in progress. Moreover, contact with the industrial world is possible through the visit of factories, internships and master's thesis subjects from different sectors.

## CAREERS IN INDUSTRIAL AREAS

This training will enable electromechanical engineers to easily integrate into a constantly changing technological sector. With a strong background in mechanics, electricity, electronics, thermodynamics, fluid dynamics and multi-body systems, they will be able to plan a career in industrial areas such as robotics, aerospace, automotive or energy transformation systems, in production, as well as in design or R & D divisions. Thanks to a non technical training, engineers are also prepared to handle changes in a professional life that more and more requires leadership skills.



# Master in Mathematical Engineering

[120 credits]

<b>Programme :</b> <a href="http://www.uclouvain.be/en-prog-map2m">www.uclouvain.be/en-prog-map2m</a>	<b>Campus :</b> Louvain-la-Neuve	<b>Day schedule</b>
<b>Duration:</b> 2 years	<b>Language:</b> English	<b>Activities in other language:</b> YES
		<b>Internship:</b> optional

## MODELLING, SIMULATION AND OPTIMISATION

The Master in Mathematical Engineering is an interdisciplinary engineering degree centered on mathematical which has become instrumental in engineering sciences. Through training in modelling, simulation and optimisation (MSO), students learn to design, analyse and implement mathematical models to be applied to complex systems of the industrial or corporate world, and to create efficient strategies to optimize their performance.

The mandatory courses provide the students with the necessary common skills in MSO. They span the domains of numerical analysis and scientific computing, dynamical systems, matrix computations, stochastic models, optimisation models and methods.

## A WIDE RANGE OF OPTIONS

Moreover, students are offered several elective tracks. Some of the options provide them with advanced skills in various branches of MSO: optimisation and operations research, dynamical systems and control, and computational engineering. The other tracks pertain to data science, financial mathematics, cryptography & information security, biomedical engineering, business risks and opportunities, and launching of small and medium-sized companies.

In view of the background in numerical analysis and stochastic modelling provided by the mandatory courses, the students can, through dedicated complementary modules, obtain direct access to the second year of several other master's programme, such as Master in Actuarial Science, Master in Statistics, and Master in Biostatistics.





## Master in Mechanical Engineering

[120 credits]

<b>Programme :</b> <a href="http://www.uclouvain.be/en-prog-meca2m">www.uclouvain.be/en-prog-meca2m</a>	<b>Campus :</b> Louvain-la-Neuve	<b>Day schedule</b>
<b>Duration:</b> 2 years	<b>Language:</b> English	<b>Activities in other language:</b> YES
		<b>Internship:</b> optional

### FUNDAMENTALS AND PRACTICAL APPLICATIONS

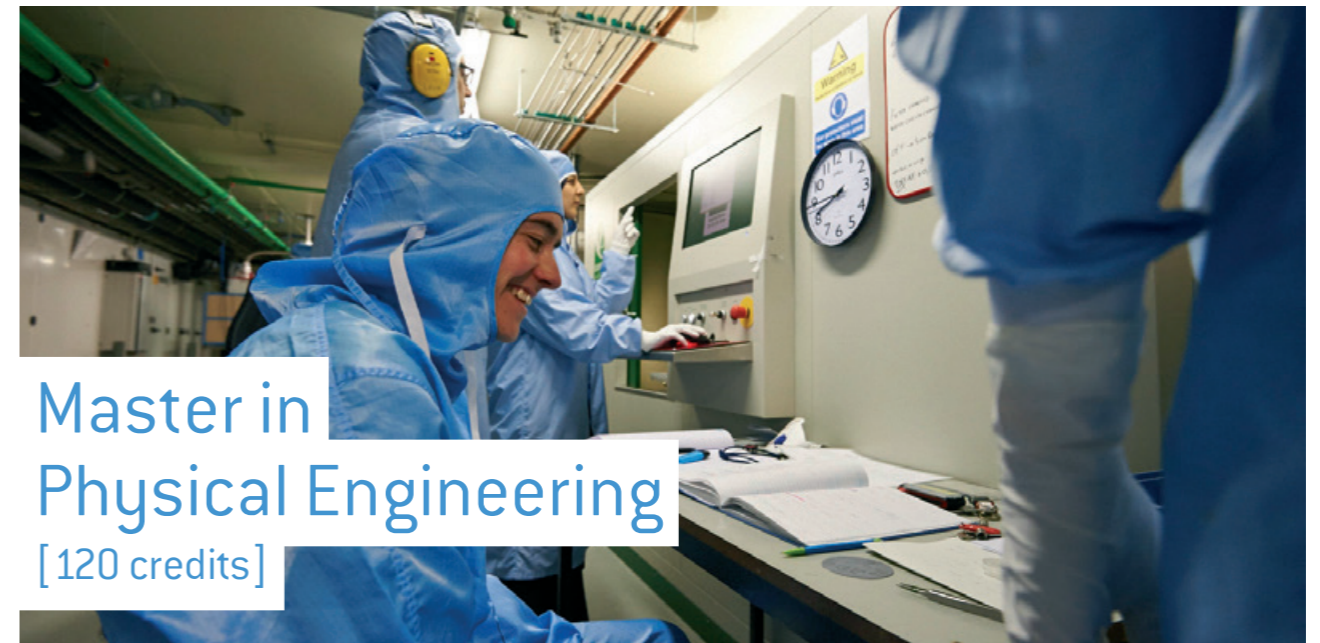
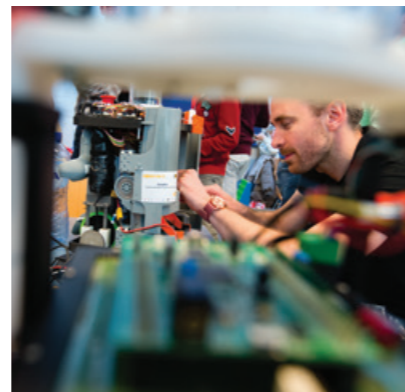
Mechanical Engineering is a diverse, versatile and rapidly evolving discipline at the forefront of modern industrial activities and future technological developments. It deals with the analysis, design and production of everything from small components and devices, such as micro-sensors and labs-in-a-chip, to large systems such as spacecraft and power stations. At UCL, the Master's programme in Mechanical Engineering is designed to provide advanced training in both the fundamentals and the practical applications to the industrial and technological sector. Our programme of study is quite broad and extensive so that our students develop a wide range of skills sought after in the industry.

### 5 FOCUS AREAS

Our training covers all fields of mechanical engineering and students may choose between 5 focus areas (elective tracks): i) aeronautics, ii) energy, iii) dynamics, robotics & biomechanics, iv) manufacturing and mechanics of materials, and v) nuclear energy. The programme consists of a number of compulsory courses and a diverse portfolio of elective courses. The class size for most elective courses is small, thus fostering close collaboration between students and professors. Our teaching practices link theory and practice and our courses include laboratory exercises with state-of-the-art equipment, projects, case-studies etc. Another particular strength is the student-exchange agreements with universities from all around the world that offer the possibility to complete a part of the coursework abroad. Moreover, our students have the opportunity to conduct research and development for their master's thesis. Another feature that makes our programme particularly attractive is the possibility for an industrial internship and/or master's thesis in the industrial sector. The courses are taught in English, thus providing a truly international dimension to our master's programme.

### EMPLOYMENT PERSPECTIVE

Mechanical engineers play a central role in numerous industrial and technological sectors such as the automotive, aerospace, energy, marine, biotechnology, computer and electronics sectors, as well as in environmental protection and safety, automation, manufacturing, etc. For this reason they are constantly sought after and find easily employment upon graduation. Moreover, they have particularly good starting salaries. Also, due to their versatility, mechanical engineers have a broader than usual understanding of the technological world and their careers are not sensitive to fluctuations of the economy. Finally, the mechanical engineers of UCL have established a well-developed alumni network, enjoy a very good international reputation and are highly regarded by employers.



## Master in Physical Engineering

[120 credits]

<b>Programme :</b> <a href="http://www.uclouvain.be/en-prog-fyap2m">www.uclouvain.be/en-prog-fyap2m</a>	<b>Campus :</b> Louvain-la-Neuve	<b>Day schedule</b>
<b>Duration:</b> 2 years	<b>Language:</b> English	<b>Activities in other language:</b> YES
		<b>Internship:</b> optional

### HIGH TECHNOLOGY PRODUCTS

The ambition of the Master in Physical Engineering is to develop in-depth and multidisciplinary competences in physical engineering, including formal concepts in physics, numerical simulation tools as well as experimental competences. The programme is intended for students :

- who have acquired a solid background in physics and mathematics during their bachelor's programme,
- who seek a programme that focuses on current technological and scientific issues on national and international job markets,
- who want to be active in the design of high technology products based on advanced physical engineering : optics, thin layers, magnetic devices, transducers, sensors, nuclear devices, quantum physics, electronic materials, systems based on the interaction between radiation and materials or objects produced from nanotechnologies.

### THE MASTER'S PROGRAMME OFFERS:

- a solid training in applied physics in an international environment as all courses are taught in English with a "French-friendly" approach for French native speakers,
- an interdisciplinary approach at the interface between physics and material sciences,
- laboratory experiments and research projects,
- exposure to the industrial sector: factory visits, internships, projects carried out at companies,
- the opportunity to complete coursework abroad.

The programme further consists of:

- compulsory classes aiming to perfect fundamental knowledge in physics and physical engineering,
- a large selection of elective courses grouped into three majors (materials and devices for electronics, nanotechnology, advanced engineering physics) that may be complemented by other classes taken at UCL.

### WIDE RANGE OF CAREER OPPORTUNITIES

The Master's programme in Physical Engineering provides a wide range of career opportunities based on advanced technologies in industry as well as research and development environments. Our engineers are present in all industrial sectors: the chemical industry, pharmaceuticals and food production, electronics and the telecommunications industry, energy, metallurgy, aeronautics, design and civil engineering, large scale distribution, banking or consulting services, nanotechnologies and medical technology, etc. They play a central role as researchers and developers overseeing production or project management and even holding positions in marketing and sales of high tech products. We find them in finance departments, information technology, quality control, the public sector, higher education and government agencies.





## Advanced Masters

### ADVANCED MASTER IN NANOTECHNOLOGY

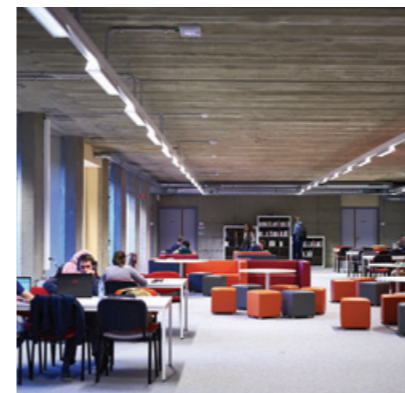
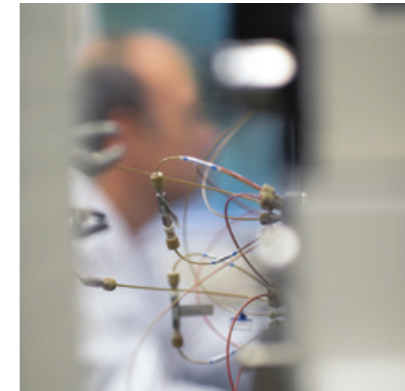
The interuniversity Advanced Master in Nanotechnology offers holders of a basic second cycle degree complementary and/or advanced training in the fields of nanoscience and nanotechnology. It is organised around five main specialisation areas: nanophysics, nanochemistry, nanoelectronics, nanomaterials, nanobiotechnology. It is also intended to train students in the multidisciplinary aspects of nanotechnology: knowledge of basic phenomena at the nano level, nanomanufacturing or synthesis of nanostructures, characterisation of nanostructures, and modelling and numeric simulation at the nano level.

Information : [www.uclouvain.be/en-prog-nano2mc](http://www.uclouvain.be/en-prog-nano2mc)

### ADVANCED MASTER IN NUCLEAR ENGINEERING

The Advanced master in Nuclear Engineering is organised by the Belgian Nuclear Education Network (BNEN). This consortium gathers the 6 major Belgian universities (UCL, ULg, ULB, VUB, Ugent, KUL) plus the federal nuclear research center SCK•CEN. This programme provides a high academic level in the main topics of nuclear energy including nuclear physics, thermal-hydraulics, nuclear materials, fuel cycle, safety, and radioprotection, for full-time students and life-long-learning education.

Information : [www.uclouvain.be/en-prog-gnuc2mc](http://www.uclouvain.be/en-prog-gnuc2mc)





## Five good reasons for studying at the Louvain School of Engineering

### HIGH QUALITY TEACHING AND LOW TUITION FEES

EPL has adopted a project-based approach 20 years, and it has been developing and improving its teaching methods ever since, with the support of the Louvain Learning Lab, and most recently with additional support from the ILV language institute. Furthermore, the regional government runs a subsidy system allowing EPL to apply very attractive tuition fees.

### INDUSTRY ORIENTED TRAINING STRONGLY GROUNDED IN RESEARCH

EPL has developed strong links with industrial partners, some of them world leaders in their fields. This has resulted in interesting internship opportunities for students, cutting-edge applied research and excellent job opportunities upon graduation. A third of EPL students get a job proposal before graduation, approximately 70% have a paid activity within 3 months of graduation and, most importantly, 94% are happy in their work, according to a survey of alumni conducted in 2016-2017.

### INTERNATIONAL OUTLOOK AND STRONG PARTNERSHIPS ACROSS THE GLOBE

Studying at EPL also opens doors to programmes with our prestigious partners across the globe. Furthermore, master's courses are in English. This has resulted in an ever increasing offer of international exchange programmes and double-degree agreements, as well as in an ideal preparation of our students for today's global society. There are over 120 nationalities present on UCL's campus without mentioning the 200.000+ learners following its on-line courses via the edX platform worldwide!

### A WORLD-CLASS UNIVERSITY

Founded in 1425, UCL is one of the oldest universities in Europe. Erasmus, Mercator and Vesalius are just some of the famous names who have studied here. The university demonstrates this excellence in an important variety of domains spanning across the humanities and social sciences, the medical sector and science and technology, as well as in the many areas where these intersect. As an example, the university runs two hospitals allowing engineering students to lead challenging and rewarding projects with concrete applications.

### EXCITING AND REWARDING CAMPUS LIFE

EPL is located in Louvain-la-Neuve, the main campus of UCL. It is a safe environment, free of car traffic, and surrounded by 300 hectares (750 acres) of woods. Yet it is close to Brussels and thus ideally connected to all of Europe, with capitals such as London, Paris or Amsterdam just a short train ride away. The campus offers excellent sports infrastructures, and the students enjoy a rich and engaging social life. They participate in the engineering students' annual show La Revue des Ingénieurs or join one of the 80 student projects "Kots-à-projet" (KAP). One of the most exciting current opportunities is the student-led project UCL to Mars, in collaboration with the Mars Society and supported by NASA.



WITH ONE NOBEL PRIZE IN MEDICINE, 21 FRANCQUI PRIZES AND 27 ERC GRANTS UCL HAS MAINTAINED ITS WORLD-CLASS REPUTATION OVER THE CENTURIES AND IS WELL PLACED IN INTERNATIONAL RANKINGS: TOP 1.25% IN THE WORLD (THE, QS RANKINGS)



- 128th in the "world university ranking"\*
- 4th comprehensive French-speaking university in the world\*\*
- Included amongst the world's elite institutions in 28 of the 46 subjects ranked in QS Rankings 2017\*\*\*

\* Times Higher Education ranking 2016-2017. \*\* QS ranking 2016-2017. \*\*\* QS ranking by subject 2017



### LOUVAIN SCHOOL OF ENGINEERING

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