Master of **Electronics and ICT Engineering Technology**
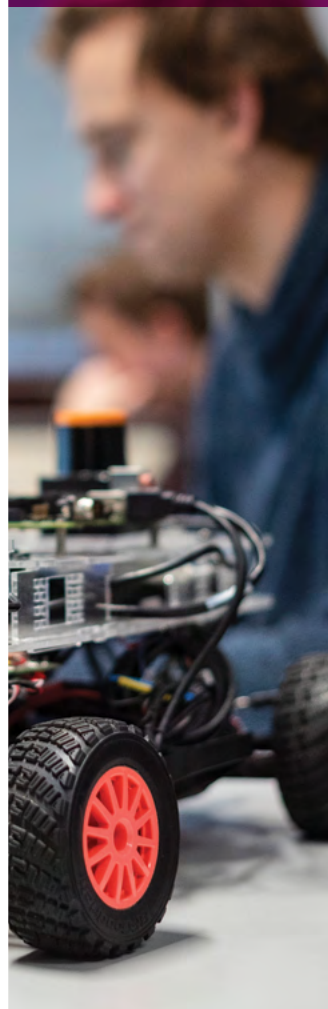
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2024-2025

Become a Master in Artificial Intelligence, Cyber-Physical Systems or Internet of Things in **one year**
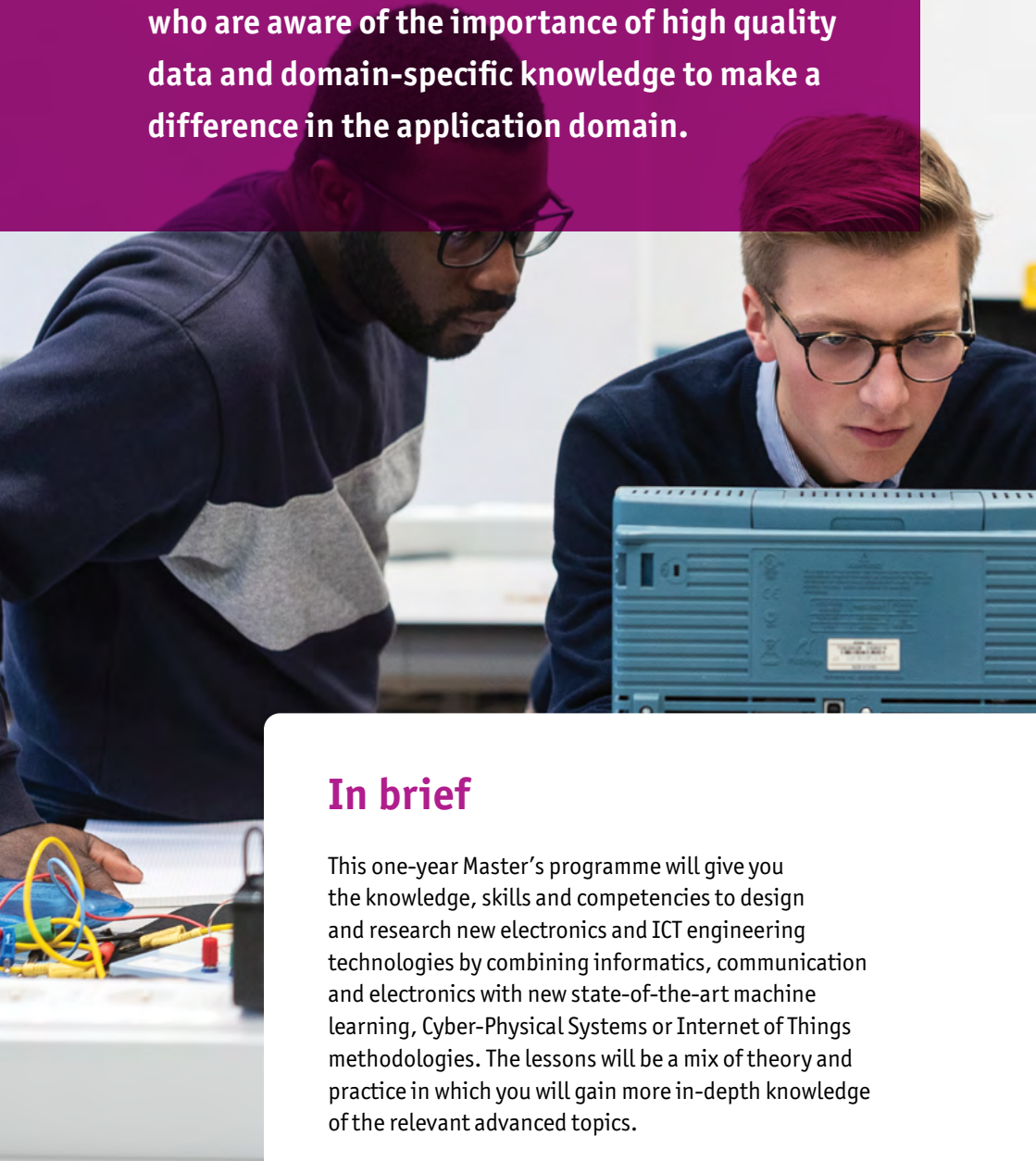
University of Antwerp

I Let's shape the future

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> We build the engineers of tomorrow. Engineers who are aware of the importance of high quality data and domain-specific knowledge to make a difference in the application domain.

In brief

This one-year Master's programme will give you the knowledge, skills and competencies to design and research new electronics and ICT engineering technologies by combining informatics, communication and electronics with new state-of-the-art machine learning, Cyber-Physical Systems or Internet of Things methodologies. The lessons will be a mix of theory and practice in which you will gain more in-depth knowledge of the relevant advanced topics.

In detail

In this Master's programme you choose between **3 majors**:

1 Artificial Intelligence

2 Internet of Things

3 Cyber-Physical Systems

In each major, 60% of your time will be invested in practical engineering.

Major 1:
Artificial Intelligence

This major gives you the knowledge, skills and competences to design and research new Artificial Intelligence technology by combining informatics, communication and electronics with new state-of-the-art machine learning methodologies.

Distributed machine learning is the discipline where new intelligence is created by combining the strengths of different distributed intelligent devices and components. The main idea is to rely on the emergent that originates from the various devices and components working together in an intelligent way. It does not focus on computationally intensive, centralised Artificial Intelligence (AI) solutions, but on decentralised interaction of intelligent components to achieve an equal or better result with lower latencies, lower energy consumption and lower computational complexity.
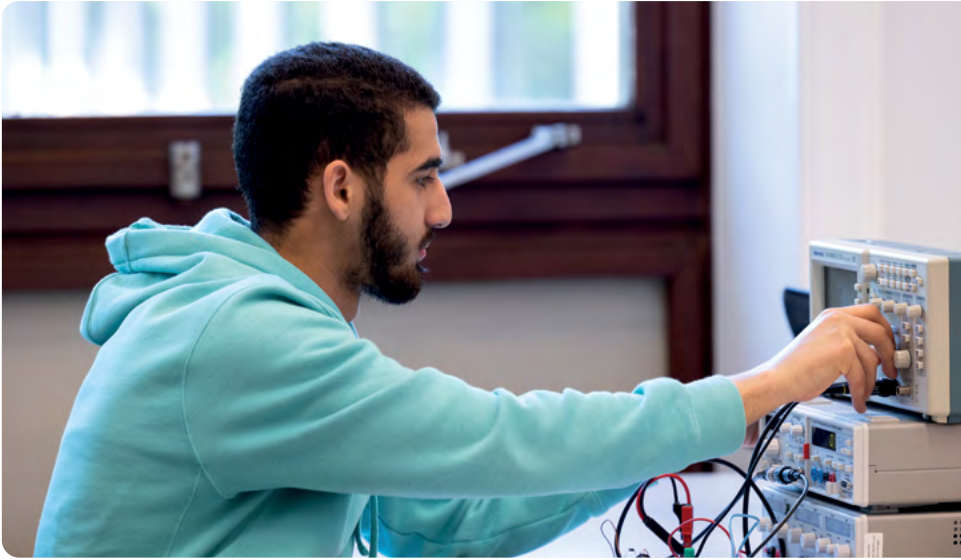
Major 2:

Internet of Things

This major will give you knowledge, skills and competences to design and research new Internet of Things (IoT) solutions by combining informatics, communication and electronics with new state-of-the art machine learning methodologies. IoT is the art of bringing together data from large sets of distributed heterogeneous embedded sensors. The main complexity of this process lies in the resource constraints. Huge quantities of data have to be sensed and communicated in an environment where resources like energy and computational power are limited.

The core of this programme focuses on engineering these high complexity sensor networks, taking into account the constraints, and choosing or designing the right communication, hardware and software solutions.

Major 3:

Cyber-Physical Systems

This major will give you the knowledge, skills and competences to design and research new Cyber-Physical Systems (CPS) by combining informatics, communication, signal processing, sensing and electronics with new state-of-the-art (CPS) model-driven engineering and control technologies. Cyber-Physical Systems are systems where the sensors, control and computational properties are optimally adapted to the mechanical and functional requirements of the system at hand. In the fast-evolving world of digital innovation the main focus lies on the optimal integration of the individual parts of CPS to achieve certain performance constraints.

The core component of this programme is solving functional, safety and timing constraints, while considering the physical and mechanical problems of both sensors and actuators, using a model-driven approach.

Programme structure

The programme consists of 60 ECTS credits. The main modules depend on the major you choose:

Major 1:
Artificial Intelligence

In your Master's thesis and in the course Artificial Intelligence you will build, test and implement **solutions for complex machine learning related engineering problems** within the University of Antwerp's technology test beds, like smart highway, smart waterway or autonomous car.

The study programme consists of **three main modules**:

- Core electronics-ICT competences
- Core distributed AI competences
- AI research competences

Major 2:
Internet of Things

In your Master's thesis and in the course Internet of Things you will build, test and deploy solutions for energy-aware wireless battery or battery-less applications.

The study programme consists of **three main modules**:

- Core electronics-ICT competences
- Core IoT competences
- IoT research competences

I chose this study programme because as an industrial engineer you can find work in many different fields.

Tekla Mortelmans

Major 3:
Cyber-Physical Systems

In your Master's thesis and in the course Cyber-Physical Systems you will build, test and deploy control solutions in a cyber-physical context with non-trivial functional and non-functional constraints.

The study programme consists of **three main modules**:

— Core electronics-ICT competences

— Core CPS competences

— CPS research competences

Learning Outcomes

Following the Master of Electronics and ICT Engineering Technology will make you a **technology expert** who can take on complex technical problems based on advanced international current scientific knowledge and technological know-how.
You will also become a **researcher** who can independently and accurately solve complex technical problems, integrating existing scientific information.

An engineer is also a **team worker** who can take on a leading and motivating role in interaction with other professionals and multidisciplinary teams.

As a student in this Master's programme and future engineer, you are also a **citizen**, who takes the global international context into account in your actions, with attention to economics, social context, ecology, ethics, safety and sustainability.

I look at our engineers as nurses. Their main task is to talk with people to thoroughly understand their technological pains in order to find a suitable cure using AI, IoT or CPS.

**Prof. Peter Hellinckx,
Academic coordinator**

Curriculum	**Common compulsory courses**	**ECTS credits 27**
	Electronic Systems	6
	Master's project	6
	Model-based Systems Engineering	3
	Communication Systems	6
	Software Engineering	6

Cyber-physical Systems:
Compulsory courses **ECTS credits 12**
Cyber-Physical Systems

Internet of Things:
Compulsory courses **ECTS credits 12**
Internet of Things: Low Power Embedded
Communication

Artificial Intelligence:
Compulsory courses **ECTS credits 12**
Distributed Artificial Intelligence

Master's project **ECTS credits 15**
Master's project Electronics including Internship

Optional packages **ECTS credits 6**
1 optional package to be chosen from a list of 2
(Please consult the course catalogue on
www.uantwerpen.be/electronics-ict-engineering-technology)

Total **ECTS credits 60**

Job opportunities

There is **great demand** for electronics and ICT specialists on the labour market. Certainly in the domains of emergent technologies like CPS, IoT and AI. Our graduates have careers in fields like:

- **Data science** in almost every application domain

- **Technical-commercial positions**, as a programmer or designer

- **After-sales service**, as a service technician for multimedia equipment or industrial electronic systems

- **Production support service**, as responsible for the control and adjustment of electronic end products

- **Telecommunications company**, for fixed and mobile communication

- **Expert agencies**

- **Researcher** at a university or research centre. As an academically trained applied engineer you can also start a career in **academics**. If you have a passion for **research** you can conduct a PhD.

The most important skill that I acquired during this study programme was to teach myself new things. In a constantly changing world such as that of electronics and ICT, this is extremely valuable. For doctoral research this is also an important skill. You have to constantly renew yourself, learn things and delve into new topics.

Astrid Vanneste

Why choose UAntwerp

Our university is located in the **city of Antwerp**, in the heart of Belgium and Europe. The port of Antwerp is one of the biggest in the world. Antwerp is not just an ancient medieval and baroque city, full of history. It is also a bustling metropolis with a vibrant social scene, impressive architecture and cultural contrasts. Over 170 nationalities live here, more than in New York! This cosmopolitan vibe is also reflected at the University of Antwerp.

First-rate research and education make the University of Antwerp a wonderful place to study and to work. We foster the nexus between research and education. Internationalisation is key to our mission. It is no coincidence that the University of Antwerp is a partner in a highly promising European University Network, the Young Universities for the Future of Europe www.YUFE.eu.

As home away from home to over **20,000 students**, the University of Antwerp prides itself on operating on a human scale. Our faculty and staff will welcome you into top-notch infrastructure on one of our four campuses. While you're here you are also invited to enjoy our vibrant cultural programme, sports facilities and many student services.

The University of Antwerp **scores extremely well** in Young University Rankings

#5
Times Higher Education
Millennials 2020

#7
Times Higher Education
Young University Ranking
2023

#20
QS 50 Under 50
2021

Testimonial

This Master's programme is very practical. We wrote real programmes, built websites and even developed a game. So it was about much more than studying formulas and definitions. I still use the practical skills every day: drawing architecture, doing research, inventing new technology and writing effective code.

Nils Franssen, Cloud Solution Architect at Microsoft

Admission criteria

Students with a Flemish degree of 'academische Bachelor in de industriële wetenschappen: elektronica-ICT' have direct access to the Master's programme.

Students without this Flemish degree should have an **academic Bachelor's degree** in a relevant field. They can apply if they have obtained an honour Bachelor's degree (B.Sc., B.Tech., B.Eng., etc.) or a Master's degree in a related/cognate subject area.

All applications will be screened by the **Board of Admissions** for motivation, and background in an academic Bachelor of Electronics and ICT Engineering Technology.

Since the programme is taught in **English**, candidates with a prior degree issued outside Belgium, the Netherlands or Luxembourg are required to demonstrate their proficiency in English. They can do so in **two ways**:

— Either by submitting a **language certificate** showing their TOEFL, IELTS or ITACE results (the level required can be checked on the website).

— Or by submitting **proof** they have studied at least one academic year (or 60 ECTS credits) in an English-language Bachelor's or Master's programme.

Please note that the Board of Admissions may still ask for additional proof of proficiency in English.

Application procedure

Students with the above-mentioned **Flemish degree** have direct access to the Master's programme.
Candidates with a Bachelor's or Master's degree from a higher education institution in the Netherlands or Luxembourg need to ask permission from the faculty through the faculty's helpdesk. Other candidates and candidates who need a visa must submit an online application through the online application tool **Mobility Online**. Applications for the academic year 2024-2025 can be started in Mobility Online from 9 November 2023 onwards.

Application deadlines
To submit an application through Mobility Online
- For non-EEA * nationals and for students who need a visa: **before 1 March 2024**
- For EEA nationals: **before 1 June 2024**

Enrolment deadline
4 October 2024. Enrolments start on 1 July 2024.
The academic year 2024-2025 starts on
Monday 23 September 2024.

ECTS credits

The University of Antwerp applies the '**European Credit Transfer and Accumulation System**' (ECTS) in all its degree programmes. A full-time one-year study programme amounts to **60 ECTS credits** (30 ECTS credits per semester), which implies a student workload of about 1500 to 1800 hours. One ECTS credit stands for 25 to 30 hours of work including contact hours, preparatory work, study and assessment.

* **EEA =** European Economic Area
Member states: Austria, Belgium, Bulgaria, Croatia, Cyprus, Czech Republic, Denmark, Estonia, Finland, France, Germany, Greece, Hungary, Iceland, Ireland, Italy, Latvia, Liechtenstein, Lithuania, Luxemburg, Malta, the Netherlands, Norway, Poland, Portugal, Romania, Slovakia, Slovenia, Spain and Sweden

Quick facts

Level
Master

Language
English

Credits
60 ECTS credits

Number of years
1

Tuition fee per year *
EUR 1092.10 for EEA nationals
EUR 5800 for non-EEA nationals

Campus
Campus Groenenborger

Faculty
Applied Engineering

More information
www.uantwerpen.be/electronics-
ict-engineering-technology

* subject to yearly revision

Contact

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Engineering Technology**
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