

# Electronic and Computer Engineering



## Electronic and computer engineering

Electronic and computer engineering (ECE) includes multidisciplinary knowledge of hardware and software necessary to build complete electronic systems for acquiring, processing, and communicating signals and information in today's connected world.

## What is an electronic system?

Electronic systems are everywhere - in mobile phones, cars and airplanes, robots and factories, they connect things to the Internet, monitor health, and make your home smart. In interaction with the environment, user or other system, they collect and exchange data and change the environment. They consist of interconnected electronic components - analog and digital circuits of varying degrees of integration controlled by embedded software. To build them, one must intertwine natural sciences and technology with practical skills.

## Skills

- Provides the competencies needed in the development, design, implementation and testing of electronic and embedded systems.
- Provides extensive systematic knowledge for designing and building complete solutions using embedded hardware and software, as well as skills in the use of modern equipment and development tools.
- Trains for work on planning, implementation and management of development projects.
- Programme prepared in collaboration with industry encourages initiative, creativity and independence through project work.

## Career

- The combination of knowledge from electronic and computer engineering enables adaptation to new technologies and employment in a wide range of jobs and branches - from start-ups to global technology leaders.
- In interaction with the industry, students get to know employers and opportunities to start new ventures.
- Contacts with the business environment are also established at meetings of the alumni community and students.



## What is an embedded computer system?

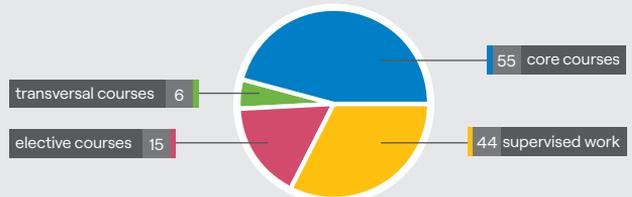
Embedded systems are special purpose computers that are embedded as “brains” of complex electronic systems. They provide specialized functions to the system within which they are embedded and ensure its high reliability, predictability and real-time operation. They are characterized by limited and optimized hardware and software resources, which minimizes complexity, dimensions, power consumption and system costs.

The process of embedded systems development is based on hardware-software co-design approach. These systems encompass all levels of complexity and technologies: from microcontrollers and digital signal processors (DSP) to programmable devices (FGPA) and application processors suitable for running general-purpose operating systems (e.g. Linux).

Application areas cover all technology fields, with particular importance in the automotive industry, communications, Internet of Things (IoT), wearable devices, measurement technology, biomedical electronics, etc.

PLAN OF STUDY	SEMESTER	ECTS
<b>Core courses</b>		55
Digital Signal Processing	1	5
Electronic Systems*	1	5
Seminar 1	1	3
Sensor Technologies	1	5
Random Signals and Processes	1	5
Analog and Mixed Signal Processing	2	5
Electronic Instrumentation	2	5
Signal Processing for Communications	2	5
Seminar 2	2	3
Embedded Systems*	2	5
Software Design for Embedded Systems	3	5
Fundamentals of Power Electronics	3	5
Fundamentals of microelectronics	3	5
Research seminar	3	5
Project	3	3
Diploma thesis	4	30
<b>Elective courses</b>	1, 2, 3	15
<b>Transversal courses</b>	1, 2, 3	6

\* the course is also offered at the undergraduate level (if the course is passed at the undergraduate level, it can be replaced by the Elective course recommended for the profile)



*ECE provided me with a stimulating, project-oriented environment for gaining theoretical and practical knowledge in the fields of electronics and embedded systems. I applied the acquired knowledge in the industrial environment during internships at Ericsson and Xylon.*

**Karla Salamun**  
student at FER



*ECE provided me with a specific knowledge, highly appreciated in the industry. This was initially recognized by my employer, and later by many ByteLab clients. Studying ECE contributed significantly to my success, enabling me dynamic and interesting career.*

**Ivan Dodig**  
Co-founder and R&D Manager, Byte Lab Grupa d.o.o.



*Research projects in ECE profile motivated me to pursue a scientific career and to develop new technologies. I have obtained my doctoral degree at ETH Zürich and I am currently developing novel sensor technology and systems in a global company, ABB Corporate Research.*

**Matija Varga, PhD**  
Sensor Systems Scientist, ABB Research