Did you know?
Every day we use billions of miniature electronic switches - semiconductor transistors - with dimensions several times smaller than a virus, which are functionally arranged on just a centimeter square of a semiconductor chip.

What will you learn?
We may be subjective, but electronics is the most beautiful and diverse field of electrical engineering. The Electronics profile covers professional and scientific fields, ranging from semiconductor technology, through micro and nano components, to digital, analog, mixed and high-frequency integrated circuits and systems. In these fields, you will gain the knowledge and skills needed to analyze, model, design, implement, measure and test electronic components, circuits, systems, and entire devices.

Skills
- Design of digital, analog and mixed-signal integrated circuits.
- Design of high-frequency and microwave circuits.
- Knowledge of instrumentation and measurement techniques for DC, transient and high-frequency analysis.
- Mastering techniques of modeling and simulation of micro and nano electronic components and circuits.
- Knowledge of the production process in semiconductor technology.
- System analysis and design with respect to electromagnetic compatibility.

Career
Development, production and maintenance of complex systems in the field of electrical engineering and information technology implies teamwork, where professionals with expert knowledge of electronics from the component level to the system level are necessary. Our alumni are employed in small, medium and large companies in Croatia and top global companies including Ericsson, Alpro, Xylon, ams AG, Texas Instruments, Infineon, Bosch, ON Semiconductor, and others.
**Our projects and co-operations**

Professors in the Electronics profile run a number of research and development projects in which graduate students also participate, and which are financed by the Croatian Science Foundation (HRZZ), bilateral programmes and EU funds. We work with a number of top companies (ams AG, ON Semiconductor, Bosch, Infineon, Eridan, FEI, Laser Components) and world leading universities and institutes (MIT, KU Leuven, IMEC, CERN, Univ. Stuttgart, Univ. Twente, IHP Frankfurt, UCLA), and our students do professional internships in some of them (Erasmus).

Our current projects cover the following topics: (1) fast switching converters based on gallium nitride elements, (2) new semiconductor components for sensor and communication microelectronics in the Internet-of-Things era, (3) design of machine learning and artificial intelligence circuits, (4) advanced modeling and atomistic simulations of nanoelectronic components, (5) chip design with built-in analog sensors and ARM Cortex-M cores.

In our laboratories we have state-of-the-art equipment for the characterization of transistors, chips, integrated circuits and systems from DC to 8 GHz and industry-standard software packages, the same as those used in the world-leading electronics companies.

---

**A chip that generates a 1 Hz frequency clock (Real-Time Clock, RTC) designed by 3rd year undergraduate students at FER. The chip was processed in 180 nm TSMC CMOS technology and worked just right (to the amazement of all the students involved in the design).**

*Professor Adrijan Barić, PhD*

**We have developed and patented a new horizontal current bipolar transistor (HCBT) which is the fastest silicon bipolar transistor in the world. Our students design and measure advanced communication and other circuits with HCBT and further develop the technology.**

*Professor Tomislav Suligoj, PhD*

**An example of an input part of a biomedical device that is able to measure 400 nV amplitudes and must operate in the presence of 100 V noise. The figure shows a 3D structure containing an ultra-low-noise amplifier with high input impedance and its protective components.**

*Professor Igor Krois, PhD*