UNIVERSITY OF ZAGREB

**FACULTY OF ELECTRICAL ENGINEERING AND COMPUTING**

Freshmen Guide

As the leading Croatian higher education and research institution in the field of electrical engineering, computer science and information and communication technology, FER strives to be integrated and competitive in the European higher education and research domain, to generate new forms of knowledge transfer to economy, as well as to drive the economy and social activities of Croatia.



# Contents

# We enrol 650 students a year

**429**

out of 1,000 best State Matura high-school graduates in (higher-level) mathematics

**450**

out of 1,000 best State Matura high-school graduates in physics

**3.500+**

students at undergraduate, graduate, doctoral and specialist studies

**590+**

employees

**200+**

assistant, associate and full professors

**12**

departments

# OUR STUDY PROGRAMMES



### UNDERGRADUATE
FER offers two undergraduate study programmes with joint first year, covering the knowledge required in both programmes.

### GRADUATE
FER offers three graduate study programmes; they last for two years and students deepen their knowledge in areas that interest them.
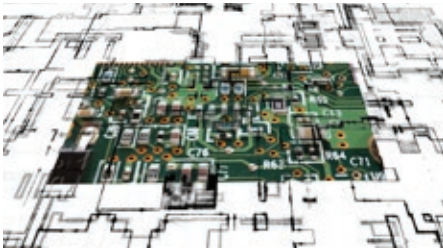
### DOCTORAL
PhD students are introduced to scientific research work and prepared for career development in either scientific and academic sector or research and development centers, as well as in innovative companies.

### SPECIALIST
At specialist studies we teach industry experts new knowledge, skills and technologies.

# UNDERGRADUATE STUDIES





### ELECTRICAL ENGINEERING AND INFORMATION TECHNOLOGY

Electrical engineering includes the knowledge required for creative engineering.

Information technology, which uses computers, computer networks, communication systems and technology, today has a significant impact on electrical engineering.

### COMPUTING

Computing covers theory, methods of analysis and synthesis, design and construction, application and operation of computer systems.

The undergraduate studies last for 3 years, and upon graduation, students earn 180 ECTS* credits.

The first year of study is common to both study programmes.

Upon graduation, it is possible to enrol in the graduate study programme.

* European Credit Transfer System (ECTS) indicates student workload while fulfilling college obligations. One credit equals 25 to 30 student working hours.

# GRADUATE STUDIES



Graduate studies last for 2 years and students earn 120 ECTS credits during their studies. Upon graduation, students gain the academic title of Master of Science (MSc).

## ELECTRICAL ENGINEERING AND INFORMATION TECHNOLOGY

This programme enables a student to acquire the competencies to solve complicated engineering problems, to design complex systems, act as a leader of a team and to conduct research and development.

## INFORMATION AND COMMUNICATION TECHNOLOGY

Information and communication technology enables the transfer and use of all types of information and is the most widely used generic technology of today.

## COMPUTING

This programme enables a student to acquire the competencies to solve complicated engineering problems, to design complex systems, act as a leader of a team and to conduct research and development.

# HOW TO BECOME A
# FER STUDENT

## Enrolment through State Matura

Enrolments in the first semester of undergraduate studies are conducted through classification examinations for candidates who have applied for the open competition for the enrolment of students in first year of study.

## Transfer from another university

Applicants who have started their study at another related university may transfer to a FER undergraduate study programme, if they fulfil the requirements the Faculty prescribes.

*Info on the enrolment to the study programmes in English will be available at www.fer.hr/enrolment.

**Female vocal choir Rezonanca**

The choir has been performing at FER since 2011 and is comprised of alumni and current FER students.
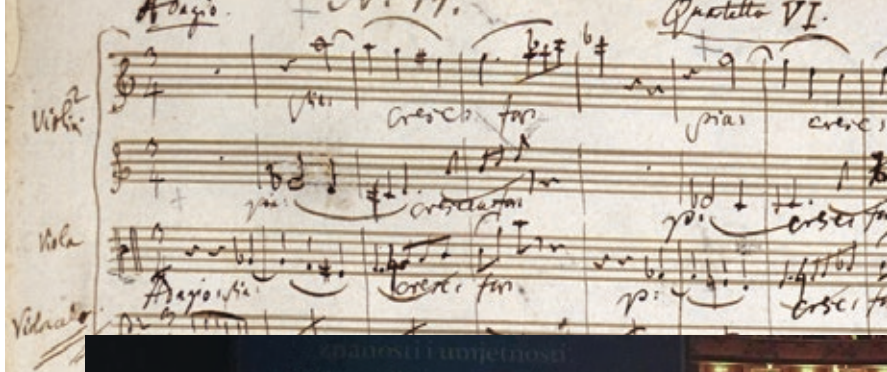


**Sporting activities**

In addition to being the best at knowledge competitions, FER students proved to be best at the sports part of "STEM Games" as well. Our students regularly win university championships in volleyball, soccer, rowing and swimming.



**FER Gallery**

The FER Gallery has been operating at the Faculty since November 1998 with the aim of bringing cultural content closer to students. Fifty notable exhibitions have been held so far.

FER's Academic Men's Choir (AKMUZ) was founded in January 2016.

# LIFE @FER

FER students are not what you would expect: among us there are artists, singers, models, athletes, as well as politicians. Apart from interesting lectures, life at FER offers various opportunities...

Attending lectures, labs and exercises or studying is not the only thing that academic life involves. As a student you can enrol in various student associations, and you can even be rewarded for your work at the Faculty.

FER cares about the health and well-being of its students through student counselling service, medical or psychological counselling.

**Popularization of science**

Through school visits, staff educational workshops and events at the Faculty, our popularization of science program, ŠUZA, excites in the youngest the passion for science, technology, engineering and natural sciences (STEM area; *Science, Technology, Engineering and Mathematics*.

# STUDENT ASSOCIATIONS

Numerous college, university, state, international and professional student organizations allow students to socialize with colleagues who share the same interests and occupations.

Club of Electrical Engineering Students, KSET, has been running since the late 1960s. It is organised into nine sections, and three areas: musical, cultural and scientific-technical. KSET is also the organiser of the Brucošijada FER-a, the largest freshman party at the University

# CAREER CENTER

Career Center carries out activities that complement the academic curriculum with contents and topics closely related to students' career development, while aiming to facilitate connection between the academia and the economy. It provides students with the opportunity to learn how to pursue a desired career which suits their values, interests, personalities and skills. During the study, students can participate in workshops or seek advice on a potential career and business orientation.



Through the events such as Job Fair and Career Speed Dating, and through the organisation of professional visits, lectures and internships, students are introduced to the environment in which they will work after graduation.

# STUDENT ENTREPRENEURSHIP
# SPOCK

Student entrepreneurship support programme (SPOCK) provides students with everything they need to develop a successful start-up.

FER is renowned for the professional and qualified scientists who pass on their knowledge to new generations. Many of them have entrepreneurial experience or have worked closely with successful entrepreneurs. They will pass on their knowledge and experience to SPOCK members, while numerous external mentors will provide easier access to valuable information. Sharing knowledge and experience with other start-ups and SPOCK's extensive network of associates and mentors will accelerate the implementation of students' business ideas.

## Mentor Network

During the participation in the programme, mentors from FER and other institutions are available to students for consultation and specialist assistance in addressing the challenges they face.

## Workspace

The space at FER will allow students to work on developing their ideas in the break between lectures and at the center of knowledge, surrounded by experts.

## Workshops and Lectures

We offer workshops on topics such as formation of Business Model Canvas, the basics of design, team management, starting and running small businesses, preparing and running crowdfunding campaigns, basics of marketing, intellectual property law and finance, while students prepare and practice pitches and presentations together with other SPOCK start-ups.

## Community

Students have the opportunity to share their knowledge and to learn from other fellow entrepreneurs, as well as to meet the investors, experts and partners at various events during the programme.

# INTERNSHIP

Internship programme provides students with the opportunity to gain hands-on experience through work in companies, thereby giving the students a direct contact with the industrial work environment.

2E SYSTEMS, 8 Sigma, A. T. Kearney Management Consulting S.R.L., A1 Hrvatska, ABB, Abest, Acceleratio, Adacta, Adria Scan, Agenor Automatika, Agrivi, AI Data Labs, Alfatec Group, Altima, Altpro, Altus informacijske tehnologije, Amphinicy, anTONIos, Apis IT, Aplos, Applicon, Apsolon (ex Sense savjetovanje), Ars Futura, Artes Calculi, Artronic, Asseco SEE, Atlantic Grupa, atos IT solution and services, Aura Soft, AVL - AST, Axilis , Balaena, Bilfinger Đuro Đakovic montaža, Binaria, Bisnode, Borealis, BroadStream Solutions, Bulb, Burza, Byte Lab Grupa, C.M.G.C., Calyx, Centar za mjerenja u okolišu, Cisco Systems Hrvatska, Combis, Combis, Communis, Creative Fields, Croatel, Croatia osiguranje, CROZ, CS Computer Systems Zagreb, CubeServ, Cuspis, Datacom, Deloitte savjetodavne usluge, Diversitas IT sustavi, dm-drogerie markt, Dobar Kod, DOK-ING, Dolotron, Dom računala, Doron net, doXray, Drager Safety, Ducati komponenti, ECCOS inženjering, ecx. io croatia, Ekobit, Elektro - kontakt, ELPOS, Elput, Eltra MG, Enso, Entrio tehnologije, Envox Lab, Erste Group Card Processor, Esapi, Eurotip, ExMental, Extensionengine, Farmeron, Fiktiv, Financijska agencija, Five by Five, Foreo Adria, Future Code, Gamechuck, GDi Gisdata, Gemmeus, Geolux, Gideon Brothers, GlobalLogic, HashCode, Helb, HEP, Holisticware, HRPRO, Hrvatska agencija za poštu i elektroničke komunikacije, Hrvatska Lutrija, Hrvatska radiotelevizija, Hrvatski institut Hrvoje Požar, Hrvatski Telekom, Hrvatski zavod za mirovinsko osiguranje, Huawei Technologies, Human Resources Cloud, Hyperactive, HZ Infrastruktura, IDIP - Internetski dizajn i programiranje, Implementacija snova, IN2, Inceptum, Inducta, Inetec – institut za nuklearnu tehnologiju, Infigo IS, Infinum, Info Novitas, Infoart, Infobip, Infodom, Infolink, Infomodul, Informatika projekt, Infoscope, Infosit, Ingemark, INsig2, InSky Solutions, Inspekt, Instantor Technology Services, Intea, Intenda Net, Interaktivni studio d..o.o., Internet jelovnik, Intesa Sanpaolo Card, Intis, Intis engineering, Iskon Internet, Istarska kreditna banka Umag, Istra informaticki inzenjering, IT Sistemi - Nove Tehnologije, i-Ways, Jadransko osiguranje, Java Language Zone, King ICT, Kod Biro, Koios savjetovanje, Končar - Električni aparati srednjeg napona, Končar - Energetski transformatori, Končar - distributivni i specijalni transformatori, Končar  - Institut za elektrotehniku, Končar - Aparati i postrojenja , Končar - Električna vozila, Končar – Inženjering za energetiku i transport, Končar - MES, Končar - Elektronika i informatika, Končar - Niskonaponske sklopke i prekidači, Kontakt, Konto, KPMG Croatia, Kraken, LED Elektronik, Lemax, Libusoft Cicom, Markoja, Mavenir Systems, Megatrend Poslovna Rješenja, Metadata, Miadria, Micro-link, Mikroprojekt, Minus5, Mireo, Mivex-prom, Mobendo, Mobilisis, Mobilna informatika, Mobilne aplikacije, Mono, Montelektro, Morpholine Interactive, Mrežne tehnologije Verso, mStart, mStart plus, Multicom, Nanobit, Neoinfo, NEOS, Netgen, Neyho Informatika, Nobium, Nova ICT, Nova TV, Novamina, Odašiljači i veze, Omega Software, Omnidata, Omnisdata, On-Air Sistemi, OptimIT, Oradian, Perpetuum Mobile, Perzej, Pet minuta, Photomath, Pine Studio, Pinecone, Plava tvornica, Plavi Pixel, Pliva Hrvatska, Poslovna inteligencija, Privredna banka Zagreb, Pro-klima, Q Alijansa, Raiffeisenbank Austria, Rasco, RealNetworks, Recogno , Refactorit, Research and Engineering Center, ReversingLabs, Rimac automobili, RIZ -Odašiljači, RoMb Technologies, RP Global Projekti, S&T Hrvatska, S. D. Informatika, Sagena - Informatički inženjering, Sartura, Schneider Electric, Sedam IT, SELK, Senso IS, Senso Profi, Serengeti, Seven of Nine, Siemens , Siemens, Siemens Healthcare, Slikoplat, Smart Lumies, Smart Sense, Soba202, SofaScore , SPAN, Srce, Strabag Bruz, Stype CS, Styria Digital Development, Styria medijski servisi, Superius, Supracontrol, Syntio, Systec Automatizacija, Tagit Adriatica, Tehnomobil Securitas, Tehnozavod - Marušić, Telegra, Tentamen, TEO-Belišće, TIS objektivni informacijski sustavi, Tri plus grupa, Trikoder, Triple - Inovacije, TUNE informacijske tehnologije, Tvornica turbina, UHP digital, Ulitis, Undabot, Uprise, Vertiv Croatia, Veski, Vestigo, Vingd, Virtualni Atelier, Visage Technologies, Web rješenja, Xylon, Zagrebačka banka, Zagrebački holding, Zeraxo
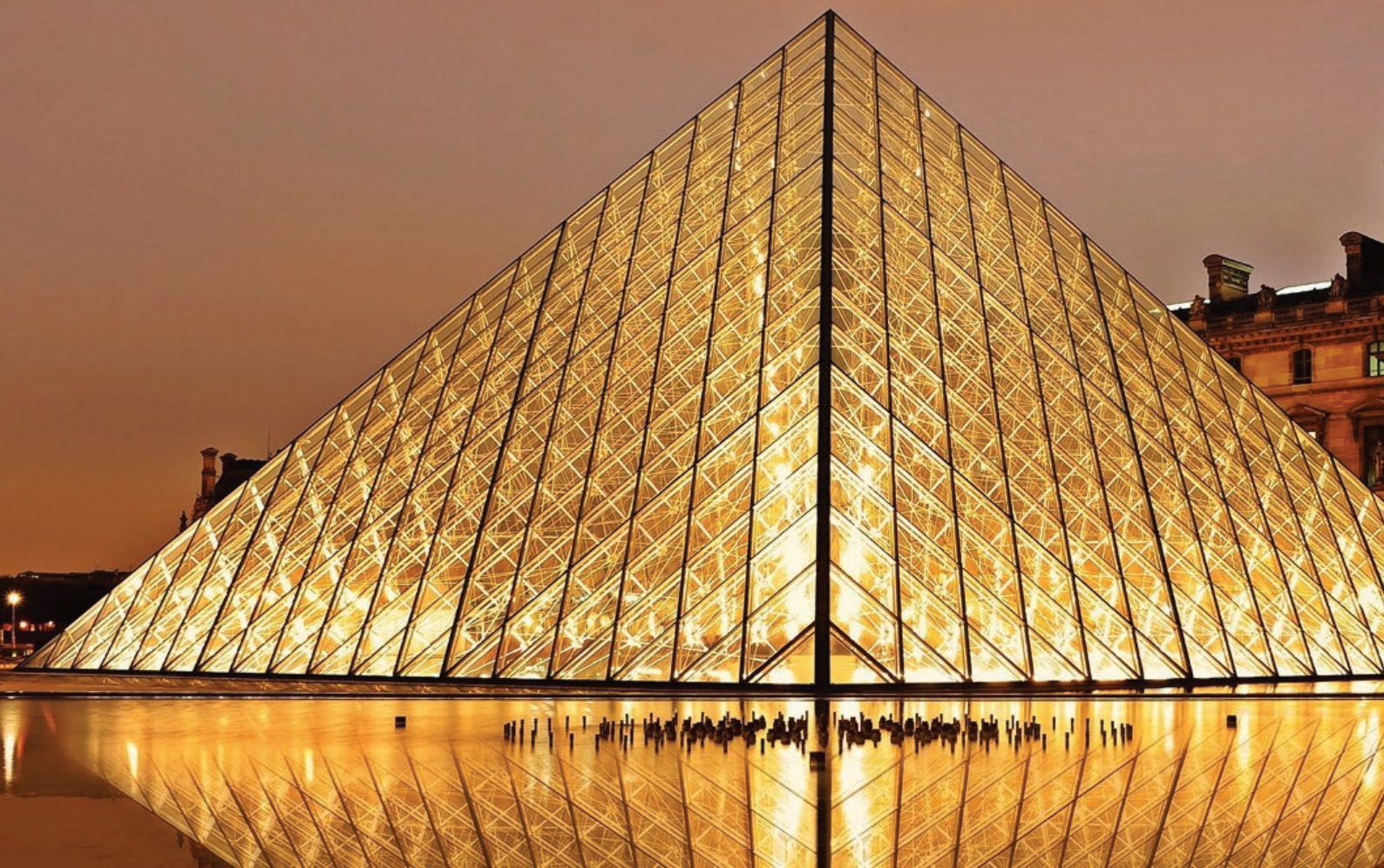
# SCHOLARSHIPS AND AWARDS

## Students can apply for various scholarships offered by companies and published on FER web pages

Many students receive scholarships already during the undergraduate programme. Lately, due to a declining student interest in scholarships that condition the employment at the scholarship provider after graduation, employers are increasingly inclined to provide scholarships to students without the employment obligation, but they build a continuous relationship with the students, connect them with mentors and monitor their progress.

In addition, there are many scholarships available to students based on their excellence that are provided by the state, city, University, etc. We expect that a large number of FER undergraduate students will receive state scholarships in STEM fields in the academic year 2020/2021, including most of the freshmen. In recent years, about 450 students have received this scholarship every year.

The best FER students are winners of numerous international, national, University and other awards.

# STUDENT AND STAFF MOBILITY

FER has established an intensive co-operation with the leading European universities in the form of student exchange through the Erasmus+ programme and 128 bilateral agreements with institutions from 22 countries.

During the last few years, between 55 and 65 FER students spent one or two semesters at foreign universities, while there is a steady increase in the number of incoming students.

Some of the incoming students come from the best European universities (such as the University of Leuven in Belgium or the University of Aalborg in Denmark).

In addition to the student exchange, there are also professor and researcher exchange programmes, through which a number of our employees spend between three months and one year at the leading European institutions, while in return many distinguished professors and researchers visit FER.

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# DOCTORAL STUDY

FER carries out doctoral study in the area of technical sciences, scientific field of electrical engineering and scientific field of computing. The core components of the University doctoral study are scientific research and creativity.

### Enrolment to the study

Enrolments to the study are carried out through an open competition for applicants, which are announced twice a year. Enrolment criteria includes the success in the graduate study, demonstrated interest in scientific research, published papers and a proposal of the field of research. Interview with the applicant is an obligatory part of the enrolment procedure.

### Enrolment criteria

Doctoral study can be enrolled by applicants who graduated from a graduate study in the fields of electrical engineering or computing with a grade point average of all passed exams at the graduate study of at least 3.5..

**60**

**PhD positions**

**53**

**doctoral dissertations defended in the academic year 2018/2019**

**490**

**students at the doctoral studies**

# SPECIALIST STUDIES

Lifelong education, along with specialist courses, is also present within six postgraduate specialist studies in which industry experts are taught new technologies.



### TRANSFORMERS

The study provides a high level of applied, research and educational work in the field of transformers through the co-operation between the University of Zagreb and the "KONČAR" Group.

The aim of the study is to educate the specialists from the field of transformers, vital for the economy, higher education and science.



### RAILWAY ELECTRICAL SYSTEMS

The purpose of the study is to educate specialists who will advance the development, design, production and maintenance of railway electrical systems components by using modern methods and insights.

## THE REGULATION OF THE ELECTRONIC COMMUNICATIONS MARKET

The study deals with the regulatory mechanisms that guide the development of the electronic communications market in order to achieve the availability of services in line with the needs and capabilities of the citizens, economy and society as a whole, and to invest in the new technologies.

## INFORMATION SECURITY

The study helps to meet the growing demand for information security specialists who possess a good balance of analytical skills and business acumen.

The program combines security policies, management and technical aspects of information security and risk management.
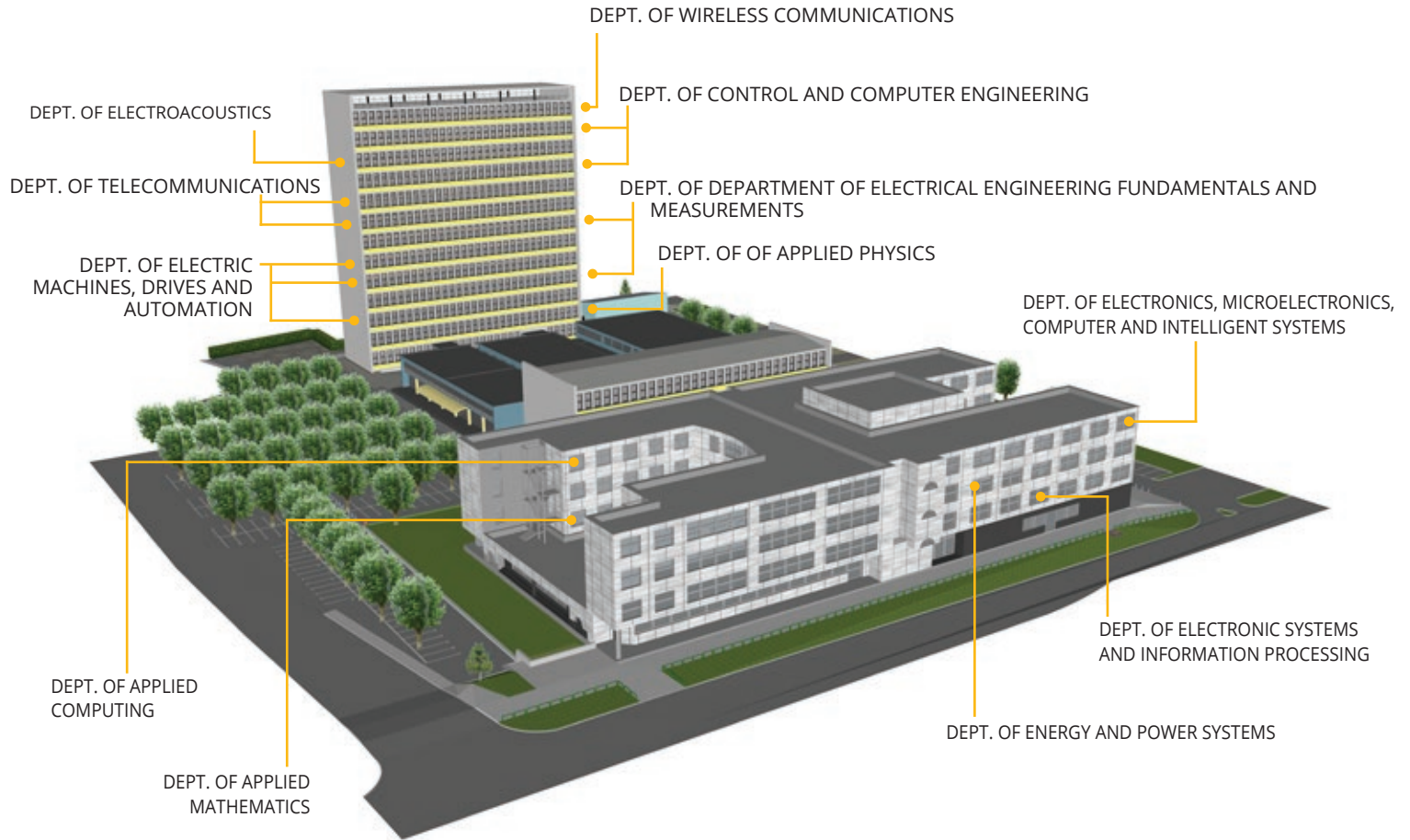
## PROJECT MANAGEMENT

The study contributes to the advancement of project management field and enables the students to strengthen their capacity in the professional life, irrespective of the field of their professional activity and their graduate degree programme.

## PRODUCTS, DIGITAL INNOVATIONS AND TECHNOLOGIES IN INSURANCE – INSURTECH

This study offers a comprehensive view on the development of new insurance products, generates competences for successful digital value chain management and capacity for participation in future business ecosystems.

DEPT. OF WIRELESS COMMUNICATIONS

DEPT. OF CONTROL AND COMPUTER ENGINEERING

DEPT. OF ELECTROACOUSTICS

DEPT. OF TELECOMMUNICATIONS

DEPT. OF DEPARTMENT OF ELECTRICAL ENGINEERING FUNDAMENTALS AND MEASUREMENTS

DEPT. OF OF APPLIED PHYSICS

DEPT. OF ELECTRIC MACHINES, DRIVES AND AUTOMATION

DEPT. OF ELECTRONICS, MICROELECTRONICS, COMPUTER AND INTELLIGENT SYSTEMS

DEPT. OF APPLIED COMPUTING

DEPT. OF ELECTRONIC SYSTEMS AND INFORMATION PROCESSING

DEPT. OF APPLIED MATHEMATICS

DEPT. OF ENERGY AND POWER SYSTEMS

# STRUCTURE
# AND MANAGEMENT

The Faculty is comprised of 12 departments and several administrative and support services. It is governed by the Dean and the Faculty Council, which consist of more than 230 members - employees from the ranks of professors, associates and students.

Departments are organisational units that coordinate research and education activities.

Each FER department is the core of the educational, research and scientific activities in the individual fields or areas.
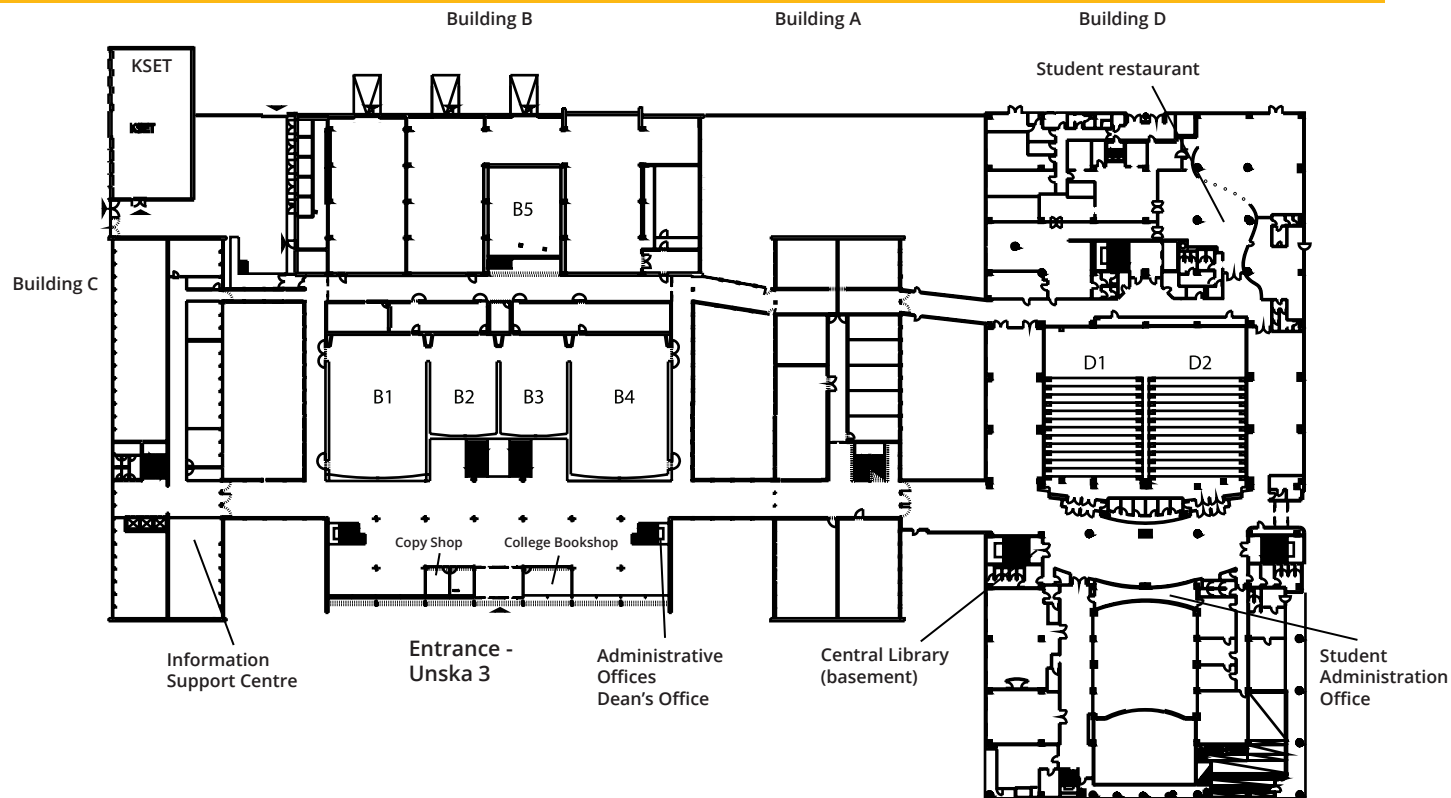
About one hundred staff members employed in the Faculty services attend to day-to-day functioning of the Faculty.

# THE BEST FRESHMEN PARTY...

**... IN CROATIA (AND BEYOND)**

Building B

Building A

Building D

Student restaurant

KSET

Building C

B5

B1　B2　B3　B4

D1　D2

Copy Shop　College Bookshop

Entrance -
Unska 3

Information
Support Centre

Administrative
Offices
Dean's Office

Central Library
(basement)

Student
Administration
Office