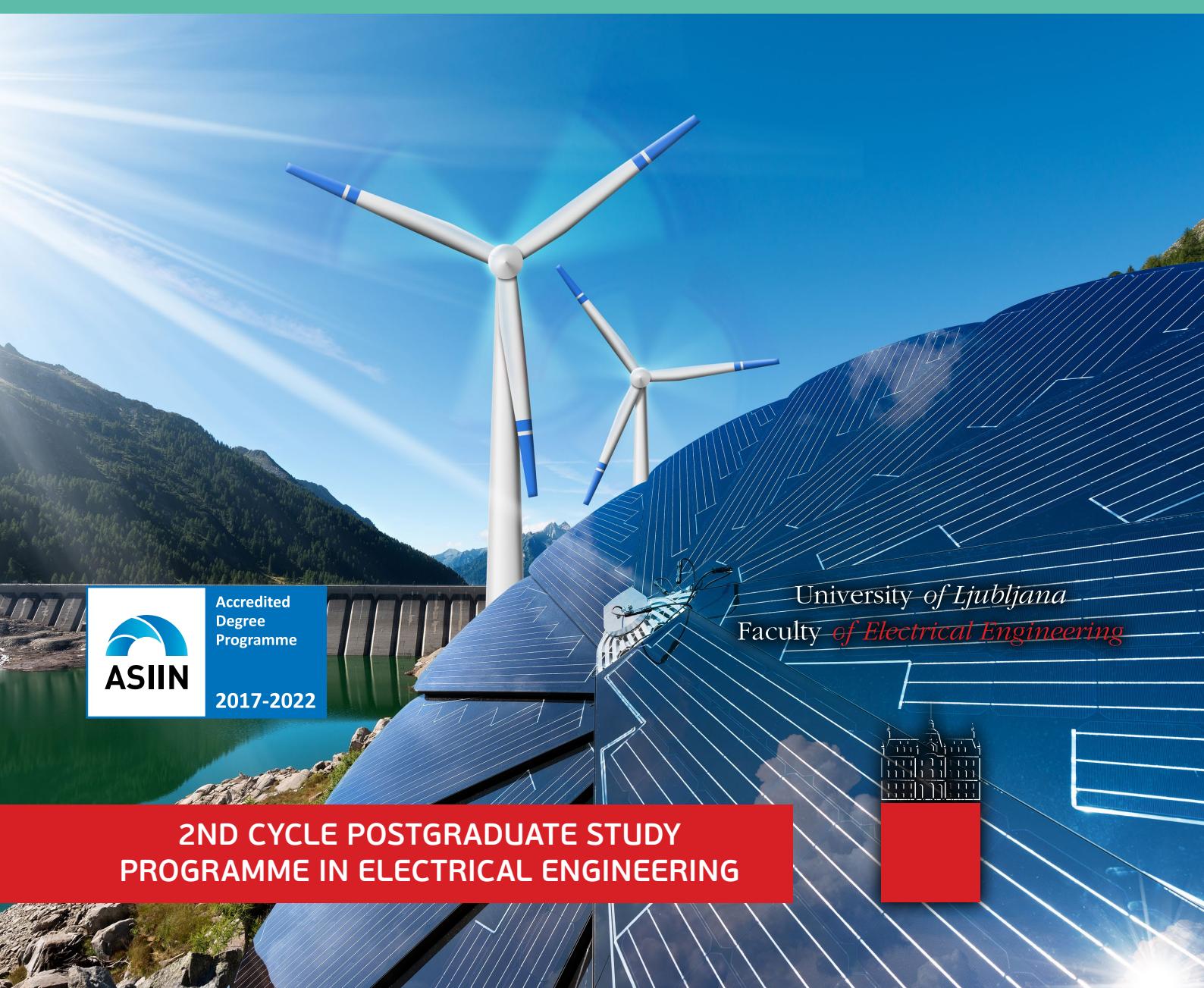


ADVANCED POWER SYSTEMS



Accredited
Degree
Programme
2017-2022

University of Ljubljana
Faculty of Electrical Engineering

2ND CYCLE POSTGRADUATE STUDY
PROGRAMME IN ELECTRICAL ENGINEERING



UNIVERSITY OF LJUBLJANA



The University of Ljubljana is an institution with a very rich tradition. It was established in 1919 on the foundations of a long-established pedagogical tradition. It is a very large university, with 40,000 undergraduate and postgraduate students taking over 300 different undergraduate and postgraduate study programmes. It employs approximately 5,600 higher education teachers, researchers, assistants and administrative staff in 23 faculties and 3 arts academies. The central building, all three academies and the faculties are located in the centre. Some of the most recent and modern buildings have been constructed on the outskirts of Ljubljana, giving the university and its students a ubiquitous presence in the city.

The University of Ljubljana is the central and largest educational institution in Slovenia. It is renowned for its quality social and natural sciences and technical study programmes, structured in accordance with the Bologna Declaration. Our projects keep pace with the latest developments in the areas of arts, sciences and technology both at home and abroad.

The University of Ljubljana is listed amongst the top 500 universities in the world according to the ARWU Shanghai, Times THES-QS and WEBOMETRICS rankings.



FACULTY OF ELECTRICAL ENGINEERING

Broad and quality specific knowledge from a chosen field of electrical engineering
Encourages the pursuit and mastering of the latest procedures and technologies
The ability of correct judgement and creating the newest achievements on a broader field of electrical engineering
The knowledge needed for individual research and development
Study in modernly equipped classrooms and laboratories
Internationally acclaimed teachers and researchers
Education comparable Europe-wide
Interdisciplinary knowledge
Very good base for the continuation of studies on a doctoral study of electrical engineering or other technical fields
Broad career choice opportunities for masters in electrical engineering enable effective entering on the job market

The Faculty of Electrical Engineering (FEE) was founded in 1919 as a unit of the Technical Faculty of the University of Ljubljana. The main goals of the Faculty are: to offer diverse forms of education with an emphasis on internationalisation and practical skills as well as on international comparability of achieved educational levels; to conduct internationally comparable scientific research work; to foster professional work and the transfer of technologies into practice; to promote and further the development of the profession in society.

The Faculty of Electrical Engineering has a high reputation today, as its pedagogical and scientific research work focuses on the technologies of the future in various fields of electrical engineering. Throughout the years, together with the leading role in the education of top experts, the Faculty has built successful scientific and research cooperation with the Slovenian industry and has participated in numerous international projects. Postgraduate master's level 2 study program of Electrical Engineering, option Advanced Energy Systems offer a high-quality set of specific expertise in the field of energy, advanced information and communication technologies, electronics and intelligent control.

The international integration of the program allows our students to upgrade specific knowledge within the framework Erasmus+ and other types of mobility at universities abroad.



ADVANCED POWER SYSTEMS

- STUDY PROGRAMME OPTION

Study programme:	2nd cycle postgraduate study programme in Electrical Engineering
Programme type:	Full time post-graduate study, 8.000€/year, 16.000€/programme
Length of the study programme:	2 years + additional year
Number of ECTS credits of the study programme:	120
Study programme options:	Advanced Power Systems*  Control Systems and Computer Engineering  Biomedical Engineering  Electrical Power Engineering  Electronics  Mechatronics  Robotics  Information and Communication Technologies 
Advanced Power Systems option goals:	to attain professional knowledge in the fields of advanced electrical power systems, advanced information and communication technologies, electronics and artificial intelligent control
Professional title conferred:	magister inženir elektrotehnike / magistrica inženirka elektrotehnike
The abbreviated form of the title in both cases is	mag. inž. el.

* Study option Advanced Power Systems is conducted in English.



WHAT ARE ADVANCED POWER SYSTEMS?

Power engineering
Electrical power systems
Smart grids
Conventional sources of electricity
Renewable sources of electricity
Power electronics
Electricity market
Network communications
Mobile and wireless networks
Internet services and applications
Internet of things
Cyber security
Intelligent decision support systems
Photonics
Lighting engineering
End users

The electrical power system is the largest system created by man. Today, the electrical power system is not only composed of generators, lines and consumers. It consists of protection and control devices, electronic elements, various communication and information systems, data acquisition and processing systems, artificial intelligence and systems that ensure safety and models of end-user behavior. If we want to maintain it in equilibrium, we need to know and use power electronics, advanced information and communication technologies, internet services and applications, end-user models, and intelligent systems for decision support and management. Only with the help of these skills can a graduate of the option Advanced Power Systems contribute to the efficiency and reliability of the power system, thus enabling the uninterrupted supply to consumers with one of the most flexible forms of energy - with electrical energy.



1st year

Winter semester

- Conventional Energy Sources
- Circuits and Signals in Power Engineering
- Internet Networks I
- Non-Linear Electronic Circuits
- Lighting*
- Communication Electronics*
- Software for Communications Systems*

Summer semester

- Power System Protection and Control
- Mobility and Internet of things
- Modern Power Supplies
- Modul A: Intelligent systems in decision support*
- Modul A: Identification*
- Modul E: Power Engineering*
- Modul E: Alternative Sources of Electrical Energy and Energy Markets*
- Modul L: Information and communication systems security*
- Modul L: Operations research in telecommunications*

2nd year

Winter semester

- Internet services and applications
- Photonics
- Power System Dynamic Phenomena
- Increasing Power System Transmission Capacity
- Construction of Electronic Systems***
- Power Distribution and Industrial Systems***
- Power Quality***

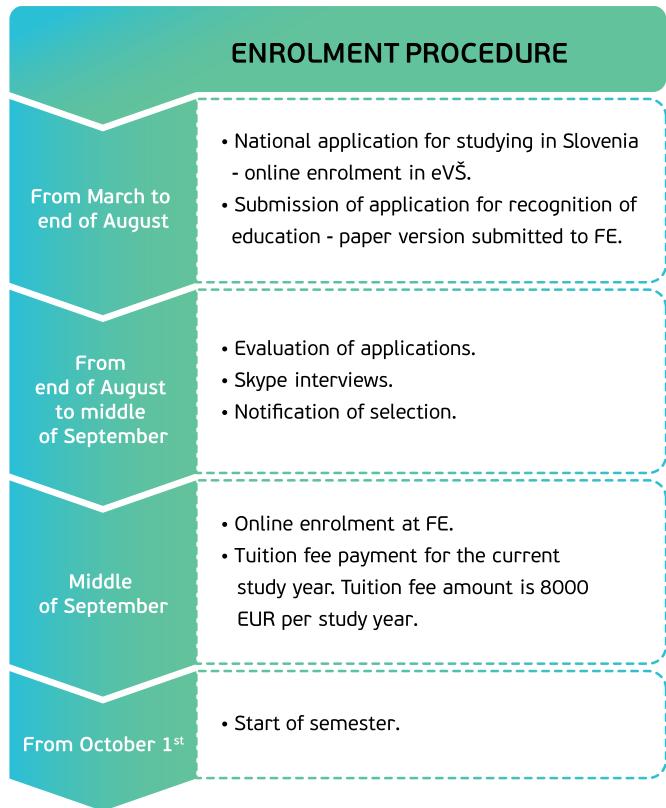
Summer semester

Master's thesis

* Students can choose from the variety of subjects carried out on the programme Electrical Engineering in English. In the winter semester they choose one elective subject and a module of two bound subjects in the summer semester.



STUDY OF ADVANCED POWER SYSTEMS



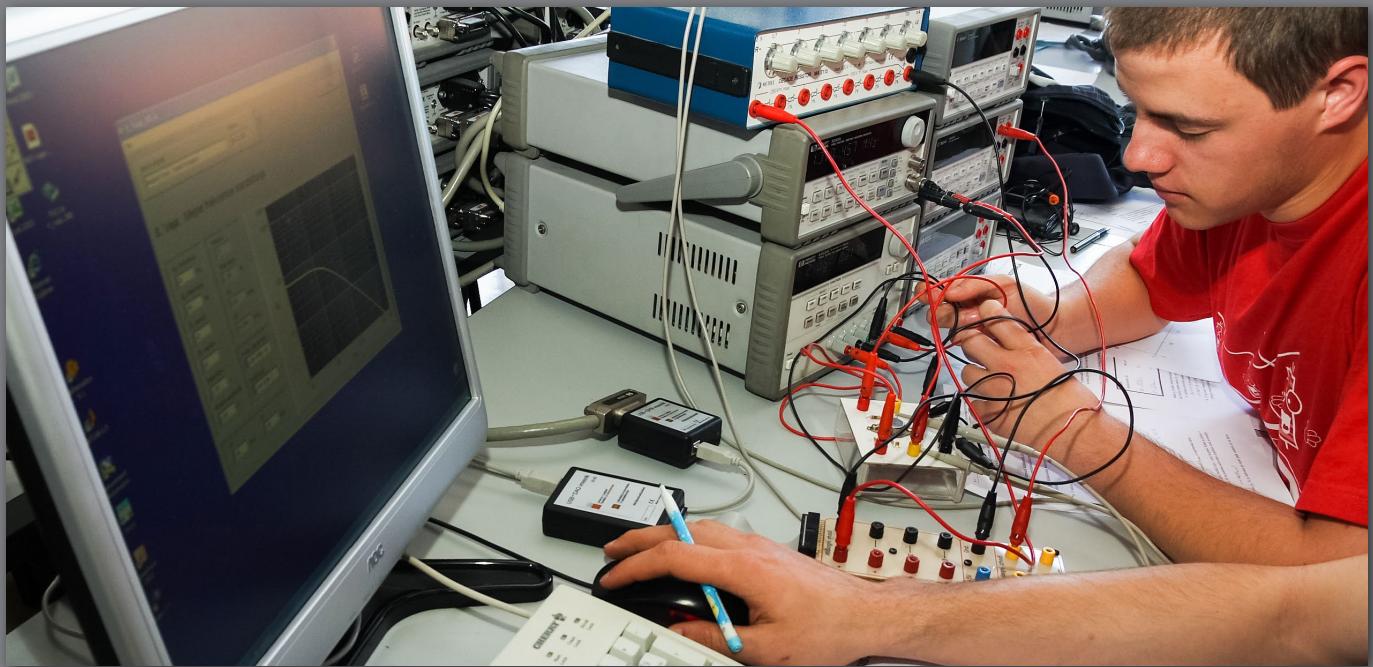
During the course you will learn all the components of the power system. Most of the electrical energy is still produced by conventional sources of electricity, that is, in hydroelectric power stations, thermal power plants and nuclear power plants. In the desire to minimize environmental impact, alternative sources of electrical energy are increasingly being established: the sun, wind, geothermal energy and the energy of the sea.

Today there is no electrical power system without electronics. With the help of power electronics and devices based on it, electric energy can be transferred to the desired paths and delivered to desired destinations. In addition, electronics-based devices are also used to monitor the state of the power system, and to protect and manage it.

Modern electrical power system can no longer be imagined without the extensive cooperation of information and communication technologies. If the electrical power system of today's world is like the veins through which energy flows, the ICT systems are its nerves. Therefore, during the course of your studies, you will also be deeply involved in communication systems, data collection platforms, software and cyber security, as well as services and end-users. You will also meet the Internet of Things and Mobile Systems and use them in advanced power systems.

Those who will be attracted to the control and management of advanced power systems can also learn about the identification of dynamic systems based on measurements, procedures for evaluating their parameters, and methods of intelligent modeling of systems that enable them to manage them through optimization procedures.

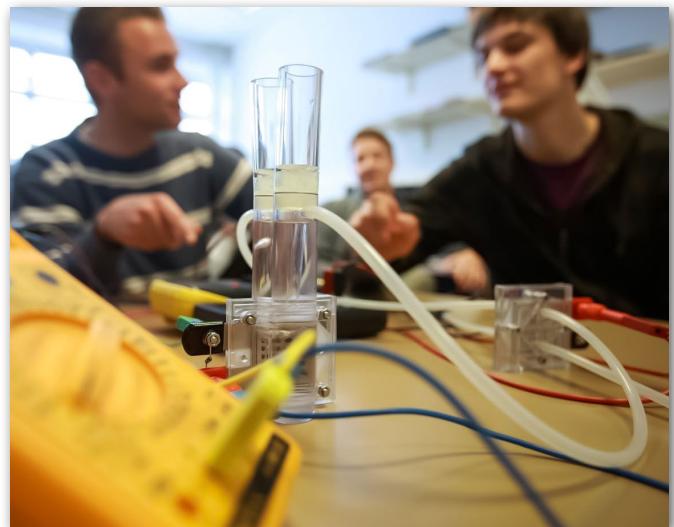
Our study programmes received national seal ASIIN of the German Accreditation Council. The ASIIN subject-specific quality seal validates that a study programme fulfils the requirements of science and professional practice in a certain discipline to a very high level.



AFTER COMPLETING THE STUDIES

Studies of Advanced Power Systems provide, on the one hand, basic knowledge in the field of production, transmission and consumption of electrical energy, and on the other, specific knowledge about the modern technologies and approaches that we use. Graduates will acquire a broad knowledge that offers a qualitative basis for further education in doctoral studies in connection with electrical power engineering, as well as power electronics and information and communication technologies. The acquired knowledge offers numerous employment opportunities, not only in power engineering, but also in other interdisciplinary industries, where knowledge about systems management and modern information and communication technologies is needed - practically everywhere.

The rapid development of electrical power systems over the last decade, the change in their role in relation to distributed resources and energy storage, the desire for a carbonless society, and the increased use of various information and communication technologies in this field have in recent years triggered increased employment of experts with relevant skills. However, there is still a lack of such workforce. Not only in Europe, engineers with knowledge of advanced electrical power systems and power electronics combined with ICT and IoT knowledge are extremely sought after all over the world. They are needed both for planning or managing modern electrical power systems as well as for the development of technologies, devices and services that will contribute to their development.



STUDENTS LIFE IN LJUBLJANA

SLOVENIA

Slovenia is the first country in the world to be declared a green destination based on the Green Destinations Criteria. Situated in the heart of Europe, Slovenia is a boutique country between the Alps, Mediterranean Sea, mysterious Karst with more than 11,000 karst caves and Pannonian Plain, rich in healthy water springs. This small green country has an area of 20,273 km², and is home to a sincere, hospitable and diligent nation of people. Slovenia has a population of two million. Slovenes are very conscientious in learning foreign languages in order to make themselves understood. The majority of people can speak good English. In Slovenia, it is not difficult to compare the value of goods and services, as they are priced in one of the world's major currencies, the euro.



The Ljubljana region lies in Slovenia's largest basin. Ljubljana is the political and cultural heart of the Slovenian nation. It is an important European commercial, business, exhibition and congressional centre, as well as being the transport, science and education centre of Slovenia. In Ljubljana, the old meets the new; it seems that history has spent all of the settlement's five millennia preparing it to become the nation's capital. Ljubljana is a small city of culture situated on the Ljubljanica River, which flows between the city centre and the castle hill above. It is home to numerous theatres, museums and galleries, and boasts one of the oldest philharmonic orchestras in the world. Ljubljana has been named the European Green Capital 2016. It is a safe city with a high standard of living. Due to its central location in Europe, it is the perfect starting point for travelling and discovering other European cities.

STUDENTS LIFE IN LJUBLJANA

PUBLIC TRANSPORT

The most effective means of public transport in Ljubljana is the city bus. Please check current fares at www.lpp.si/en. Fare is paid using an URBANA card. For those planning to stay longer, a student monthly bus card is available at the Ljubljana Transport System.

FOOD SYSTEM

All students are entitled to subsidised student meals. To use this subsidy, students are required to submit an online application form through the www.student-ska-prehrana.si portal and then report to the nearest Subsidised Student Meal point the number of the application form (online application is irrelevant without the application number), an identity document, evidence of student status for the current academic year and phone. Subsidised student meals are available in various restaurants and pubs. There is a faculty restaurant at the Faculty of Electrical Engineering, with a daily offer of special lunches for students.

RESIDENCE PERMIT

EU Citizens

EU citizens may enter Slovenia with a valid personal ID or passport. Students report their stay at the local police station. A residence permit is not required for the first three months of exchange (except when living in a student dormitory). After three months, a permit is obligatory and can be obtained at the Administrative Unit Ljubljana, Department for Foreigners.

NON-EU Citizens

If you wish to enter and stay in the Republic of Slovenia for purposes other than those permitted on the basis of your visa, you are required to be in possession of a residence permit issued in the Republic of Slovenia, which must be obtained prior to entry to the Republic of Slovenia. Please contact your embassy for details.

COST OF LIVING

Living expenses (rent in private accommodation or dormitory, food, public transport, books) in Slovenia roughly amount to €500 per month; actual expenditure depends on individual lifestyle.

HEALTH INSURANCE

International students coming from **EU and EEA Member countries** and **Switzerland** have free access to emergency or necessary healthcare services during their temporary residence in the Republic of Slovenia upon submission of evidence of their status: the European Health Insurance Card (EHIC) or a certificate as a substitute for EHIC that is issued by the competent state. Persons from **non-EU and non-EEA countries**, **Switzerland** or from countries with which Slovenia has not concluded bilateral agreements on social insurance can take out their compulsory health insurance policy at one of the local units of the Health Insurance Institute of Slovenia. Upon registering for this compulsory health insurance policy, students have to submit a certificate that confirms they are enrolled in an educational programme in Slovenia.

STUDENT LIFE IN LJUBLJANA

SPORTS ACTIVITES

Students can join free sports hours in the sports hall in Rožna Dolina. Recreation takes place once per week. Those with an ambition to compete are invited to join faculty sports teams, which attend various university sports competitions during the academic year.

The Sports Association of the Faculty of Electrical Engineering organises numerous skiing, hiking and biking tours, as well as rafting, a school of wind surfing and many other activities. All of the events are published on the university website.

Further possibilities for becoming involved in sports activities are offered by the University Sports Centre CUŠ.



LIBRARIES

The Faculty of Electrical Engineering Library has a higher education library intended for the needs of the students, professors and researchers of the Faculty, as well as other users, assisting them with their teaching and research work.

Registered students of the University of Ljubljana are entitled to use all of the libraries of the university.

- The National and University Library (NUK) is the main library for students at the University of Ljubljana. It is located in the city centre and contains more than 2.5 million items.
- The Central Technical Library is the main library in the field of natural sciences and engineering. The library contains more than 300,000 items.



THE CHALLENGES OF THE FUTURE

The fact is that a modern society can no longer survive without the proper supply of electrical energy and digitization. And the fact is that in the last decade both areas have undergone a revolution. Energy from distributed renewable sources represents an increasing share of the total electrical energy produced each year. As a consequence, classical sources of electrical energy, particularly thermal power plants and nuclear power plants, are increasingly being abandoned. Therefore, electrical energy generation is increasingly moving away from the power centers and is increasingly dispersed over sometimes difficult to reach areas, such as in wind farms high in the mountains or at sea. As a result, electrical energy transmission from manufacturers to consumers is becoming increasingly difficult to implement. If, for the most part, most of the power lines operated far under technical options, they must now be burdened to the extreme technical limits, and in the future, with new technologies, these borders will need to be moved even further. Similarly, electrical energy consumption is changing.

There are more and more electric cars and other means of transport, more and more consumers are choosing a certain share of self-sufficiency through solar power plants or cogeneration of heat and electricity.

The electrical power system today has to function differently than it was designed at its inception and in its young years a hundred years ago. It needs to be much more dynamic, quickly responding to changes, being digitized and, moreover, to provide ever-increasing reliability. This is possible only through the integration and use of electronic components, modern information and communication technologies, data technologies and artificial intelligence.

In the future, it will be necessary to look for newer and newer opportunities to integrate modern production sources in order to increase the capacity of existing ones and to set up new transmission capacities and to ensure a reliable supply of high quality electrical power for the consumers. As well as for the technical and economic performance of the entire electrical power system, including human end users. All this will not be possible without a new generation of engineers with the necessary knowledge in the field of Advanced Power Systems.



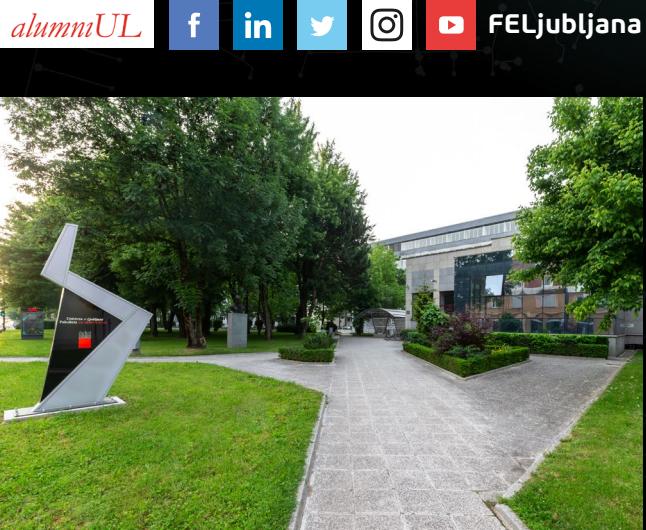
LEAVE YOUR MARK
in technological progress

WITHOUT ELECTRICAL ENGINEERING THE WORLD AS WE KNOW IT WOULD NOT EXIST.

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