

Study program Overview: Electronics, Automation and Robotics – BSc 2024-2027

Name of the Institution	University of Prishtina
Faculty / Department	Faculty of Electrical and Computer Engineering Department of Electronics Department of Automation and Computerized Robotics
Main campus and/or branch	Main campus
Name of study program	Electronics, Automation and Robotics
Qualification Level according to KKK	Level VI
Academic grade or name of the academic grade in diploma:	Bachelor of Science in Electrical and Computer Engineering - Study Program Electronics, Automation and Robotics
ECTS:	180
Profile of the study program (specialization)	1. Electronics 2. Automation and Robotics
Field of study according to Erasmus Subject Area Codes (ESAC)	06.2
Form of study:	Regular studies
Minimum duration of studies	3 years
Number of study places:	120

Year of study: I

Semester I

No	M/E	Subjects	L	NE	LE	ECTS	Lecturer
1	M	Linear Algebra with Calculus 1	3	3	0	7	Qefsere Doko, Shqipe Lohaj, Valdete Rexhebeqaj
2	M	Physics for engineering 1	2	1	1	5	Valon Veliu
3	M	Fundamentals of electrical engineering 1	3	1	1	6	Enver Hamiti, Mimoza Ibrani, Vjosa Shatri
4	M	Fundamentals of programming	2	0	2	5	Avni Rexhepi Kadri Sylejmani
5	M	Communication skills	2	0	0	3	Blerim Rexha, Sabrije Osmanaj, Bujar Krasniqi
Elective subjects (select one of the following electives)							
6-1	E	Practicum in Mathematics	2	0	0	3	Valdete Rexhebeqaj-Hamiti
6-2	E	Basics Software Tools	2	0	0	3	Core FECE staff

Semester II

No	M/E	Subjects	L	NE	LE	ECT S	Lecturer
1	M	Analytical geometry with Calculus 2	3	3	0	7	Qefsere Doko, Shqipe Lohaj, Valdete Rexhebeqaj
2	M	Physics for engineering 2	2	1	1	5	Valon Veliu
3	M	Fundamentals of electrical engineering 2	3	1	1	6	Enver Hamiti, Mimoza Ibrani, Vjosa Shatri
4	M	Algorithms and Data Structures	2	0	2	6	Kadri Sylejmani, Avni Rexhepi
5	M	Digital logic circuits	2	1	1	6	Sabrije Osmanaj, Artan Mazrekaj

Year of study: II**Semester III**

No	M/E	Subjects	L	NE	LE	ECT S	Lecturer
1	M	Calculus 3 with Probability	2	2	0	5	Shqipe Lohaj
2	M	Microprocessors and Microcontrollers	2	0	2	5	Lavdim Kurtaj
3	M	Signals and systems	3	1	1	6	Vjosa Shatri
4	M	Automation	2	1	1	5	Drilon Bunjaku
5	M	Basic Electronics	3	0	1	5	Qamil Kabashi
6	M	Electronic measurements	2	0	1	4	Milaim Zabeli

Semester IV

No	M/E	Subjects	L	NE	LE	ECT S	Lecturer
1	M	Internet of Things	2	0	2	6	Drilon Bunjaku
2	M	Power Systems	2	1	1	5	Vezir Rexhepi Arben Gjukaj
3	M	Electromagnetic Fields and Waves	2	1	1	5	Vjosa Shatri
4	M	Discrete Signals and Digital Processing	2	0	2	5	Faton Maliqi
5	M	Computer Architecture	2	0	2	5	Qamil Kabashi, Dhurate Hyseni
6	M	Project management	2	1	0	4	Nora Sadiku Dushi

Year of study: III- Specialization ELECTRONICS

Semester V

No	M/E	Subjects	L	NE	LE	ECT S	Lecturer
1	M	Electronic Devices	3	0	1	6	Milaim Zabeli
2	M	Digital Electronics	2	0	2	6	Sabrije Osmanaj
3	M	Power Electronics	2	0	2	5	Sabrije Osmanaj
4&5 Technical electives: (select two of the following technical electives)							
1	E	Optoelectronics	2	0	2	5	Milaim Zabeli
2	E	Sensors and Actuators	2	0	2	5	Faton Maliqi
3	E	Electronic Communication	2	0	2	5	Vjosa Shatri
4	E	Artificial Intelligence	2	0	2	5	From industry
5	E	Fundamentals of Mechatronics	2	0	2	5	Drilon Bunjaku
6	E	Programmable Logic Controllers	2	0	2	5	Qamil Kabashi
6 Non-technical electives: (select one of the following non-technical electives)							
1	E	Entrepreneurship and Innovation	2	0	0	3	Nora Sadiku Dushi
2	E	Management in Engineering	2	0	0	3	Nora Sadiku Dushi

Semester VI

No	M/E	Subjects	L	NE	LE	ECT S	Lecturer
1	M	Microelectronics	2	1	1	5	Milaim Zabeli
2	M	Analog Electronics	2	0	2	5	Qamil Kabashi
3	M	Cyber Security	2	0	2	5	Blerim Rexha
4 Technical electives: (select one of the following technical electives)							
4-1	E	Machine Learning	2	0	2	5	Faton Maliqi
4-2	E	Fundamentals of Robotics	2	0	2	5	Lavdim Kurtaj
3	E	Optical Communication Technology	2	0	2	5	Milaim Zabeli

4-3	E	Embedded Systems	2	0	2	5	From industry
4-4	E	Computer Aided Design of Electronic Circuits	2	0	2	5	Milaim Zabeli
5	M	Internship	2	0	0	5	from department
6	M	Bachelor Thesis				5	from department

Year of study: III- Specialization AUTOMATION AND ROBOTICS

Semester V

No	M/E	Subjects	L	NE	LE	ECTS	Lecturer
1	M	Fundamentals of Control Systems	2	1	2	6	Drilon Bunjaku
2	M	Fundamentals of Robotics	2	0	2	5	Lavdim Kurtaj
3	M	Programmable Logic Controllers	2	0	2	6	Qamil Kabashi
4&5 Technical electives: (select two of the following technical electives)							
1	E	Artificial Intelligence	2	0	2	5	Faton Maliqi
2	E	Smart Actuators and Drives	2	0	2	5	Lavdim Kurtaj
3	E	Smart Sensors	2	0	2	5	Drilon Bunjaku
4	E	Communications in Automation	2	0	2	5	Lavdim Kurtaj
5	E	Finite Element Methods	2	0	2	5	Vjosa Shatri
6	E	Operating Systems	2	0	2	5	Dhurate Hyseni
6 Non-technical electives: (select one of the following non-technical electives)							
1	E	Entrepreneurship and Innovation	2	0	0	3	Nora Sadiku Dushi
2	E	Management in Engineering	2	0	0	3	Nora Sadiku Dushi

Semester VI

No	M/E	Subjects	L	NE	LE	ECTS	Lecturer
1	M	Modeling and Simulation	2	0	2	5	Drilon Bunjaku

2	M	Digital Control Systems	2	0	2	5	Lavdim Kurtaj
3	M	Cyber Security	2	0	2	5	Blerim Rexha
4 Technical electives: (select one of the following technical electives)							
4-1	E	Nonlinear Control Systems	2	0	2	5	Sabrije Osmanaj
4-2	E	Machine Learning	2	0	2	5	Faton Maliqi
3	E	Real-time Control Systems	2	0	2	5	Lavdim Kurtaj
4-3	E	Computer Data Acquisition and Analysis	2	0	2	5	Drilon Bunjaku
4-4	E	Building Automation	2	0	2	5	Lavdim Kurtaj
5	M	Internship	2	0	0	5	from department
6	M	Bachelor Thesis				5	from department

Mission and objectives

The mission of the study program - Bachelor of Electronics, Automation and Robotics is in accordance with the general mission statement of the Faculty of Electrical and Computer Engineering. The program is oriented towards continuous teaching and scientific research. The Electronics, Automation and Robotics bachelor study program has a well-defined didactic and research concept. All staff and students of the EAR (Electronics, Automation and Robotics) bachelor study program comply with internal regulations concerning ethical conduct in teaching, research and assessment in all academic and administrative activities. Graduates will demonstrate knowledge, skills and competences in line with the National Qualifications Framework and the Qualifications Framework of the European Higher Education Area. The mission of the Electronics, Automation and Robotics bachelor program is to prepare skilled and creative engineers with transferable and specialized skills, who are able to address the challenges related to the field and new technology in the field of Electronics, Automation and Robotics, to create, develop and disseminate new knowledge and play a leading role in providing interdisciplinary education in order to solve the problems faced by the Electronics, Automation and Robotics sector. Through this program, a rigorous educational experience is provided that prepares students for further study and to practice engineering professionally and ethically in a competitive global environment.

This program strongly corresponds to short-term and long-term mission and objectives of the Faculty of Electrical and Computer Engineering, as described in strategic planning and development.

Based on the strategic mission of the Faculty of Electrical and Computer Engineering (FECE) for overall performance enhancement and reform implementation in the structure of studies, the content of study

programs, and the attainment of skills, the mission of the study program in Electronics, Automation and Robotics is to deliver up-to-date, flexible content that will easily follow up-to-date technological developments as well as local, regional and global industry and labor market requirements.

The bachelor's degree program in Electronics, Automation and Robotics is characterized by a comprehensive interdisciplinary combination of the content required to deal with most current contemporary systems and those to be developed in the future. Throughout their studies, students will gain knowledge about electronics, computers and programming, communication networks in general, as well as specific knowledge about communications for automation and complex automated systems. This program enables graduates to gain theoretical and practical knowledge of international levels, using contemporary teaching methods and active involvement of students in implementation of critical and creative thinking, independent work and teamwork at all levels.

Students of the study profile in Electronics gain theoretical and practical knowledge needed for modeling, analyzing, simulating, designing and manufacturing electronic circuits and systems. Students gain knowledge in the fields of microelectronics; radio frequency and microwave electronics; optoelectronics; power electronics; acoustics and audio techniques; electronic measurement and electronic devices and circuits testing; biomedical electronics; electric vehicles; and other fields of applied electronics. This proposal reflects the orientation of engineering studies and research in these basic areas of application of electronics: telecommunications, automated control systems, power systems, and biomedicine.

Students of Automation and Robotics study profile gain theoretical and practical knowledge needed for design and implementation of automatic control systems, embedded systems, dedicated computer systems, PLC-based process automation and PLC programming with specific programming languages, distributed measurement, supervisory and automation systems (SCADA), and robotics. Students acquire knowledge of mathematical modeling methods, system simulation and identification, advanced control methods, design and optimization of products and systems, design of dedicated computer systems, signal processing for natural and medical interfaces, physical modeling and simulation, computer graphics and animation, virtual and augmented reality, distributed computer systems, sensors and actuators, medical devices, automation in residential buildings, smart house/buildings/city/ and smart grid, communication protocols (general and for specific application), automation in industry, industrial robots, mobile robots, computer games, artificial intelligence and self-configuring systems.

Program objectives for graduates

- be able to communicate effectively with colleagues, customers and a variety of audiences in the field of electronics, automation and robotics;
- be able to function effectively in a team whose members together provide leadership, create a collaborative and inclusive environment, set goals, plan tasks and meet objectives;
- be able to organize their time effectively and focus on their tasks and projects;
- be able to adapt to changes and developments in the field of electronics, automation and robotics and continue to learn and grow professionally;
- to have a general understanding of the functionality of complex systems of different natures and the possibilities for automation of such systems;
- to have a general understanding of the principles of functionality of basic electronic

- components, electronic systems, and microelectronics;
- to be trained in the maintenance, diagnostics, and repair of electronic systems and computerized systems for automation and robotics;
- to be trained in the independent design and implementation of automation systems based on microcontrollers, computers and PLCs;
- to develop critical and creative thinking on contemporary technological achievements in the fields of electronics, automation, and robotics;
- be able to develop and perform appropriate experimentation and result analysis and interpretation;
- be able to acquire and apply new knowledge as needed, using appropriate learning strategies, data and engineering judgment to draw conclusions;
- to be trained for the local and international labor market;
- to be trained in providing expertise to relevant industries, institutions and organizations;
- be able to recognize ethical and professional responsibilities in engineering situations and make informed judgments, which must consider the impact of engineering solutions in global, economic, environmental and social contexts.

After successfully completing the Electronics study profile, students will possess the knowledge and skills to:

- Understand electronic systems and subsystems within the field of electrical engineering;
- Understand the design and operation of basic electronic components and systems (such as amplifiers, transmitters, receivers, microprocessors, computer systems, power sources, inverters, electric vehicles, and robots);
- Analyze implemented systems in commercial and multimedia electronics (such as TVs, mobile phones, radios, and hi-fi systems);
- Understand bioengineering and photonics for applications in biomedical diagnostics;
- Analyze, implement, and optimize information systems, optical fiber communication systems, and sensor-based systems.
- Design and implement systems based on PLCs, microprocessors, microcontrollers, and computers;
- Design and implement power electronic systems for the generation, management, and control of electrical energy, using technologies such as solar panels, inverters, microcontrollers, and computers;
- Understand systems used for entertainment, speech, and visual recognition;
- Design, program, and troubleshoot embedded systems using microcontrollers and real-time operating systems for applications in automation, control, and energy management.
- Prepare technical documentation for electronic systems.

After successful completion of this program, study profile Automation and Robotics, students will have knowledge and skills to:

- Understand the electronic systems and subsystems within the field of electrical engineering;
- Understand the design and operation of basic electronic components and systems (such as amplifiers, transmitters, receivers, microprocessors, computer systems, power sources, inverters, electric vehicles, robots);

- Design, document and implement dedicated computer systems based on microcontrollers, computers, and PLCs;
- Analyze, design, and implement industrial, home, and building automation systems;
- Understand, program, document and use industrial and mobile robotic systems, and integrating them with automation systems, electric vehicles and autonomous driving;
- Design, program, and troubleshoot embedded systems using microcontrollers and real-time operating systems for applications in automation, control, and energy management.
- Understand, program, and implement advanced interfaces, HMI, speech and visual;
- Be involved in different implementation phases of distributed automation systems (SCADA).