MINISTRY OF EDUCATION AND SCIENCE OF THE REPUBLIC OF KAZAKHSTAN
NON-PROFIT JSC "ALMATY UNIVERSITY OF POWER ENGINEERING AND
TELECOMMUNICATIONS NAMED AFTER GUMARBEK DAUKEYEV"
INSTITUTE OF SPACE ENGINEERING AND TELECOMMUNICATIONS
DEPARTMENT OF ELECTRONICS AND ROBOTICS

«AGREED»
Head of Department IT
«Saiman» Corporation
_____ Zikirbay K.Y.
«____» ___04___ 2024

«APPROVED»
Rector of AIPET named after
Gumarbek Daukeyev
_____ Nygymetov G.S.
«____» _____ 2025

MODULAR EDUCATIONAL PROGRAM
«6B07117 - ROBOTICS AND MECHATRONICS»

Head of the educational program Nurgizat Y.S.

Trajectories (specializations) of training:
Robotics and Mechatronics
Design of Unmanned Aerial Vehicles (UAVs)

Term of study - 3 years
Awarded an academic degree - Bachelor of Engineering and Technology
Qualification Level according to the national qualification degree – 6

Almaty 2025.

The educational program was developed: on the basis of the laws of the Republic of Kazakhstan and regulatory documents: The State mandatory standard of higher Education, the State mandatory standard of postgraduate education (Decree of the Government of the Republic of Kazakhstan dated 23.08.2012 No. 1080), Standard rules for the organization of higher and postgraduate education (Decree of the Government of the Republic of Kazakhstan dated 17.05.2013 No. 499), Rules for the organization of the educational process on credit technology of education (order of the Ministry of Education of the Republic of Kazakhstan dated 20.04.2011 No. 152)

T   he educational program is developed at the Department of Electronic Engineering.

Head of the educational program   Nurgizat Y.S.

The EP is considered and approved at the meeting of the Department of Electronic Engineering, protocol No. from *N 7   08.04.2025*

Head of the Department of Electronic Engineering _____Orazalieva S.K.

The EP is considered and approved at the meeting of Scientific and Methodical Council of the Institute of Communication and Space Engineering (Minutes № from d.). *N8.   29.04.2025*

Director of ICSE_____ Omarbekova A.O.

The EP was considered and approved at the Academic Council of AUES named after Gumarbek Daukeev (Minutes №*14* from "*23 05.2025*).

List of designations and abbreviations

HE   - Higher education
SMSE - State mandatory standard of education
EQF   - European Qualification Framework
НКЗ   - National Classifier of Occupations
RK   - Republic of Kazakhstan
NQF   - National Qualifications framework
NQS   - National qualifications system
GEM   - General educational module
EP   - Educational program
GED   - General education disciplines
RC   - Required component
HSC   - High school component
BD   - Basic disciplines
PD   - Profile disciplines
IET   - Individual educational trajectory
IQF   - Industry qualifications framework
PS   - Professional standard
PE   - Postgraduate education
ON   - Competencies
LR   - Learning result
CP   - Course paper
CGW   - Calculation and graphic work
RWS   - Research work of students
CED   - Catalog of elective disciplines

1. Passport data of EP «6B07117 - ROBOTECHNICS AND MECHATRONICS»

Table 1

№	Field name	Note
1	Registration number	6B07100071
2	Education field code and classification	6B07 – Engineering, manufacturing industries
3	Code and classification of training directions	6B071 – Engineering and Engineering business
4	Group of educational programs	B064 – Mechanics and metal working
5	Name of the educational program	«6B07117 – Robotics and Mechatronics»
6	Type of OP	Current Educational Program
7	The purpose of the OP	To prepare highly qualified young engineers, demanded in the labor market, to work with robotic and mechatronic systems in various industries.
8	OP Mission	To graduate specialists who play a leading role in the invention and implementation of new electronic, engineering and mechatronic tools. To train specialists in economically important industries in RK.
9	The level of the NRK	NRK 6 Bachelor's degree or equivalent
10	Level at NQF	6
11	Level at GER	6
12	Distinctive features of the EP	Developed on the basis of the professional standard - Robotics (production of robots and their components) Full-time abbreviated
	Partner University (SEP)	No;
	Partner University (DDEP)	No;
13	List of competencies	LO-1. Apply fundamental natural sciences and general engineering knowledge, as well as methods of mathematical analysis, to solve engineering problems.
14	Learning result	LO-2. Conduct professional activities with consideration of economic, environmental, social, and other constraints at all stages of the life cycle.
LO-3. Understand the principles of modern information technologies and use them to solve professional tasks.
LO-4. Organize work with regulatory and technical documentation related to professional activities using standards, norms, and regulations.
LO-5. Apply theoretical and practical knowledge to solve academic and professional problems in the field of study; understand and apply scientific research methods and academic writing; recognize the importance of academic integrity and ethics.
LO-6. Develop and implement modern digital methods for the analysis and design of mechatronic and robotic systems, including measurement tools and techniques, initial data analysis, sensor selection and calibration.
LO-7. Apply standard actuators and control devices, automation equipment, measurement and computing technologies in accordance with technical specifications; develop digital control algorithms and programs for mechatronic and robotic systems.

		LO-8. Design and implement automated control systems for industrial processes and general-purpose mechanical engineering systems; perform calculations of mechanical properties of structural materials and design typical machine components and assemblies.
		LO-9. Describe mathematical models of robots, robotic and mechatronic systems, their subsystems and modules; conduct simulations using both specialized and general-purpose software to justify theoretical and design decisions.
		LO-10. Configure, program, and flash microcontrollers and microcomputers; assemble and install electronic devices; understand microcontroller architecture and operating principles; develop and design new circuit solutions and microcontroller-based systems.
		(Appendix 2.1)
15	Form of training	Day Form of training time
16	Language of instruction	Kazakh, Russian, English
17	Volume of loans	240
18	Academic degree awarded	Bachelor of Engineering and Technology
19	Availability of an appendix to the license for the direction of training	License number KZ80LAA00018161 Date of license issue 05.05.2020
20	Availability of EP accreditation	-
	Name of the accreditation body	-
	Validity period of accreditation	-
21	Information about the disciplines	Information about disciplines VK/QB OOD, DB, PD (Annex 2.2)

2. Matrix of correlation of learning outcomes in the educational program as a whole with the formed competencies

No	. Name of disciplines	ON1	ON2	ON3	ON4	ON5	ON6	ON7	ON8	ON9	ON10
1	Philosophy		V			V					
2	Foreign language I		V			V					
3	Foreign language 2		V			V					
4	Kazakh (Russian) language 1		V			V					
5	Kazakh (Russian) language 2		V			V					
6	Information and communication technologies (in English)			V							
7	Socio-political knowledge module (sociology, political science)		V			V					
8	Physical Culture	V	V								
9	Physical Education	V	V								
10	Physical Education	V	V								
11	Physical culture	V	V								
12	History of Kazakhstan	V	V								
13	Module of socio-political knowledge (cultural studies, psychology)		V			V					
14	Differential and integral calculus I	V					V				
15	Differential and integral calculus II	V					V				
16	Automatic control of mechatronic systems						V	V			
17	Differential equations	V					V				
18	Probability theory and elements of mathematical statistics	V					V				
19	Physics	V					V				
20	ARM microcontrollers									V	V
21	Python programming		V			V					
22	Theoretical Mechanics	V					V				
23	Principles of SAE (computer-aided engineering -Engineering Graphics in SolidWorks)	V	V								
24	Introduction to the speciality	V	V								
25	Artificial Intelligence			V			V				
26	Numerical modelling methods in mechatronics (MatLab application package)						V	V			
27	Intelligent systems and neural networks in robotics			V			V				
28	Big Data basics			V		V					

№	Discipline						
29	Unmanned Aerial Vehicle (UAV) wireless communication elements and devices				V		V
30	Module wk (Economics and Law, Entrepreneurship and Financial Literacy)	V	V				
31	Software for mechatronic and robotic systems			V	V		
32	Sensors and actuators			V		V	
33	Industrial practice		V		V		
34	Theoretical fundamentals of electrical engineering	V	V				
35	Integral and microprocessor circuitry					V	V
36	Research fundamentals and academic writing			V	V		
37	Electronic circuit design			V			V
38	Electrical engineering and electronics				V		V
39	Computer networks in the electronics industry			V	V		
40	Pre-graduation internship		V		V		
41	FPGAs for embedded systems					V	V
42	MANUFACTURING TECHNOLOGY	V			V		
43	Material Resistance	V			V		
44	Fundamentals of interchangeability	V			V	V	
45	Project management in engineering			V			
46	Hydro-Pneumatic Mechatronics Systems			V	V		
47	Motors and Drivers for Unmanned Aerial Vehicles (UAVs)				V		V
48	Design and control of mechatronic systems			V	V		
49	Unmanned Aerial Vehicle (UAV) Piloting				V	V	
50	Industrial robots KUKA			V	V		
51	Automated control system for unmanned aerial vehicles			V	V		
52	Mechatronics Device Programming			V	V		
53	Small Unmanned Aerial Vehicles (SUAV)				V	V	
54	Linear algebra		V	V			
55	Sustainable Development: Ethics, Inclusion and Safety			V			