«ТҰРАН»
УНИВЕРСИТЕТІ»
МЕКЕМЕСІ

УЧРЕЖДЕНИЕ
«УНИВЕРСИТЕТ
«ТУРАН»

Рассмотрено на заседании
кафедры «Информационные технологии»
Протокол № _1_ от «_04_» __09__ 2023 г.

Зав. кафедрой _____ Байтенова Л.М.

УТВЕРЖДАЮ
Проректор
по академической деятельности
_____ Тусупова Л.А.
«_05_» __09__ 2023 г.

Modular educational program development plan

6B06103– Intelligent Robotics (Bachelor's Degree)

Almaty, 2023

Content

Passport

for the development plan of the modular educational program (MEP)
"Intelligent Robotics"

Purpose of the Educational Program	The purpose of the educational program is determined by the changing requirements of the external environment, which are associated with professional competition and the demand for the specialty.
Grounds for developing a MEP development plan (hereinafter referred to as the "Plan")	The educational program "6B06103 - Intelligent Robotics" is aimed at broad training of qualified specialists in the field of robotics who have the necessary knowledge to develop and maintain software products with the necessary practical skills in the field of intelligent systems. The educational program is developed in accordance with the National Qualifications Framework and professional standards, aligned with the Dublin Descriptors and the European Qualifications Framework. The MEP complies with regulations and other documents that define the national priorities and educational policy of the Republic of Kazakhstan, as well as the mission and Strategy of the University. When developing the MEP, the needs of the market and the demands of consumers of educational services were taken into account.
Main developers of the Plan	Baytenova L.M. – Doctor of Economics, Professor Ismailova R.T. – Ph.D., professor Employers: Japarov B.A. - Doctor of Technical Sciences, Professor, General Director of the Association of Users of the Scientific and Educational Computer Network of Kazakhstan "KazRENA"
Purpose of the Plan	The development plan for the educational program "6B06103 - Intelligent Robotics" was created with the demand for new types of robotic systems in economic sectors and in accordance with the requests of employers. The strategic goal of the educational program development plan is to train highly qualified specialists with knowledge in the field of robotics, automation of mechanisms and modeling of processes of various complex systems and to meet the needs of society in the use of automatic machines that can greatly facilitate both the industrial sphere of life and everyday life. The operational goal of the plan is to ensure effective management and implementation of the MEP for the approved period.
Mechanism for forming a plan[1]	The MEP and Development Plan were drawn up with the involvement of all stakeholders of the program: employers, leading teaching staff of the department of EP, students, based on an analysis of information on the demand for specialists in the market, which affects or may affect the activities of the program (analysis of the external and internal environment, analysis of student satisfaction and Teaching staff, analysis of resources available and necessary for the program, including material and technical base, etc.).
Mechanisms for disseminating information	Consideration of the educational program at an extended meeting of the department's EMA with the participation of employers. Review and approval of the educational program by the Faculty Academic Council.

[1] Drawing up a plan and other activities should, to the maximum extent necessary and possible, cover and involve all interested parties, who in turn should represent not individual interests, but the interests of any significant groups of interested parties.

about the MEP Plan and objectives [2]	Discussion of monitoring results and approval of adjustments to the educational program plan. Placement of the MEP on the website of the Turan University www.turan-edu.kz. The official website of the university provides access to educational, methodological and educational-administrative information necessary for students through links to the automated information system "ASU-Turan", LMS "Canvas", which is an automation system for managing the educational process.
Time frame for implementation of the Plan	From September 2023 to September 2027 (4 years)

[2] The development plan and goals should be as transparent as possible and accessible to all interested parties.

The main goals and objectives of the development of the educational program

The goal of the educational program “6B06103 - Intelligent Robotics” is to train highly qualified specialists for innovative sectors of the country’s economy in the field of the latest technologies, possessing theoretical, practical and scientific knowledge, skills and abilities that meet the needs of the domestic and world markets of intellectual and engineering labor, capable of quickly adapting to constantly changing socio-economic conditions in the light of prospects for the development of the information and communication sector.

A distinctive feature of the educational program “Intelligent Robotics” is an integrated approach to the formation of students, combining the technical skills of robotics with the active use of artificial intelligence. The program focuses on developing transdisciplinary competencies, emphasizing real-world projects, teamwork, and a global perspective.

Key aspects that can make this program stand out:

- Training of highly qualified specialists in the field of robotics with deep technical knowledge and abilities.
- Stimulating creative thinking and developing skills in an innovative approach to solving technical problems.
- Providing students with a range of technical skills, including programming, design, data analysis and technical operation of robots.
- Creating an environment for transdisciplinary learning, integrating knowledge from various fields so that students can successfully solve complex problems.
- Formation of effective teamwork skills and development of social competence necessary for successful interaction in groups.
- Promoting student participation in real-life projects where they can apply their knowledge in practice and face real industry challenges.
- Showing interest in science and technology through participation in scientific research, competitions and projects.
- Developing a global mindset and understanding of the impact of robotics on society, with attention to ethical aspects.
- Support students in creating conditions for further professional growth, including training, internships and networking with industry.

This goal of the educational program is aimed at creating comprehensively developed, technically literate, creative and socially responsible individuals who are able to successfully adapt and contribute to the rapidly changing world of robotics and technology.

External environment analysis

The modular educational program (MEP) is analyzed and updated annually, taking into account the interests of consumers of educational services and the labor market. The list of compulsory disciplines is changed in accordance with the changes made to the State Compulsory Standard of Higher Education, approved by Order of the Minister of Science and Higher Education of the Republic of Kazakhstan No. 2 dated July 20, 2022. The structure of the MEP “6B06103 - Intelligent Robotics” was developed in accordance with scientific, theoretical and practice-oriented requirements for professional and social competencies.

The volume of study load and time required to master an academic discipline, module or educational program as a whole is taken into account on the basis of the credit education system. Credits reflect the complexity of the student’s academic workload, which includes all types of his educational activities provided for in the curriculum, including classroom and independent work, practice, etc.

In terms of content, the MEP consists of general compulsory modules, compulsory modules for the educational program, entrepreneurial modules and elective modules, covering the entire course of study for students with a total volume of 240 ESTC credits. Much attention in the MEP is paid to the personal development of students - the formation of their knowledge, skills and abilities. In general, the structure and design of the MEP complies with the current legislation and regulations in the field of higher education of the Republic of Kazakhstan and ensures an improvement in the quality of education.

Today in the Republic of Kazakhstan there are no analogues for the EP “6B06103 - Intelligent Robotics”. MEP “6B06103 - Intelligent Robotics" is offered by many universities in countries far and near abroad (Kaunas University of Technology, Princeton University, National University of Singapore, Georgia Institute of Technology, University of West Florida, Colorado School of Mines, etc.).

The basic requirements for applicants are to have excellent knowledge of mathematics and physics. The ability to navigate these subjects is the key to the fact that in the near future graduates of the specialty “6B06103 - Intelligent Robotics” will master technical, socio-economic, mathematical and natural sciences, as well as general professional and special disciplines. Graduates will be able to develop, design, install and maintain robots and robot systems for use both at home and in industries such as aerospace or military, etc. They will learn to program and train robots, analyze electromechanical processes, control complex equipment, and use computer vision or the Internet of Things.

This unique interdisciplinary program combines electronics, robotics, artificial intelligence, automation and computer programming. He uses a modern approach to teaching. Graduates will become agile knowledge workers in the IR4.0 era and beyond, in high demand across a variety of industries. Within the framework of the characteristics of professional activity, the general competencies of the graduate are determined, as well as the role of each module in obtaining the corresponding competencies, which is reflected in the competency matrix.

SWOT analysis

of the EP program "Intelligent Robotics" at the University "Turan"

Strengths	**Weaknesses**
1. Highly qualified teaching staff, innovative teaching methods, practice-oriented educational process. 2. Developed material and technical base, the use of modern information and communication technologies in the educational process. 3. Relevant and meaningful educational programs; stakeholders, enterprises, associations, teaching staff and students are involved in the development of EP. 4. Availability for all students of educational materials, software, literature and additional resources	1. Rapid obsolescence of technical and software training tools due to the dynamic development of technology. 2. Insufficient development of contract-funded scientific projects. 3. Lack of international and interdisciplinary research teams. 4. Not a high level of academic mobility of students and teaching staff. 5. Small number of academic groups
Opportunities	**Threats**
1. Career prospects for graduates of the program due to the increasing demand for highly qualified software developers. 2.Increasing the number of state grants for technical specialties. 3. Attractiveness of the educational program. 4. Creation of joint educational programs and double degree programs with foreign universities (Turkey, Latvia, Uzbekistan, etc.)	1. Insufficient involvement of students and teaching staff in international programs. 2. Economic crisis, inflation processes, decrease in the solvency of the population. 3. Lack of grants for foreign students under academic mobility programs. 4. Growing competition in the educational services market.

Анализ внутренней среды

The implementation of the EP "6B06103 - Intelligent Robotics" is ensured by scientific and pedagogical personnel who have a basic education corresponding to the profile of the discipline being taught, and who are systematically engaged in scientific and educational activities.

For the effective implementation of the educational program at the university, optimal conditions have been created:

1) *Highly qualified teaching staff* from the academic and business environment, trained in a variety of international face-to-face and online advanced training courses, in particular on the Coursera platform.

2) Turan University signed a Cooperation Agreement with COURSERA, 500 licenses were received for students and undergraduates, as well as 30 licenses (free) for teaching staff. Benefits from cooperation with Coursera: increasing the number of students through improving the quality (relevance) and accessibility of educational programs focused on employment and research activities; saving infrastructure costs (lecture classes) through the introduction of hybrid learning; supporting the skills and qualifications of teaching staff by providing teaching staff

with full access to more than 9000+ courses from 250+ universities and industrial partners; improving local/international university rankings.

3) *Modern material and technical equipment.* To carry out educational activities, specialized laboratories have been organized (rooms 310, 314, 316, 317, 712), equipped with high-performance computers, the power of which is sufficient for software development. The laboratories are provided with a high-speed Internet connection. The classroom fund meets the requirements for organizing interactive training. All classrooms where training is planned are equipped with a video display system (multimedia projector and screen, teacher's work computer). For organizing conferences, joint panel discussions, meetings and master classes, guest lectures, etc. There is a conference room equipped with a video display system and microphones. Throughout the university, free access to the Internet is provided for all participants in the educational process. The sanitary condition of classrooms complies with established requirements and sanitary standards for seating and ensuring sanitary standards for providing an area of 5 sq. m for participants in the educational process.

4) There is a modern educational and methodological base with remote access. The university operates the Canvas LMS platform, which is an automation system for managing the educational process, on which educational and methodological complexes of disciplines are located.

5) High quality scientific and professional infrastructure. To conduct classes and perform various types and scales of applied research, students have access to advanced scientific information through the resources of the university library.

6) Close cooperation with employers at all stages of the educational process. As the educational program is implemented, together with business partners, the content of educational programs is monitored for compliance with the professional requirements of the modern labor market in the field of information technology, assignments and cases are updated, and currently relevant additions are made to the subjects of the disciplines.

7) Compliance of curricula and training programs with the requirements for the competencies of a modern specialist in the field of intelligent robotics. The curriculum fully meets the competency requirements of a modern Information Systems specialist.

8) Correspondence of thesis/project topics to current problems. All studies are based on real data and are implemented in modern business processes, which is confirmed by relevant implementation acts.

9) Individual curriculum. Each student has the opportunity to create their own curriculum, building an individual educational trajectory within the framework of the specialty "6B06103 - Intelligent Robotics".

One of the indicators of the professionalism and competence of teaching staff and employees is the implementation of the results of scientific activity in the educational process and production. In general, the teaching staff implementing the educational program meets the qualification requirements for licensing educational activities and has full knowledge of modern teaching methods, which makes it possible to organize an effective educational process.

Completing professional internships is an important component in the training of competitive specialists and is important for the socio-psychological adaptation of graduates to labor market conditions.

According to the EP "6B06103 - Intelligent Robotics", there are agreements on internships for students, concluded with various companies and organizations. Among them: Association of Users of the Scientific and Educational Computer Network of Kazakhstan (KazRENA); ST "Shi Yan"; ST YAM Production; LLP The World of Gaming; GALAMAT LLP; Department of Education of the Ili region; Office of the private judicial enforcement district Zhanabaeva A.S.; JSC Altyn Bank; JSC "Insurance Company "Centras Insurance""; ST "ROBO-TECH.KZ"; IT Resource LTD LLP; Almeria LLP; "Pacibic solutіcn" LLP; LLP "Old square"; LLP "Monolitspetsstroy"; LLP "Zhan-1"; LLP "Corporate Adviser"; LLP "Telefactory Dala".

Analysis of satisfaction with MEP students and teaching staff

To determine the level of customer satisfaction, both external and internal, a survey of all consumer groups will be organized and conducted annually: employers, students, teachers and university staff.

Action plan for the development of the EP "6B06103 - Intelligent Robotics"

№	Events	Responsible persons	Deadlines	Type of reporting, mark of completion
I. Improving the content of MEP				
1	Adjustment of the MEP taking into account new regulatory documents in the field of higher education	Baytenova L.M.	Annually, September - June	Updated MEP, working curriculum, COM
2	Work on proactively generating employers' requests (meetings, round tables, presentation events, visits of teaching staff to enterprises and organizations)	Baytenova L.M.	in accordance with the deadlines established by legal regulations, before the start of the academic year	Protocols of meetings with representatives of practice bases, potential employers, copies of agreements
3	Involving employers to participate in the work of the educational and methodological section of the department and the Council of the Faculty of Economics	Baytenova L.M. Ismailova R.T.	According to the plan of the department	Protocols of meetings of the educational and methodological section of the department and the Council of the Faculty of Economics
4	Adjustment of work curricula taking into account market requirements, wishes of employers and recommendations of the Ministry of Science and Higher Education of the Republic of Kazakhstan (elective modules and elective disciplines) in order to increase the competitiveness of EP	Baytenova L.M.	March – April 2024	Updated MEP, working curriculum, COM

5	Annual updating of the content of disciplines, based on the principles of practice-oriented training, incl. content of disciplines that determine modern professional competencies of a specialist	Baytenova L.M.	Annually March-April	EP development plan, corrective action plan, updated working curriculum
6	Constant monitoring of specialist competencies and disciplines of the EP specialty	Baytenova L.M.	Every year February	Updated MEP, working curriculum, COM
II. Educational and methodological support				
1	Publishing educational and methodological literature	Baytenova L.M. Ismailova R.T.	During the 2023-2024 academic year, according to the thematic plan for the publication of educational and methodological literature	1. Mamyrova A.K., Ismailova R.T., Belginova S.A., Design and creation of client-server PC (Cisco) architecture/Tutorial
				1. Moldakalykova B.Zh. Creation of mobile applications, Practicum
				1. Bimoldina Z.A., Mereeva Z.A. Methodological instructions for practical work on the subject of PL/SQL basics
				4. Mamyrova A.K., Basics and reliability of information systems. Study guide eng
				5. Mamyrova A.Sh. The basis and reliability of information systems. Study guide
				6. Moldakalykova B.Zh. Computer graphics. Study guide
				7. Mamyrova A.K. Fundamentals and reliability of information systems. Study guide
				8. Mamyrova A.K., Ismailova R.T. "1C: Enterprise System Management". Course of lectures
				9. Bektilevov A.Yu., Ismailova R.T. Programming of robotic

				systems. Course of lectures
2	Improving methods for conducting internships and research work of bachelors in order to prepare students for independent performance of professional tasks	teaching staff	Annually October	Methodological developments: guidelines по прохождению всех видов практики
3	Optimization of teaching methods, introduction of new teaching technologies into the educational process that increase the efficiency of teachers, active use of information technologies that allow students to master educational material at a convenient time for them	teaching staff	Annually September	Methodological developments: guidelines for performing practical tasks, independent work of the student under the guidance of a teacher, self-help work within the framework of the disciplines studied
4	Development and testing of proprietary innovative teaching methods	teaching staff	According to the plan of the department	Patents for copyright developments
III. Staffing				
1	Involving practitioners in delivering lectures and conducting practical classes in specialty disciplines	Baytenova L.M.	According to the academic calendar	Agreement, class schedule
2	Advanced training of teaching staff (internships, School of Pedagogical Excellence, trainings, educational seminars, round tables, etc.) in order to effectively implement modular, variable, individual-oriented education	teaching staff	According to the plan for advanced training of the department	Certificates of participation, diplomas
3	Improving the teaching staff rating system	Baytenova L.M.	Annually May - June	Annual reports of the department, rating of the department, qualitative composition
4	Assessment of teaching quality	Baytenova L.M.	Annually September - May	Certification of teaching staff, panoramic lectures, competition for filling vacant positions 2 times a year (January, August)

5	Increase in the number of teachers teaching as part of academic mobility abroad	teaching staff	Annually September - May	Training and internships at a foreign university, certificates
IV. Material support				
1	Updating the licensed software of all IT programs	Baytenova L.M. Tokhtar B.	Annually August, January	Department reports
V. Information and library resources				
1	Assistance in acquiring new literature in the state and Russian languages	Baytenova L.M., teaching staff	September - June 2023-2024 academic year	New literature acquired
2	Release of educational and methodological literature in the state and Russian languages	Baytenova L.M. teaching staff	In accordance with the calendar and thematic plan of the publication	2023-2024 academic year –8 titles
3	Connection to information resources and databases of the world's leading scientific centers	Baytenova L.M. Tokhtar B.	Annually September - May	Access to information resources and databases
VI. Development of the research component of the MEP				
1	Increasing the proportion of teaching staff and students who have publications in scientific journals with a non-zero impact factor	teaching staff	Annually January - December	Articles in high-ranking magazines
2	Participation of students with reports and articles in international and interuniversity scientific and practical conferences	teaching staff	Annually January - December	Reports, certificates of participation, collections of conference materials.
3	Development of research activities of students: ensuring the effective functioning of student scientific clubs, sections	teaching staff	According to the plan, Scientific research work and research work of the student	Active student scientific clubs, sections

4	Organization of interdisciplinary applied research for the purpose of completing a thesis/project	Baytenova L.M.	Annually September - April	Diploma projects, works
5	Intensifying relations with foreign partners in order to implement joint scientific research and publish educational and methodological literature	Teaching staff of the department	Annually January - December	Implementation of joint scientific research and publication of educational and methodological literature
VII. Monitoring the effectiveness of MEP				
1	Analysis of academic performance based on the results of winter and summer examination sessions in dynamics, percentage of academic performance	Baytenova L.M. Bimoldina Zh.A.	Annually January - June	Department report
2	Analysis of the number of bachelors - winners and prize-winners of competitions and olympiads	Kim E.R.	Annually January - May	Department report
3	Examination and review of MEP by employers	Baytenova L.M.	February – March 2024	MEP reviews
4	Expertise and review Educational and methodological complex of disciplines	Kuanova S.B.	Annually June	Reviews of the Educational and Methodological Complex of Disciplines
5	Graduate employment analysis	Bimoldina Zh.A.	November every year	Employment report, employer reviews

Measures to reduce the impact of risks on the development of the educational program

To manage the risks of implementing an educational program, the following measures are applied:

№	Name of possible risks	Measures to reduce their influence
1	Small number of academic groups	Formation of a contingent of students in this profile through career guidance and information and advertising work, creation of multilingual training groups. Active PR campaign through effective means of communication with the involvement of representatives from employers and graduates.

2	Obsolescence of the content of curricula and syllabuses due to the emergence of additional requirements of employers for professional competencies during training.	Maintaining contact with employers, checking with updates to the Industry Qualifications Framework, expanding the network of interactions with leading universities in the world in order to enrich educational content

V. EXPECTED END RESULTS AND SOCIO-ECONOMIC EFFECT OF IMPLEMENTATION OF THE EDUCATIONAL PROGRAM DEVELOPMENT PLAN

Expected results:

- Providing modern education that combines fundamental academic knowledge and practice-oriented training in accordance with the global labor market requirements for graduate competencies.
- Demand for graduates and their professional self-realization.

The expected socio-economic effect from the implementation of the development plan for the educational program “6B06103 - Intelligent Robotics” is as follows:

1) Increasing the number of recruits and graduates of highly qualified specialists from the EP “6B06103 - Intelligent Robotics”.
2) Integration of research into the processes of practice-oriented training and development of professional skills of graduates.
3) Improving the quality of professional education in the field of intelligent robotics.

Разработчики:

Руководитель ОП _____ **Байтенова Л.М.**

Работодатель
Генеральный директор Ассоциации пользователей научно-образовательной компьютерной сети Казахстана «КазРЕНА», д.т.н., профессор _____ **Джапаров Б.А.**

СОГЛАСОВАНО:

Председатель Совета факультета, декан экономического факультета _____ **Мухамедьярова –Левина Т.Т.**

Директор центра онлайн-обучения _____ **Бекмагамбетова Ж.М.**