










**Research Projects of Abylkas Saginov Karaganda Technical University, within the framework of which studies are conducted to support the UN Sustainable Development Goals**

		Scientific Supervisor	Project Title	Project Objective	Implementation Period	
<b>3. GOOD HEALTH AND WELL-BEING</b>						
1		Ibraev M.K.	Development of Efficient Methods for the Synthesis of Chalcones, Flavonoids, and Stilbenoids, as well as Their Chemical Modification, to Identify Potential Antioxidant, Anti-Inflammatory, and Antibacterial Agents for Medical Applications	Development of Rational and Optimal Methods and Conditions for the Synthesis of New Chalcones, Flavonoids, Stilbenoids, and Their Derivatives; Investigation of the Possible Mechanisms of Their Formation; Comprehensive Structure Elucidation; and Biological Evaluation of the Synthesized Compounds for Antioxidant, Anti-Inflammatory, Hepatoprotective, Antimicrobial, and Other Activities	January 2018	1 November 2020
2		Rakhimberlinova Zh.B.	Development of Efficient Methods for the Synthesis of Azole Compounds Based on Natural Substances with Antibacterial, Anti-Inflammatory, and Antioxidant Activity	Development of Efficient Methods for the Synthesis of Azole Compounds Based on Natural Substances with Antibacterial, Anti-Inflammatory, Geroprotective, and Antioxidant Activity, with the Aim of Identifying New Therapeutic Agents for the Treatment of Tuberculosis Patients. Preparations Based on Azole Heterocyclic Compounds are Expected to Be Highly Effective in the Treatment of Acute Bacterial Infections.	April 2020	31 December 2022
3		Takibaeva A.T.	Development of Methods for the Isolation of Natural Triterpenoids from Plants and Their Chemical Transformation for the Search for New Biologically Active Substances	Development of Multivariate Methods for Obtaining Polyfunctional Derivatives of Lupane-Type Triterpenoids under Conditions of Classical Organic Synthesis, Microwave Irradiation, and Mechanochemical Activation. This work is focused on developing methods for the isolation of natural triterpenoids from birch species of Kazakhstan for the subsequent synthesis of new biologically active derivatives based on them for the pharmaceutical industry of the Republic of Kazakhstan.	October 2020	December 2022
<b>4. QUALITY EDUCATION</b>						







4		Zhantasova D.D.	Enhancing the Internationalization Capacity of a Technical University through Digital Learning Technologies	To develop and implement a model for enhancing the internationalization capacity of a technical university through digital learning technologies in order to realize sustainable and feasible strategies for the internationalization of the educational process in training technical specialists, taking into account national and international contexts. The project also aims to assess the needs of internationalization capacity, as well as to develop and implement measures to strengthen the internationalization potential of educational programs in technical specialties through the development of specialized competencies that enhance the qualifications and capabilities of students and faculty at the international level.	April 2020	31 December 2022
5		Ospanova B.R.	Creation of a Linguistic and Mathematical Aggregated Model for Speech Diagnostics of Specialists Based on the Methods of the Theory of Self-Organization of Language Structure	To develop a linguistic and mathematical model with theoretical justification based on the application of the fundamental law of conservation of the sum of information and entropy in order to determine an indicator of the level of speech competence from the perspective of improving the scientific training of personnel with a high culture of management. The project also aims to develop strategies and tactics of speech behavior, determine their functionality and effectiveness, and correlate them with linguistic means of expression.	October 2020	December 2022
6		Zhantasova D.D.	Development of the potential of innovative training of engineers through STEAM education	Development and implementation of a model for training technical profile specialists through STEAM technologies for the implementation of sustainable programs of intercultural communication, creative industry, and creative collaboration, based on creativity and intellectual capital. Assessment of the needs of STEAM education potential, development and implementation of measures to develop the potential of training programs in technical specialties based on the development of specialized	March 2021	December 2023







				competencies, allowing to strengthen the qualifications and abilities of students and teachers at the international level.		
7		Nygmetyova N.T.	Development of web textbooks for levels B1, B2 “Qazaq tili” using innovative technologies (for higher education institutions)	Support for work on the transition to the Latin alphabet; Show the effectiveness of using innovative technologies in teaching the Kazakh language.	March 2021	December 2023
8		Abaeva N.F.	Development of an innovative model “Statistical analysis and information processing for research work” for distance education	Develop an innovative model “Statistical analysis and information processing for research work” for distance education. Implement the developed model in the research work of master’s and doctoral students.	September 2022	December 2024
9		Zhantasova D.D.	Intensification of scientific-professional language training of technical specialists in the context of digital transformation of education	Development and implementation of a model of scientific-professional language training for technical university specialists through digital learning technologies for the intensification of the scientific component in the process of learning second and foreign languages by students of technical specialties, including in the context of non-formal education. The development of a scientific component aimed at the development of scientific written and oral speech of students of technical specialties will contribute to the promotion of scientific ideas and the creation of dialogue within the scientific community, including international. Development of a digital learning program aimed at forming research language skills of technical specialists capable of solving professional tasks and interdisciplinary problems in the context of the new digital reality.	July 2023	December 2025



7. AFFORDABLE AND CLEAN ENERGY						
10	 <p>7 AFFORDABLE AND CLEAN ENERGY</p>	Mekhtiev A.D.	Micro cogeneration-type thermal power plant with heat recovery	Conducting comprehensive scientific research, mathematical and computer modeling, pilot-industrial testing and implementation of a micro cogeneration-type thermal power plant for the recovery of thermal technological losses in metallurgy, also capable of operating on any type of fuel and combustible waste with an intelligent sensor control system. (Industry 4.0).	January 2018	1 November 2020
11	 <p>7 AFFORDABLE AND CLEAN ENERGY</p>	Sholanov K.S.	Development of designs for units of a prototype small wind power plant with a swinging sail working element	Research and development of the design of a parallel manipulator and a mechanical energy extraction unit for creating automated wind power plants with swinging sails, using technology and technical means for more efficient conversion of wind energy into electrical energy over a wide range of wind speed variations.	May 2021	December 2021
12	 <p>7 AFFORDABLE AND CLEAN ENERGY</p>	Feshin B.N.	Forecasting the states of electrotechnical complexes of heat supply systems of megacities as monitoring objects	Forecasting the states of electrotechnical complexes of heat supply systems of megacities as monitoring objects by evaluating in real time the vector of observed coordinates $X(t)$ , calculating the vector of reference modes, and eliminating critical deviations $Z(t) = f((X_{\text{э}}(t) - X(t))^2)$ to improve reliability, ensure energy saving, and minimize the reduction of the electromechanical equipment resource of pumping stations.	May 2021	December 2021
13	 <p>7 AFFORDABLE AND CLEAN ENERGY</p>	Yugai V.V.	Next-generation information-measuring system based on fiber-optic sensors	Development of a prototype of a next-generation information-measuring system based on energy-passive fiber-optic sensors for implementation at industrial enterprises of the Republic of Kazakhstan.	May 2021	December 2021








14	 <p>7 AFFORDABLE AND CLEAN ENERGY</p>	Tomilova N.I.	Development of a thermal energy distribution control system in heat supply systems based on a digital model	Increasing the efficiency of the use and transportation of thermal energy in a heat supply energy system by developing a control system for the transmission and distribution of thermal energy based on changes in the heat network throughput, using a digital model of the heat supply system and representing a software component of the digital technology for controlling the heat supply energy system.	May 2021	December 2021
15	 <p>7 AFFORDABLE AND CLEAN ENERGY</p>	Yugai V.V.	Development of a remote monitoring complex for the condition of HV power line construction elements during operation based on intelligent noise-resistant telemetry systems	Reducing losses and accidents in the transmission of electricity on HV power lines above 110 kV based on interrelated scientific and technical solutions, containing the concept, principles of construction, and structure of a remote monitoring complex for the condition of high-voltage overhead power line construction elements during operation based on intelligent diagnostic noise-resistant telemetry systems.	October 2020	December 2022
16	 <p>7 AFFORDABLE AND CLEAN ENERGY</p>	Neshina E.G.	Development of an intelligent fiber-optic system for monitoring the geotechnical condition of mining workings of quarries and open-pit mines	Creation of an intelligent fiber-optic system for monitoring the geotechnical condition of mining workings of quarries and open-pit mines, operating in real time to provide timely alerts about changes in geotechnical parameters that lead to the collapse of quarry and open-pit walls, which allows increasing the level of safety of mining operations and reducing economic costs for eliminating the consequences of collapses.	September 2022	December 2024
17	 <p>7 AFFORDABLE AND CLEAN ENERGY</p>	Buziakov R.R.	Development of an energy-efficient steam electro-vacuum heater for residential and industrial heating	Improvement of the design of a laboratory prototype of an energy-saving thermal device based on a steam electro-vacuum heater to create a prototype with prospects for its use in energy-efficient decentralized heating systems for residential and industrial facilities.	February 2025	December 2027

**9. INDUSTRY, INNOVATION AND INFRASTRUCTURE**












18	<p>9 INDUSTRY, INNOVATION AND INFRASTRUCTURE</p>	Zhetesova G.S.	Development of a resource-saving technology for repairing long-length hydraulic cylinder rods of large-sized industrial special-purpose machinery with the possibility of restoring local damage at the place of its operation	Development of a technology for repairing damage to the chrome-plated surface of long-length hydraulic cylinder rods of large-sized industrial special-purpose machinery based on thermal spraying methods, which will be a cheap, environmentally friendly alternative to the rechroming process and will provide higher properties of the restored surface compared to other repair technologies currently used, and will also make it possible to carry out repair work on site.	October 2020	December 2022
19	<p>9 INDUSTRY, INNOVATION AND INFRASTRUCTURE</p>	Balabaev O.T.	Development and research of the design of a stationary lift for loading grain cargo into containers transported by railway platforms	Development of the design and study of the operation of a stationary lift for loading grain cargo into containers transported by railway platforms for further implementation in agricultural production of grain crops.	September 2022	December 2024
20	<p>9 INDUSTRY, INNOVATION AND INFRASTRUCTURE</p>	Imashev A.Zh.	Creation of new technologies for conducting drilling and blasting operations ensuring the preservation of design parameters of mine workings and the stability of the contour-adjacent part of the rock mass	Creation of new technologies for conducting drilling and blasting operations ensuring the preservation of the design parameters of mine workings by minimizing the overbreak coefficient depending on the disturbance of the rock mass by blasting operations, the seismic impact of the explosion force, and the geomechanical condition of the contour-adjacent part of the rock mass in accordance with the geological strength index.	September 2022	December 2024
21	<p>9 INDUSTRY, INNOVATION AND INFRASTRUCTURE</p>	Andreishchenko V.A.	Development of a technology for the synthesis of composite ceramic materials of the AlxFeySi system using an additive method	Develop a technology for the synthesis of composite ceramic materials of the AlxFeySi system using an additive method to improve the quality of the structure of materials and parts based on them.	July 2023	December 2025







22	<b>9</b> INDUSTRY, INNOVATION AND INFRASTRUCTURE 	Taranov A.V.	Creation of a pilot-industrial prototype of an innovative passenger pneumatic lift for buildings and structures	Creation of pilot-industrial prototypes of passenger pneumatic lifts, as well as design and technological documentation.	July 2023	December 2025
23	<b>9</b> INDUSTRY, INNOVATION AND INFRASTRUCTURE 	Nikonova T.Yu.	Design and creation of prototypes of automated production control systems, remote monitoring and diagnostics of microclimate in polymer agricultural sleeves for grain storage	Design, development, and creation of prototypes of an automated system for controlling the production processes of polymer agricultural sleeves and an automated system for remote continuous monitoring of the microclimate in polymer agricultural sleeves.	April 2020	31 December 2022
24	<b>9</b> INDUSTRY, INNOVATION AND INFRASTRUCTURE 	Tomilov A.N.	Development of an expert decision-making system on issues of support and maintenance of mine workings	Creation of a domestic expert system aimed at providing solutions on issues of support and maintenance of mine workings using both heuristic and algorithmic methods, which makes it possible to provide the most optimal result of requests. Placement of the knowledge base and the main software of the expert system is предполагается with the use of cloud technologies.	July 2023	December 2025
25	<b>9</b> INDUSTRY, INNOVATION AND INFRASTRUCTURE 	Ganyukov A.A.	Development of the design and calculation of a mobile overpass	Development of the design and calculation of a mobile overpass used in the repair of utility networks.	July 2024	December 2026
26	<b>9</b> INDUSTRY, INNOVATION AND INFRASTRUCTURE 	Kadyrov A.S.	Development of a methodology for calculating the operating mode, design of devices and materials for cleaning exhaust gases of transport equipment by ultrasonic and laser radiation	Development of a methodology for calculating the operating mode, design of devices, and selection of materials for laser and ultrasonic cleaning of automobile exhaust gases directly in the muffler.	July 2025	December 2027






27	<b>9</b> INDUSTRY, INNOVATION AND INFRASTRUCTURE 	Smirnov Yu.M.	Research and development of the composition and production technology of gas-glass and foam-glass blocks from technogenic glass cullet	Development of the composition of gas-glass and foam-glass construction mixtures for the production of construction products based on energy-saving technologies for the use of recycled technogenic glass cullet.	January 2018	1 November 2020
28	<b>9</b> INDUSTRY, INNOVATION AND INFRASTRUCTURE 	Khalikova E.R.	Research and substantiation of the technology for maintaining mine workings with control of the stability of zones of increased rock arching during the mining of thick coal seams	Creation of a progressive technology for maintaining the contouring extraction pillars of mine workings based on the established regularities of rock behavior during the mining of layers of thick seams, ensuring an increase in the efficiency and safety of the functioning of underground mining production.	June 2024	December 2026
29	<b>9</b> INDUSTRY, INNOVATION AND INFRASTRUCTURE 	Musin A.A.	Development of resource-saving technologies for mining mineral deposits ensuring the preservation of mining industry facilities in regions with high tectonic activity	Creation of resource-saving technologies for mining mineral deposits ensuring the preservation of mining industry facilities in regions with high modern tectonic activity.	July 2024	December 2026
30	<b>9</b> INDUSTRY, INNOVATION AND INFRASTRUCTURE 	Arinova S.K.	Research and development of a technology for obtaining lining from technogenic waste of steelmaking production for furnaces of the metallurgical industry	Development of the composition and technology for obtaining lining based on waste from the metallurgical industry, possessing increased strength, heat resistance, and chemical resistance. The use of economically and environmentally efficient lining will lead to production optimization, that is, a reduction in the cost of final products and repeated waste processing, which determines an environmentally and resource-saving approach to production.	July 2024	December 2026

31	<b>9</b> INDUSTRY, INNOVATION AND INFRASTRUCTURE 	Suimbaeva A.M.	Development of effective technological schemes for blasting thin deposits ensuring the reduction of ore dilution, taking into account the geomechanical state of the rock mass	Conducting geotechnological studies on the zoning of deposit sections according to the rock stability rating in accordance with the geological strength index for the development of optimal drilling and blasting operation passports for blasting thin ore bodies depending on their thickness, ensuring the reduction of ore dilution.	July 2022	December 2024
32	<b>9</b> INDUSTRY, INNOVATION AND INFRASTRUCTURE 	Zhumabekova A.E.	Development of a technology for maintaining preparatory mine workings for the conditions of coal mines	Development of a technology for maintaining preparatory workings based on controlling the stress-strain state of the contour-adjacent rock mass ahead of the longwall face.	July 2022	December 2024
33	<b>9</b> INDUSTRY, INNOVATION AND INFRASTRUCTURE 	Khalikova E.R.	Development and industrial testing of technological schemes for strengthening the weakened zone of rocks when crossing a geological disturbance by a preparatory working	Development of technological schemes for strengthening the weakened zone of rocks when crossing a geological disturbance by a preparatory working, ensuring an increase in the stability of the rocks surrounding the working.	July 2022	December 2024
<b>10. REDUCED INEQUALITIES</b>						
34	<b>10</b> REDUCED INEQUALITIES 	Shormanbaeva D.G.	Institutional regulation of the prevention of interethnic conflicts among student youth in the conditions of sociocultural transformation of Kazakhstani society	Develop effective ways of institutional regulation of the prevention of interethnic conflicts among student youth in the conditions of sociocultural transformation of Kazakhstani society through the system of education and public organizations.	July 2023	December 2025
35	<b>10</b> REDUCED INEQUALITIES 	Mukanova A.K.	Sociocultural factors of the transformation of Kazakhstani society in the context of contemporary global trends	Development of a conceptual framework of axiological (value-based) and semantic (meaning-based) changes in the consciousness of modern Kazakhstanis in the context of globalization, explicated in the form of a cognitive map with detailed characteristics, including sociological, psychological, historical, cultural, and collective-worldview parameters.	February 2025	December 2027



11. SUSTAINABLE CITIES AND COMMUNITIES						
36	 <p>11 SUSTAINABLE CITIES AND COMMUNITIES</p>	Khuangan N.	Study of the impact of underground mining on surface social objects	Conducting calculations of the geomechanical parameters of rock mass displacement and numerical modeling of the geomechanical state of mined sections of the surface along three profile lines showing the values of absolute vertical settlements of the surface. This allows drawing conclusions about possible serious deformations of surface objects falling within the displacement zones.	May 2023	December 2025
37	 <p>11 SUSTAINABLE CITIES AND COMMUNITIES</p>	Nizametdinov N.F.	Development of methodological approaches for monitoring the condition of critically important hydraulic infrastructure objects in Kazakhstan using unmanned aerial vehicles and remote sensing	Development of methodological approaches for monitoring the condition of critically important infrastructure objects in the Republic of Kazakhstan using unmanned aerial vehicles and remote sensing methods to enhance the safety of the operation of hydraulic structures (HS) and control the likelihood of catastrophic consequences causing damage to enterprises, the population, the environment, and agricultural facilities.	June 2024	December 2026
38	 <p>11 SUSTAINABLE CITIES AND COMMUNITIES</p>	Balpanova M.Zh.	Creation of resource-saving technologies for the development of ore deposits to increase the completeness of mineral extraction	Creation of new technologies for the development of ore deposits, ensuring the completeness of mineral extraction, by establishing the order and direction of pillar extraction in a panel, based on determining the load on pillars, through constructing slip line curves for each lithological type of rock composing the overlying stratum.	July 2022	December 2024
39	 <p>11 SUSTAINABLE CITIES AND COMMUNITIES</p>	Takhanov D.K.	Creation of a method for predicting the displacement of enclosing rocks to the Earth's surface for the modernization of the technology of reworking shallow ore deposits	Improvement of the technology for reworking shallow ore deposits based on a reliable prediction of rock and surface displacement by studying the patterns and identifying factors that determine the limits of the deformation zone bounded by slip surfaces.	July 2023	December 2025



40	 <p>11 SUSTAINABLE CITIES AND COMMUNITIES</p>	Sarsembekov B.K.	Development and study of an ultrasonic method for cleaning exhaust gas of internal combustion engines of transport equipment	Obtaining results allowing the calculation, design of an ultrasonic automotive muffler, and development of its prototype.	October 2022	December 2024
41	 <p>11 SUSTAINABLE CITIES AND COMMUNITIES</p>	Pak Yu.N.	Radioecological aspects of the radioactivity of energy coals and ash-slag waste in the context of their impact on the environment	Assessment of the impact of using coals containing naturally occurring radioactive elements (NORM) in fuel energy on the radioecological situation of the environment.	July 2023	December 2025
<b>15. LIFE ON LAND</b>						
42	 <p>15 LIFE ON LAND</p>	Kudriavtsev S.S.	Forecasting the environmental consequences of emergencies at chemically hazardous facilities in the Republic of Kazakhstan	Development of a concept and methodological approach for forecasting the environmental consequences of emergencies at chemically hazardous facilities in the Republic of Kazakhstan and the development of preventive measures for emergency situations at chemical industry enterprises in order to reduce environmental risks.	January 2018	1 November 2020