S.Seifullin Kazakh Agrotechnical University

Certificate
S.Seifullin Kazakh Agrotechnical University
Faculty of Land Management, Architecture and Design
Moskovskaya 25
2023

CATALOG OF ELECTIVE DISCIPLINES
For students in the direction of preparation 6B073 - Architecture and Civil engineering
Brief description of the elective disciplines of the educational program

| EPG | EP | Form of education | The name of discipline | Code of subject | Discipline cycle | Component | Number of credits | Level of training | Cathedra | Course | Academic period | Pre-requisitions | Post-requisitions | Brief content of the discipline | Key learning outcomes | Name of the alternative discipline |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| B074 - «Urban planning, construction and civil engineering» | 6B07302 - «Geodesy and Cartography» | Full-time (bachelor 4 years) trimester | Professionally-oriented Foreign Language | POIYa 2243 | BS | Elective subjects | 3.0 | Bachelor | | 2 | 2 | Foreign language, History of Kazakhstan, Kazakh (russian) language | Automation of Land surveying services, Basics of 3 D modeling in AutoCAD system, Metrological maintenance of geodetic measurements | To form the professional foreign language speech of future specialists to increase the level of professional competence, proficiency in a professional foreign language for the implementation of written and oral information exchange, further development of speech activity (reading, writing, listening and speaking - monologue and dialogic speech). Rules of speech behavior in accordance with situations of professional communication, depending on the style and nature of communication in the social, household and academic spheres. | Use communication in oral and written forms in the state, Russian and foreign languages to solve professional problems of interpersonal and intercultural interaction. | English for special purposes |
| | | | English for special purposes | | BS | Elective subjects | 3.0 | Bachelor | | 2 | 2 | Foreign language, History of Kazakhstan, Kazakh (russian) language | Automation of Land surveying services, Basics of 3 D modeling in AutoCAD system, Metrological maintenance of geodetic measurements, Pregraduation practice | The discipline is aimed at studying general scientific terminology and terminology for the language of the corresponding specialty in English, forms skills in four types of communicative activity: reading with a full understanding of authentic texts in the specialty, the ability to write an essay on a specialty problem, the ability to listen to authentic messages containing professional information, the ability to discuss specialty issues | Possess knowledge of socio-humanitarian and economic disciplines, willingness to demonstrate a well-formed worldview, civic and moral position of a highly educated person with a broad outlook and a culture of thinking. Has the skills of practical proficiency in the specialty language for the active use of Russian, state and foreign languages in professional communication. Knows professional terminology in English. | Professionally-oriented Foreign Language |
| | | | GIS mapping | GK 3318 | AS | Elective subjects | 5.0 | Bachelor | Geodesy and cartography | 3 | 1 | Cartography, Geodesy, Mathematics | Automation of Land surveying services, Digital models and terrain maps, Interpretation of space images, The use of UAVs in various sectors of the economy | Overview of software geographic information mapping. Spatial data infrastructure. Creating a database, collecting information and storing it. Preparation and "binding" of raster maps, digitization of paper base. Carrying out cartometric operations, spatial queries, creating thematic maps. Branch geo-information projects (GIS in geology, land cadastre, forestry, in ecology, municipal administration, engineering communications, in geography). Regional geographic information projects | possess practical skills in using modern geodetic instruments and instruments: electronic theodolite and total station, laser scanner and digital level, GPS, etc. to create state planned and high-altitude networks, as well as to possess methods and methods of equalizing calculations based on the results of measurements on these networks. ability to create digital models of terrain and other objects, including based on the results of ground-based photogrammetric survey and laser scanning, and to actively use geospatial data infrastructure | Digital cartography |
| B074 - «Urban planning, construction and civil engineering» | 6B07302 - «Geodesy and Cartography» | Full-time (bachelor 4 years) trimester | Digital cartography | | AS | Elective subjects | 5.0 | Bachelor | Geodesy and cartography | 3 | 1 | Cartography, Geodesy, GIS in the field of geodesy, Mathematics | Basics of 3 D modeling in AutoCAD system, Digital models and terrain maps | The general theory of cartographic projections. Modern software for processing cartographic information. Automation in mathematical cartography. Drawing up originals of topographic maps. Updating topographic maps. Technology making plans. Designing maps. | possess practical skills in using modern geodetic instruments and instruments: electronic theodolite and total station, laser scanner and digital level, GPS, etc. to create state planned and high-altitude networks, as well as to possess methods and methods of equalizing calculations based on the results of measurements on these networks. ability to create digital models of terrain and other objects, including based on the results of ground-based photogrammetric survey and laser scanning, and to actively use geospatial data infrastructure | GIS mapping |
| | | | Satellite systems and positioning technology | SSTP 3305 | AS | Elective subjects | 5.0 | Bachelor | Geodesy and cartography | 3 | 2 | Geodesy, Remote sensing, Space shooting techniques | Pregraduation practice, Space geodesy, The use of UAVs in various sectors of the economy | The development and application of GNSS. The principle of ranging measurements, implemented in GNSS. The coordinate and time systems used in GNSS. GNSS satellite segment. Segment of management and control of GNSS. User segment with GNSS signals. Satellite measurement errors. Geodetic technology using satellite positioning. Reference station networks. | own the production of aerial photography, performing aerial photography using UAVs, creating orthophotoplanes of the required scale, creating digital terrain models and also work in software products AutoCAD, PHOTOMOD, ERDAS. to solve the problems of preliminary and thematic processing of digital satellite images, automated mapping using GIS technologies and remote sensing data | Satellite navigation systems |
| | | | Satellite navigation systems | | AS | Elective subjects | 5.0 | Bachelor | Geodesy and cartography | 3 | 2 | Engineering geodesy, Geodesy, Geodetic Instrumentation | Applied Geodesy, Modern geodesic devices, Space geodesy, The use of UAVs in various sectors of the economy | Development and application of GNSS. The principle of rangefinder measurements implemented in GNSS. Coordinate and time systems used in GNSS. Satellite measurement errors. The technology of geodetic works using satellite positioning. Networks of reference stations. | own the production of aerial photography, performing aerial photography using UAVs, creating orthophotoplanes of the required scale, creating digital terrain models and also work in software products AutoCAD, PHOTOMOD, ERDAS. to solve the problems of preliminary and thematic processing of digital satellite images, automated mapping using GIS technologies and remote sensing data | Satellite systems and positioning technology |

B074 - «Urban planning, construction and civil engineering»

6B07302 - «Geodesy and Cartography»

Full-time (bachelor 4 years) trimester

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| Planning and drafting of maps | PSK 3319 | AS | Elective subjects | 5.0 | Bachelor | Geodesy and cartography | 3 | 2 | Cartography, Geodesy, GIS in the field of geodesy, Mathematics, Physics | Basics of 3 D modeling in AutoCAD system, Space geodesy | Mathematical basis of cards. Cartographic image methods. Database design. Methods and techniques of traditional and geographic mapping. Creating thematic maps | ability to create digital models of terrain and other objects, including based on the results of ground-based photogrammetric survey and laser scanning, and to actively use geospatial data infrastructure. own the production of aerial photography, performing aerial photography using UAVs, creating orthophotoplanes of the required scale, creating digital terrain models and also work in software products AutoCAD, PHOTOMOD, ERDAS | Interpretation of space images |
| Interpretation of space images | | AS | Elective subjects | 5.0 | Bachelor | Geodesy and cartography | 3 | 2 | Geodesy, Higher geodesy, Photogrammetry, Space shooting techniques | Applied Geodesy, Pregraduation practice, Space geodesy, The use of UAVs in various sectors of the economy | The modernity of aerial photography; the scale of aerial photographs; the contrast of the photographic image; the nature of the illumination of objects during aerial photography; external features of the photographed terrain; features of aerial photography materials; the degree of training of the decoder in the field of aerial geodesy and geographical disciplines. | ability to create digital models of terrain and other objects, including based on the results of ground-based photogrammetric survey and laser scanning, and to actively use geospatial data infrastructure. own the production of aerial photography, performing aerial photography using UAVs, creating orthophotoplanes of the required scale, creating digital terrain models and also work in software products AutoCAD, PHOTOMOD, ERDAS | Planning and drafting of maps |
| Basics of 3 D modeling in AutoCAD system | OMSA 3219 | BS | Elective subjects | 5.0 | Bachelor | Geodesy and cartography | 3 | 3 | Cartography, Geodesy, GIS in the field of geodesy, Information and communication technologies, Mathematics | Modern geodesic devices, Pregraduation practice, The use of UAVs in various sectors of the economy | The main objectives and principles of three-dimensional modeling of terrain objects. Strategies and problems of 3D terrain modeling. Mathematical basis of 3D modeling. Spatial transformations. Three-dimensional scaling. Three-dimensional shifts. Three-dimensional rotation. | willingness to perform field and desk work on topographic surveys of the area, applying measures of accuracy of measurement results, possess practical skills in the modules of the CREDO software product; give an economic justification for cartographic and geodetic production and apply measures for environmental protection and rational use of natural resources. be able to create planned high-rise networks and perform topographic surveys by various methods, including the survey of underground and ground structures, and use in practice the knowledge to ensure individual stages of surveys, design, construction and operation of buildings and structures. own the production of aerial photography, performing aerial photography using UAVs, creating orthophotoplanes of the required scale, creating digital terrain models and also work in software products AutoCAD, PHOTOMOD, ERDAS | CREDO software in topographic survey |
| CREDO software in topographic survey | | BS | Elective subjects | 5.0 | Bachelor | Geodesy and cartography | 3 | 3 | Cartography, Geodesy, GIS in the field of geodesy, Information and communication technologies, Mathematics | Modern geodesic devices, Pregraduation practice, The use of UAVs in various sectors of the economy | Means and methods for the creation of filming justification and topographic survey. Modern technology of field work. The main functions of the complex CREDO. The technology of collecting field information in the complex CREDO. Field coding in the CREDO complex. | willingness to perform field and desk work on topographic surveys of the area, applying measures of accuracy of measurement results, possess practical skills in the modules of the CREDO software product; give an economic justification for cartographic and geodetic production and apply measures for environmental protection and rational use of natural resources. be able to create planned high-rise networks and perform topographic surveys by various methods, including the survey of underground and ground structures, and use in practice the knowledge to ensure individual stages of surveys, design, construction and operation of buildings and structures. own the production of aerial photography, performing aerial photography using UAVs, creating orthophotoplanes of the required scale, creating digital terrain models and also work in software products AutoCAD, PHOTOMOD, ERDAS | Basics of 3 D modeling in AutoCAD system |
| Ecology and life safety | EBZh 3118 | GER | Elective subjects | 5.0 | Bachelor | Ecology | 3 | 3 | History of Kazakhstan, Kazakh (russian) language, Labor protection and basics of life safety | Land Cadastre, Pregraduation practice | The discipline studies the laws of interaction between organisms and their habitats, the laws of development, the preservation of human health and life in the technosphere, protection from the dangers of man-made and natural origin and the creation of comfortable living conditions. | Theoretical and methodological foundations of the concept of "corruption" Improving the socio-economic relations of Kazakhstan society as a condition for countering corruption Psychological features of the nature of corrupt behavior Formation of anti-corruption culture Features of the formation of anti-corruption culture of youth Ethnic features of the formation of anti-corruption culture Moral and ethical responsibility for corruption in various fields. Legal liability for corruption offenses | Basics of anti-corruption culture, Basics of economics and law, Innovative entrepreneurship, Introduction to leadership in education |
| Basics of anti-corruption culture | | GER | Elective subjects | 5.0 | Bachelor | Economy | 3 | 3 | Philosophy | Economy, organization cartography and geodesy production, Land law | The discipline examines the theoretical and methodological foundations of the concept of "corruption" and examines the improvement of socio-economic relations of the Kazakh society as a condition for combating corruption, psychological features of the nature of corrupt behavior, formation of anti-corruption culture, features of formation of anti-corruption culture of youth, ethnic features of formation of anti-corruption culture, moral and ethical responsibility for corruption in various spheres. Discipline allows you to learn about legal responsibility for corruption offenses | Analyze in a logical and quantitative way the conditions for the development of production and evaluate the competitiveness of created products on the principles of engineering, study innovative entrepreneurship and anti-corruption culture, formulate inventions | Basics of economics and law, Ecology and life safety, Innovative entrepreneurship, Introduction to leadership in education |

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| B074 - «Urban planning, constructions and civil engineering» | 6B07302 - «Geodesy and Cartography» | Full-time (bachelor 4 years) trimester | Introduction to leadership in education | | OER | Elective subjects | 5.0 | Bachelor | Профессиональное образование | 3 | 3 | Philosophy, Political science and sociology | Pregraduation practice | The discipline analyzes and studies the model of effective communication of the leader, methods of management in critical situations, methods of work in the management team and the principle of distribution of roles in the team, methods of effective control and motivation of training. It provides an opportunity to study the theory of leadership qualities and at the same time the concept of leadership behavior (three leadership styles (K. Levin), research at the University of Ohio, research at the University of Michigan, management system (R. Likert), management grid (Blake and Mouton), concept of reward and punishment, substitute leadership (S. Kerr and J. Germier). | To organize highly efficient operation of machines, apparatus, machinery and technological equipment in production, to show leadership qualities | Basics of anti-corruption culture, Basics of economics and law, Ecology and life safety, Innovative entrepreneurship |
| | | | Innovative entrepreneurship | | OER | Elective subjects | 5.0 | Bachelor | Economy | 3 | 3 | History of Kazakhstan, Information and communication technologies, Mathematics | Economy, organization cartography and geodesy production, Land law | Form students' knowledge of the fundamental concepts of innovative development, modern approaches to the implementation of entrepreneurial activity in the field of new technologies to ensure the competitiveness of an innovative enterprise on the market. Understand the economic essence of innovative entrepreneurship, business planning, venture financing and know the types of firms with venture capital. Possess skills in risk management, human resource management, innovative management and innovative processes, as a condition for economic growth | Analyze in a logical and quantitative way the conditions for the development of production and evaluate the competitiveness of created products on the principles of engineering, study innovative entrepreneurship and anti-corruption culture, formulate inventions | Basics of anti-corruption culture, Basics of economics and law, Ecology and life safety, Introduction to leadership in education |
| | | | Basics of economics and law | | OER | Elective subjects | 5.0 | Bachelor | Economy | 3 | 3 | History of Kazakhstan, Information and communication technologies, Mathematics | Economy, organization cartography and geodesy production, Land law | The discipline promotes knowledge of the subject of economic theory and methods of research, the basis of public production and forms of public economy, the mechanism of functioning of the market system, production, costs and income of the firm, national economy. Give an assessment of economic growth and instability of the market economy, inflation and unemployment as manifestations of economic instability. Demonstrate knowledge and skills in the financial and monetary credit system in the national economy and economic security. To master the basics of the theory of the state and law, the basics of constitutional, administrative, civil, labor, family, criminal law. | Analyze in a logical and quantitative way the conditions for the development of production and evaluate the competitiveness of created products on the principles of engineering, study innovative entrepreneurship and anti-corruption culture, formulate inventions | Basics of anti-corruption culture, Ecology and life safety, Innovative entrepreneurship, Introduction to leadership in education |
| | | | Applied Geodesy | PG 4316 | AS | Elective subjects | 5.0 | Bachelor | Geodesy and cartography | 4 | 1 | Geodesy, Mathematics | Economy, organization cartography and geodesy production, Modern geodesic devices, Pregraduation practice, Space geodesy | Supporting state geodetic networks, the main methods of breakdown, a detailed breakdown of pits and foundations, geodetic work in surveying and construction of roads and railways, geodetic work in observing the deformations of buildings and structures. | to develop technological schemes for creating digital maps; to bring the spatial position of digital maps into the necessary projection; to apply methods and methods of generalization in mapping; to make digital topographic, geographical, thematic and special maps using the ArcGIS software product. be able to create planned high-rise networks and perform topographic surveys by various methods, including the survey of underground and ground structures, and use in practice the knowledge to ensure individual stages of surveys, design, construction and operation of buildings and structures. ability to create digital models of terrain and other objects, including based on the results of ground-based photogrammetric survey and laser scanning, and to actively use geospatial data infrastructure | Engineering and geodetic survey |
| | | | Engineering and geodetic survey | | AS | Elective subjects | 5.0 | Bachelor | Geodesy and cartography | 4 | 1 | Engineering geodesy, Geodesy | Economy, organization cartography and geodesy production, Modern geodesic devices, Pregraduation practice, Space geodesy | Classification of engineering structures. Engineering structures for the intended purpose and design features. Types of research. Appointments and types of engineering surveys. The composition of engineering - geodetic surveys. Planned geodetic reference network for filming. Shooting of existing ground and underground communications. Track and trace work. Planned and high-altitude thickening networks. General plan. Project, construction and executive master plans. Graph-analytical, analytical and model methods. Vertical layout project. Profile method. Method of project horizontals. Cartograms and counting the volume of earthworks. | to develop technological schemes for creating digital maps; to bring the spatial position of digital maps into the necessary projection; to apply methods and methods of generalization in mapping; to make digital topographic, geographical, thematic and special maps using the ArcGIS software product. be able to create planned high-rise networks and perform topographic surveys by various methods, including the survey of underground and ground structures, and use in practice the knowledge to ensure individual stages of surveys, design, construction and operation of buildings and structures. ability to create digital models of terrain and other objects, including based on the results of ground-based photogrammetric survey and laser scanning, and to actively use geospatial data infrastructure | Applied Geodesy |

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| B074 - «Urban planning, construction and civil engineering» | 6B07302 - «Geodesy and Cartography» | Full-time (bachelor 4 years) trimester | Statistical analysis and spatial modelling | SAP M 4338 | AS | Elective subjects | 5.0 | Bach elor | Geodesy and cartography | 4 | 1 | GIS in the field of geodesy, Mathematics, Physics | Economy, organization cartography and geodesy production., Modern geodesic devices, Pregraduation practice, Space geodesy | The discipline is devoted to the quantitative analysis of spatial data. It is a combination of theories, methods, and applications prepared to help students: develop an understanding of important theoretical concepts in spatial statistical analysis; and gain practical experience in applying spatial statistics to various mapping problems using advanced statistical programs | possess practical skills in using modern geodetic instruments and instruments: electronic theodolite and total station, laser scanner and digital level, GPS, etc. to create state planned and high-altitude networks, as well as to possess methods and methods of equalizing calculations based on the results of measurements on these networks. ability to create digital models of terrain and other objects, including based on the results of ground-based photogrammetric survey and laser scanning, and to actively use geospatial data infrastructure | 3D geospatial data modeling |
| | | | 3D geospatial data modeling | | AS | Elective subjects | 5.0 | Bach elor | Geodesy and cartography | 4 | 1 | GIS in the field of geodesy, Mathematics, Physics | Modern geodesic devices, Pregraduation practice, Space geodesy | Software products. Baseline data for 3D modeling. ArcGisESRI. Creating, managing, integrating, analyzing, displaying and presenting spatial data. Vectorization of elements in stereo mode | possess practical skills in using modern geodetic instruments and instruments: electronic theodolite and total station, laser scanner and digital level, GPS, etc. to create state planned and high-altitude networks, as well as to possess methods and methods of equalizing calculations based on the results of measurements on these networks. ability to create digital models of terrain and other objects, including based on the results of ground-based photogrammetric survey and laser scanning, and to actively use geospatial data infrastructure | Statistical analysis and spatial modelling |
| | | | Land law | ZP 4223 | BS | Elective subjects | 5.0 | Bach elor | Кадастр и оценка | 4 | 2 | Economy, organization cartography and geodesy production | Pregraduation practice | The subject and system of land law. Land legal relations, sources of land law, the right of ownership of land, the right of land ownership, land use, lease relations. Payment for the land. State management of the land fund. State control over the use and protection of land, dispute resolution, legal protection of land. The legal regime of lands by categories of the land fund | possess the skills of using information and communication technologies for searching and processing information in Kazakh/ Russian and foreign languages; regulatory and legal support of land relations | Land Cadastre |
| | | | Land Cadastre | | BS | Elective subjects | 5.0 | Bach elor | Кадастр и оценка | 4 | 2 | Cartography, Geodesy | Pregraduation practice | Thoeretical knowledge of the state land cadastre, methods of basic cadastral works, practical skills in maintaining the land cadastre. | possess the skills of using information and communication technologies for searching and processing information in Kazakh/ Russian and foreign languages; regulatory and legal support of land relations | Land law |

The catalog of elective disciplines was reviewed at the meeting of the Faculty Council of Land Management, Architecture and Design №____ _____2023y

Head of the Department "Geodesy and Land Management" _____ A.S Tuyakbai