**"KAZAKH NATIONAL RESEARCH TECHNICAL UNIVERSITY**

**named after K.I. SATPAYEV"**



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**Department of Energy**

**Modules (disciplines) of the educational program**

**6В07101**

Each teacher, depending on the type of lesson, chooses certain teaching methods himself. As a rule, these are: lectures in the form of discussion, dialogue, presentations using technical means; in laboratory classes, students collect diagrams, take readings from stands, make calculations and build graphs, and then defend their work; in practical classes, students solve problems, perform calculation and graphic work, and then pass works in the form of presentation, survey, discussion, test control.

The date of the last changes to the content of the modules is approved at the meeting of the department at the beginning of the academic year (minutes №1 of the meeting of the department dated 16/08/2022)

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| Module designation | *EPG 508 - Light technology and lighting* |
| Semester(s) in which the module is taught | *7* |
| Person responsible for the module | *Zhumatova Assel Akanovna* |
| Language | *Russian, Kazakh* |
| Relation to curriculum |  *elective*  |
| Teaching methods | *lecture, seminar* |
| Workload (incl. contact hours, self-study hours) |  *5 сredit:* *lecture -30 h, seminar – 15h. SIW ( TSIW) -105h.* |
| Credit points | *5 credit:* *lecture -2 , seminar – 1. SIW -1., TSIW – l.* |
| Required and recommended prerequisites for joining the module | *Theoretical foundations of electrical engineering**existing competencies in electrical engineering.* |
| Module objectives / intended learning outcomes | *The key question is: what learning outcomes should students achieve within the module?**As part of the course, the student will master the practical use of the light source and their characteristics, design features and the physical foundations of the operation of lighting products; with regulatory requirements for lighting installations.**Acquire knowledge: - device, principle of operation and scope of lighting devices and installations of indoor and outdoor lighting;**- basic methods for calculating indoor and outdoor lighting.**Skills: cognitive and practical abilities for which knowledge is used.**- Competences: - make a choice of light sources and lighting fixtures for indoor and outdoor lighting;**- put into practice the basic principles of design and operation of the lighting system.* |
| Content | *Sources of light. Classification of light sources. Basic parameters of light sources. Lighting. Light fixture settings. Classification of lighting fixtures. Design of lighting installations. Basic Methods**lighting calculation.* |
| Examination forms | *Exam tickets, test control.* |
| Study and examination requirements | *Requirements for successful completion of the module* |
| Reading list | *1. Козловская В.Б. Электрические освещение. – Мн.: «Техноперспектива», 2011.*1. *Шеховцов В.П. Осветительные установки промышленных и гражданских объектов. – М.: «Форум», 2009.*

*3. Справочная книга по светотехнике / Под ред. Ю.Б. Айзенберга – 3-е изд., перераб. и доп. – М.: Энергоатомиздат, 2008.**4. Анчарова Т.В. Осветительные сети производственных зданий. Ч.1,2. –М.: «НТФ Энергопрогресс, Энергетик», 2008.* |

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| Module designation | *EPG 502 – «* *Engineering design of electrical machines in the power industry»* |
| Semester(s) in which the module is taught | *7* |
| Person responsible for the module | *Maldybayeva Tolkyn Sydykkyzy* |
| Language | *Russian, Kazakh* |
| Relation to curriculum |  *basic discipline*  |
| Teaching methods | *lecture, practical classes, independent work* |
| Workload (incl. contact hours, self-study hours) | *5 cr:**Lecture - 15h, pract - 30h., independent student work (independent work of the student with the teacher) -105h.* |
| Credit points | *5 cr:**Lecture - 1* *cr, practical work - 2* *cr., independent student work -1* *cr, independent work of the student with the teacher – 1* *cr.* |
| Required and recommended prerequisites for joining the module | *Electrical machines**existing competencies in electrical engineering.* |

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| Module designation | *EPG 524 - Operation of the main TPP equipment*  |
| Semester(s) in which the module is taught | *7*  |
| Person responsible for the module | *Nygymanova Ainur* |
| Language | *kazakh* |
| Relation to curriculum |  *elective*  |
| Teaching methods | *lecture, practice* |
| Workload (incl. contact hours, self-study hours) |  *5 сredit:* *lecture -30h, practice – 15h. IWS( IWSTS) -105h.* |
| Credit points | *5 сredit:* *lecture – 2 cr, practice – 1 cr. IWS -1 cr., IWSTS – 1 cr.* |
|  | *existing competencies in Thermal power engineering* |
| Required and recommended prerequisites for joining the module | *The key question is: what learning outcomes should students achieve within the module?**The main purpose of the course operation of the main equipment of a thermal power plant is to study the physico-chemical bases of fuels used in the energy industry, their indicators, methods of fuel combustion and the phenomena of operation on modern high-power steam generators of thermal power plants.**As part of the course, the student studies the principles of operation of the main equipment of thermal power plants, technological, schematic diagrams of boiler houses, steam turbines, considers engineering methods of basic structures and calculations, first learns the basic laws, and then the practical application of specific calculation methods.**After the full completion of the course, the student must demonstrate the ability to analyze, synthesize and design engineering methods of basic structures and calculations, as well as know and be able to complete types of thermal power plants, their work, technological schemes, basic equipment. Must know the principles of operation and design schemes of power plants power plants, types of thermal loads, thermal schemes of heat supply sources, connection schemes of thermal consumers, structural foundations of thermal networks; Know the types, characteristics, principles of operation of thermal power equipment in the operation of the main equipment of thermal power plants; Know the basic principles and calculations when choosing a thermal scheme of thermal power plants* |
| Module objectives / intended learning outcomes Content | *Introduction. Production and use of thermal and electrical energy. The role of thermal power plants (TPPs) in the electric power system of Kazakhstan. Basic thermal and technological schemes of thermal power plants. Energy fuel. Device, thermal scheme of steam generators at thermal power plants. Ways to increase the efficiency of thermal power plants. Indicators of thermal efficiency of KES. Fuel economy of solid fuel thermal power plants. Fuel economy of a thermal power plant burning liquid fuel. Description of fuel oil. The gas economy of the CHP. Characteristics of gaseous fuel. Direct-flow and cyclic water supply systems. Types of cooling towers. Diagrams of the movement of water and air in the cooling tower. Ash collector start-up schemes. Reducing the release of nitric oxide. Chimneys.* |
| Examination forms | *Exam tickets, test control.* |
| Study and examination requirements | *The student must come prepared for lectures and practical classes. Timely protection and full performance of all types of work (practical and independent) is required. The student should not be late and miss classes, be punctual and mandatory. It is planned to reduce the maximum score by 10% for untimely work. If a student is forced to skip the intermediate certification for good reasons, they must warn the teacher in advance before it, so that there is an opportunity to pass the boundary control in advance. Skipping an exam for a disrespectful reason deprives you of the right to take it. If you miss the exam for a good reason, a special permit is issued and the date, time and place of the exam are assigned.* |
| Reading list | *1. Ryzhkin V. Ya. Thermal power stations, - M. Energoatomizdat, 1987. - 328 p.**2. Temirbayev D. zh. operation of thermal power plants: a textbook. Ministry of education and science of the Republic of Kazakhstan. Almaty Institute of energy and communications. - Almaty: AIB, 2001. - 94 P.**3. Dostiyarov a.m., Tyutebayeva G. M., Nygymanova A. S. "thermal power plants" – a textbook for students of the specialty of heat power engineering of the University. –Astana, L. N. Gumilyov ENU, 2015**4." Rules of technical operation of electric stations and networks of the Republic of Kazakhstan " Rd 34 of the Republic of Kazakhstan.20.501­02, 2002**5. Ergarin M., Bakytzhanov I. Organization of operation and repair of steam generators: textbook. – Astana: Folio, 2010. - 168 P.**6. Dostiyarov a.m., Tyutebayeva G. M., Nygymanova A. S. "steam generators and boiler installations". -A textbook for students of the specialty of heat and power engineering of the University. – Astana, L. N. Gumilyov ENU, 2016* |

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| Module designation | *EPG 511– « Calculation and projecting of power supply systems»* |
| Semester(s) in which the module is taught | *7* |
| Person responsible for the module | *Maldybayeva Tolkyn Sydykkyzy* |
| Language | *Russian* |
| Relation to curriculum |  *elective*  |
| Teaching methods | *lecture, practical classes, independent work* |
| Workload (incl. contact hours, self-study hours) | *5* *cr:**Lecture - 30h, practical work - 15h., student independent work (independent work of the student with the teacher) -105 h.* |
| Credit points | *5 cr:**Lecture - 2* *cr, hands-on training work - 1* *cr., student independent work -1* *cr, independent work of the student with the teacher – 1* *cr.* |
| Required and recommended prerequisites for joining the module | *Theoretical foundations of electrical engineering, Power supply of enterprises**existing competencies in electrical engineering.* |
| Module objectives / intended learning outcomes | *Key question: what learning outcomes should students achieve within the module?* *As a result of mastering the discipline "Calculation and design of power supply systems" the student must:****Be able to:****- independently solve engineering problems and practically apply theoretical knowledge**- independently carry out the whole range of tasks, connected with the design of reliable and economical power supply systems at a facility under the rated quality of electrical energy**- make a single-line diagram of power supply for any system, calculate loads, select a distribution network and be able to determine the periodic component of a three-phase short circuit, use complex substitution diagrams when analyzing complex asymmetrical faults, analyze and optimize power supply in any system**- Calculate power system element parameters;**- Calculate short-circuit currents;**- analyze the stability of the Power System;****know:****- methods of calculation, design and optimization analysis of power supply systems,* *- classification and features of power supply systems, methods of calculation of short-circuit currents in networks to 1 kV and above 1 kV, features of calculation of electrical loads for each power supply system, know the methods and possibilities of regulation of the processes in electricity compensation, methods of selection of switching and protective electrical equipment**- stages and components of the design process of power supply systems.* |
| Content | *mastering practical methods of calculating loads of any power supply system, methods of selecting power and protective equipment, methods of calculating lighting, grounding and lightning protection* |
| Examination forms | *Examination tickets, test questions.* |
| Study and examination requirements | *- Availability of a computer and computer equipment;**- Availability of an Internet channel with a speed of at least 0.5 Mbit/sec;**- Personal account with a photo of your face on the avatar and corporate e-mail on the Microsoft 365 platform;**- Attendance at classes according to the schedule.**As a result of mastering the discipline "Calculation and design of power supply systems" the student must:**Be able to:**- independently solve engineering problems and practically apply theoretical knowledge**- independently carry out the whole range of tasks, connected with the design of reliable and economical power supply systems at a facility under the rated quality of electrical energy**- make a single-line diagram of power supply for any system, calculate* |
| Reading list | 1. *Shehovtsov V.P., Calculation and design of power supply schemes. Met. manual for the course project. -M. FORUM, 2010-214p.*
2. *Schemes and substations of electricity: Handbook: a training manual. REFERENCE BOOK: THE MANUAL. -M: FORUM INFRA-M, 2006. - 480 р.*
3. *Melnikov, M.A. M48 Intrafactory power supply. Textbook. -Tomsk. TPU Publishing House,2004-180р.*
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| Module designation | *ERG510-* *Calculation and design of automated electric drive systems* |
| Semester(s) in which the module is taught | *7* |
| Person responsible for the module | *Abdissatar Berdibekov*  |
| Language | *kazakh* |
| Relation to curriculum |  *elective*  |
| Teaching methods | *lecture, practical classes, independent work* |
| Workload (incl. contact hours, self-study hours) | *5kr:**Lecture-30h, practical lesson – 15h., independent work – 105h.* |
| Credit points | *5* |
| Required and recommended prerequisites for joining the module | *Electric machines,**existing competencies in electric drive.* |
| Module objectives / intended learning outcomes | *The key question is: what learning outcomes should students achieve within the module?**As a result of mastering the discipline "Calculation and design of automated electric drive systems", the student must:**know:**- device and features of modern automated electric drive systems, their application;**- methods of calculation and design of automated electric drive systems;**be able to:**- search, accumulation, systematization, analysis, processing of information, evaluation of their usefulness and intended use in solving assigned educational, scientific and production tasks.**possess skills:**- designing automated electric drive systems and performing various related calculations;**- selection of the necessary electrical equipment for production mechanisms.* |
| Content | *Typical schemes of AES controlled by asynchronous motors; Principles of construction of multi-circuit automated electric drive systems; Complete electric drives with a valve motor and frequency control; Electric drive of various general industrial installations.* |
| Examination forms | *Exam tickets, test questions.* |
| Study and examination requirements |  *- Availability of a computer and computer equipment;**- Availability of an Internet channel with a speed of at least 0.5 Mbit/sec;**- Personal account with a photo of the person on the avatar and corporate mail on the Microsoft 365 platform;**- Attendance of classes according to the schedule.* |
| Reading list | *[1] Engineering of electric drives and automation systems /M.P.Belov, O.I. Zementov, A.E. Kozyaruk and others/ – Moscow: Publishing House of the Center Academy, 2006.**[2] Belov M.P., Novikov V.A., Rassudov L.N. Automated electric drive of standard production mechanisms and technological complexes. –M.: Publishing house of the Center Academy, 2007.**[3] Terekhov, V.M., Osipov O.I. Electric drive control systems. – M.: Energoatomizdat, 2006.* |

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| Module designation | *EPG 517 - Calculation and projecting of electrical power networks and systems*  |
| Semester(s) in which the module is taught | *7* |
| Person responsible for the module | *Abitayeva Rakhimash Shanrakbayevna* |
| Language | *Russian, Kazakh* |
| Relation to curriculum |  *elective*  |
| Teaching methods | *lecture, practical classes, independent work* |
| Workload (incl. contact hours, self-study hours) | *5* *cr:**Lecture - 30h, practical work - 15h., student independent work (independent work of the student with the teacher) -105 h.* |
| Credit points | *5 cr:**Lecture - 2* *cr, hands-on training work - 1* *cr., student independent work -1* *cr, independent work of the student with the teacher – 1* *cr.* |
| Required and recommended prerequisites for joining the module | *Electric power networks and systems* |
| Module objectives / intended learning outcomes | *The discipline is an in-depth special discipline that develops engineering design skills and is the basis for the completion of the bachelor's final qualifying work. As part of the course, the student will master the practical use of the applied methods for calculating the parameters of the elements of the electrical network, power loss and voltage during the transmission of electrical energy, as well as the choice of the cross section of wires and cable cores.**Acquire knowledge: methods of transmission of electric energy; determination of parameters of the electric network; on issues of quality of electric energy.**Skills: cognitive and practical abilities for which knowledge is used.**- Competencies: students can design electrical networks and know the design; power flow distribution over networks and calculations of power loss. Voltage losses and electricity losses.**They know the configuration of electrical networks and the choice of rated voltage, choose the power and number of transformers, the cross section of wires, calculate the modes of electrical networks and technical and economic comparisons of options, consider voltage regulation issues.* |
| Content | *Characteristics of energy and electrical systems. Structural designs of overhead and cable power transmission lines. Replacement circuits of the network and transformers. Calculation of parameters of steady-state modes of electrical networks. Loss of power, voltage, electricity. Technical and economic indicators. The quality of electrical energy. Network connection diagram or network configuration.* |
| Examination forms | *Exam tickets, test control.* |
| Study and examination requirements | *Mandatory participation in training sessions according to the schedule, which determines the readiness for the lesson. In case of absence from the lesson, the student is obliged to notify the teacher within a day and explain the plan for self-study of the lesson:**- - mandatory reading of the submitted materials before the lesson;**- delivery of tasks on time. There are penalties of -10% for late delivery;**- 20% non-participation in the audience (for a good reason with supporting documents) - rating "F (Fail)";**- plagiarism and cheating during the execution of the task are not allowed;**- mandatory use of electronic gadgets in the classroom, which is welcome, but it is unacceptable to use them in the exam.* |
| Reading list | 1. *Электрооборудование электрических сетей, станций и подстанций. Под общей редакцией Немировского А.Е. Учебное пособие// М.: Вологда: Инфра-Инженерия, 2019.*
2. *Электроэнергетические системы и сети. Версия 1.0 [Электронный ресурс]: конспект лекций/ А. А. Герасименко, Е. С. Кинев, Т. М. Чупак. – Электрон. дан. (7 Мб). – Красноярск: ИПК СФУ, 2008.*
3. *Электроснабжение. Кудрин Б.И. – 2-ое изд., перераб и доп. –М.: Академия, 2012. 352с.*
4. *Электрические сети и системы. Абитаева Р.Ш., Онгар Б. Учебное пособие//Алматы.: Принт, 2020.*
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| Module designation | *EPG 142 – Relay protection of power systems*  |
| Semester(s) in which the module is taught | *7* |
| Person responsible for the module | *Abitayeva Rakhimash Shanrakbayevna* |
| Language | *Russian, Kazakh* |
| Relation to curriculum |  *elective*  |
| Teaching methods | *lecture, practical classes, independent work* |
| Workload (incl. contact hours, self-study hours) | *5* *cr:**Lecture - 15h, labor. -15 h., practical work - 15h., student independent work (independent work of the student with the teacher) -90 h.* |
| Credit points | *5 cr:**Lecture - 2* *cr, labor. -1cr., pract. - 1* *cr., student independent work -1* *cr, independent work of the student with the teacher – 1* *cr.* |
| Required and recommended prerequisites for joining the module | *Electric power networks and systems, Electrical part of power plants and substations, Power supply of enterprises* |
| Module objectives / intended learning outcomes | *The purpose of studying the discipline "Relay protection of electrical equipment" is to gain students' knowledge in the field of principles of construction of relay protection and automation (RSiA) of elements and basic electrical equipment in the field of electric power engineering, applied modern methods and tools for performing RSiA.**Acquire knowledge: on current protection of transformers, generators, electric motors, tires.**Skills: cognitive and practical abilities for which knowledge is used.**- Competencies: expanding the understanding of the possibilities of RSiA; consolidation and specification of theoretical material concerning the principles of operation and device of RSiA, their main properties, methods of application; obtaining skills in calculating the parameters necessary to configure RSiA; the correct choice of methods and means of RSiA; evaluation of the effectiveness and reliability of the selected RSiA..**They know how to determine the relay current protection settings. Check the protection sensitivity coefficients.* |
| Content | *Short circuits in electrical installations. Abnormal operating modes in electrical systems. Requirements for RZiA. The basic principles of the implementation of relay protection and automation schemes (RZiA). Classification of relays. Organs of the Russian Academy of Sciences. Operational current sources for powering Rza devices. Relay protection of power lines. Current protection. Protection against earth faults in electrical networks. Remote protection. Differential current protection. Protection of transformers and autotransformers from internal and external damage. Protection of synchronous generators of electric motors.* |
| Examination forms | *Exam tickets, test control.* |
| Study and examination requirements | *Mandatory participation in training sessions according to the schedule, which determines the readiness for the lesson. In case of absence from the lesson, the student is obliged to notify the teacher within a day and explain the plan for self-study of the lesson:**- - mandatory reading of the submitted materials before the lesson;**- delivery of tasks at any time. There are penalties of -10% for late delivery;**- 20% non-participation in the audience (for a good reason with supporting documents) - rating "F (Fail)";**- plagiarism and cheating during the execution of the task are not allowed;**- mandatory use of electronic gadgets in the classroom, which is welcome, but it is unacceptable to use them in the exam.* |
| Reading list | 1. *Федосеев А.М. Релейная защита электроэнергетических систем.-М.: Энергоатомиздат. 1992.528с.*
2. *Копьев В.Н. Релейная защита основного электрооборудования электростанций и подстанций. Вопросы проектирования. Учебное пособие. 2-е изд., испр. и доп. Томск: 2005. 107с.*
3. *Андреев В.А. Релейная защита и автоматика систем электроснабжения. - М.:Высшая школа.2007. 496с.*
4. *Департамент РЗ и систем управления AREVA T&D Automation.-М.: Типовые решения MiCOM P10-40. Схемы РЗиА Schneider Electric. 2013.*
5. *Андреев В.А. Релейная защита и автоматика систем электроснабжения. - М.: Высшая школа.2008. 248с.*
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| Module designation | **ERG124 Basics of electrical safety** |
| Semester(s) in which this module is taught | 7 |
| The person responsible for the module | Khidolda Yerkin, Akhambayev Ruslan, Adenova Dana |
| Language | Kazakh / Russian |
| Attitude to the curriculum | Required component, profile discipline |
| Teaching methods | Lecture, laboratory and practical lesson |
| Workload (incl. contact hours, hours of independent work) | 1 hour of lectures per week, 1 hour for laboratory and practical classes per week, 1 hour for office IWST per week (total contact 60 hours and 30 hours for office IWST) |
| Credit scores | *5* |
| Necessary and recommended prerequisites for joining the module | *The student must master the module* *ERG530 - "Power supply of enterprises"* |
| Module objectives/expected learning outcomes | *The course is a discipline where students get a general idea of electrical safety, measures and prevention of fires and explosions from electrical installations in production and electrical networks, as well as special issues during the installation and operation of electrical equipment and electrical networks.**As a result of mastering, students will:**- know technical, organizational and administrative measures to ensure electrical safety of industrial enterprises;**- know the technical means of protection to ensure electrical safety;**- know the various factors affecting the outcome of electric shock;**- be able to draw up diagrams explaining the passage of current through the human body;**- be able to analyze the state of electrical safety of industrial enterprises;**- be able to calculate the parameters of the electrical network, in case of rendering a person under voltage;**- possess the skills of drawing up calculation schemes and replacement circuits of the electrical network when current passes through the human body;**- possess the skills of testing electrical protective equipment.* |
| Content | *Students will gain knowledge in the field of safe operation of electrical installations and electrical networks, about the influence of electric current on the human body, types of electrical trauma and the structure of the human body as a "conductor" of a special kind, as well as about the protective measures and means used in the energy sector.**The main topic of the course:* *- the state and causes of electrical injuries at general industrial and specific enterprises, information on legislation in the field of safety;**- protective measures and means of electrical safety in general-purpose electrical installations;**- fundamentals of the organization of safe operation of electrical installations.* |
| Examination forms | *Written exam* |
| Requirements for training and exams | * *Execution and protection of the IWS on schedule;*
* *Performance and protection of laboratory work on schedule;*
* *Attendance of classes is mandatory according to the schedule;*
* *Mandatory passing of intermediate and boundary controls.*
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| List of literature | 1. *Кudryavtsev D.Y, Monakhov A.F. Electrical safety. Theory and practice. – Moscow, Infra-engineering, 2017 y.*
2. *A. F. Monakhov. Protective measures of electrical safety in electrical installations. – Moscow, 2006 y.*
3. *Rules of electrical installations and rules of technical operation in the Republic of Kazakhstan. - Barnaul, АТU, 2005 y.*
4. *G. F. Kutsenko. Electrical safety. – Moscow, 2006 y.*
5. *John Hymson. Electrical Construction and Maintenance Workers Safety Manual. – Toronto, Association of Ontario, 2016.*
6. *Sibikin Yu. D., Sibikin M. Yu. Electrical safety in the operation of electrical installations of industrial enterprises. – Moscow, Academy, 2004 y. - 240 p.*
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| Module designation | *ERG 524 – Main machinery operation of Heat Power Plant*  |
| Semester(s) in which the module is taught | *7*  |
| Person responsible for the module | *Nygymanova Ainur* |
| Language | *kazakh* |
| Relation to curriculum |  *elective*  |
| Teaching methods | *lecture, practice* |
| Workload (incl. contact hours, self-study hours) | *5* *cr:**Lecture - 30h, practical work - 15h., student independent work (independent work of the student with the teacher) -105 h.* |
| Credit points | *5 cr:**Lecture - 2* *cr, hands-on training work - 1* *cr., student independent work -1* *cr, independent work of the student with the teacher – 1* *cr.* |
| Required and recommended prerequisites for joining the module | *existing competencies in Thermal power engineering* |
| Module objectives / intended learning outcomes | *The key question is: what learning outcomes should students achieve within the module?**The main purpose of the course operation of the main equipment of a thermal power plant is to study the physico-chemical bases of fuels used in the energy industry, their indicators, methods of fuel combustion and the phenomena of operation on modern high-power steam generators of thermal power plants.**As part of the course, the student studies the principles of operation of the main equipment of thermal power plants, technological, schematic diagrams of boiler houses, steam turbines, considers engineering methods of basic structures and calculations, first learns the basic laws, and then the practical application of specific calculation methods.**After the full completion of the course, the student must demonstrate the ability to analyze, synthesize and design engineering methods of basic structures and calculations, as well as know and be able to complete types of thermal power plants, their work, technological schemes, basic equipment. Must know the principles of operation and design schemes of power plants power plants, types of thermal loads, thermal schemes of heat supply sources, connection schemes of thermal consumers, structural foundations of thermal networks; Know the types, characteristics, principles of operation of thermal power equipment in the operation of the main equipment of thermal power plants; Know the basic principles and calculations when choosing a thermal scheme of thermal power plants* |
| Content | *Introduction. Production and use of thermal and electrical energy. The role of thermal power plants (TPPs) in the electric power system of Kazakhstan. Basic thermal and technological schemes of thermal power plants. Energy fuel. Device, thermal scheme of steam generators at thermal power plants. Ways to increase the efficiency of thermal power plants. Indicators of thermal efficiency of KES. Fuel economy of solid fuel thermal power plants. Fuel economy of a thermal power plant burning liquid fuel. Description of fuel oil. The gas economy of the CHP. Characteristics of gaseous fuel. Direct-flow and cyclic water supply systems. Types of cooling towers. Diagrams of the movement of water and air in the cooling tower. Ash collector start-up schemes. Reducing the release of nitric oxide. Chimneys.* |
| Examination forms | *Exam tickets, test control.* |
| Study and examination requirements | *The student must come prepared for lectures and practical classes. Timely protection and full performance of all types of work (practical and independent) is required. The student should not be late and miss classes, be punctual and mandatory. It is planned to reduce the maximum score by 10% for untimely work. If a student is forced to skip the intermediate certification for good reasons, they must warn the teacher in advance before it, so that there is an opportunity to pass the boundary control in advance. Skipping an exam for a disrespectful reason deprives you of the right to take it. If you miss the exam for a good reason, a special permit is issued and the date, time and place of the exam are assigned.* |
| Reading list | *1. Ryzhkin V. Ya. Thermal power stations, - M. Energoatomizdat, 1987. - 328 p.**2. Temirbayev D. zh. operation of thermal power plants: a textbook. Ministry of education and science of the Republic of Kazakhstan. Almaty Institute of energy and communications. - Almaty: AIB, 2001. - 94 P.**3. Elizarov P. P. operation of boiler installations at high power plants. Gaye, 1961**4. Kachan A.D. mode of operation and operation of thermal power plants. - Minsk: Higher School, 1978.**5. Dostiyarov a.m., Tyutebayeva G. M., Nygymanova A. S. "thermal power plants" – a textbook for students of the specialty of heat power engineering of the University. –Astana, L. N. Gumilyov ENU, 2015**6." Rules of technical operation of electric stations and networks of the Republic of Kazakhstan " Rd 34 of the Republic of Kazakhstan.20.501­02, 2002**7." heat calculation of boiler units (standard method) " under. Ed. Kuznetsova N. V., Mitora V. V., Dubovsky I. E., Karasinoy E. S.-Moscow: Energiya publ., 1973. – 296 P.**8. Ergarin M., Bakytzhanov I. Organization of operation and repair of steam generators: textbook. – Astana: Folio, 2010. - 168 P.**9. Dostiyarov a.m., Tyutebayeva G. M., Nygymanova A. S. "steam generators and boiler installations". -A textbook for students of the specialty of heat and power engineering of the University. – Astana, L. N. Gumilyov ENU, 2016* |

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| Module designation | *Calculation and design of heat and mass transfer equipment of enterprises* |
| Semester(s) in which the module is taught | *7* |
| Person responsible for the module | *Umyshev Dias* |
| Language | *Russian, Kazakh* |
| Relation to curriculum | *elective*  |
| Teaching methods | *lecture, practical work* |
| Workload (incl. contact hours, self-study hours) | *5cr:* *lecture -30 h, practical work – 15 h. Siw-60h., siwl – 45h.* |
| Credit points | *5cr:* *lecture -2 cr, prartical work – 1 cr. Siw-1 cr., siwl – 1cr.* |
| Required and recommended prerequisites for joining the module | *None* |
| Module objectives / intended learning outcomes | *The purpose of the discipline is to study the technology of electricity and heat production at modern energy gas turbine and combined cycle plants of thermal power plants.* |
| Content | *The simplest thermal schemes of CCGT. Thermal schemes and indicators of gas turbines. The main elements of the technological scheme of the GTU gas turbine engine. Abstract preparation. Operation and protection of gas turbines, start-up and shutdown. Variable modes of operation of the gas turbine. Test: operating principles, gas turbine characteristics. Condensing CCGTs with waste heat boilers. Cogeneration CCGT-CHPPs* |
| Examination forms | *Exam tickets* |
| Study and examination requirements | *Upon completion of the course, students should be able to select the types of gas turbines and CCGTs at TPPs and their auxiliary equipment, as well as determine the indicators of thermal and general efficiency of these plants, use software tools for calculating equipment characteristics, analyze information about new developments of gas turbines and CCGTs at TPPs and calculation methods.* |
| Reading list | *1. Steam and gas turbines for power plants: textbook. for universities/ed. A. G. Kostyuk. - Ed. 3rd, revised. and additional - M.: Ed. House MPEI, 2008.**2. Tsanev S.V., Burov V.D., Remezov A.N. Gas turbine and steam-gas installations of thermal power plants. – M.: MPEI Publishing House, 2009. – 584 p.**3. Gas turbine power plants: textbook/S. V. Tsanev [i dr.]. - Moscow: MEI Publishing House, 2011. - 427 p.: ill. — Bibliography: p. 420. - Subject index: p. 421-423.. - ISBN 978-5-383-00504-0.* |

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| Module designation | *Combined-cycle and gas turbine units of thermal power plants* |
| Semester(s) in which the module is taught | *7* |
| Person responsible for the module | *Umyshev Dias* |
| Language | *Russian, Kazakh* |
| Relation to curriculum | *elective*  |
| Teaching methods | *lecture, practical work* |
| Workload (incl. contact hours, self-study hours) | *5cr:* *lecture -30 h, practical work – 15 h. Siw-60h., siwl – 45h.* |
| Credit points | *5cr:* *lecture -2 cr, prartical work – 1 cr. Siw-1 cr., siwl – 1cr.* |
| Required and recommended prerequisites for joining the module | *None* |
| Module objectives / intended learning outcomes | *As part of the course, the student will master the practical use of knowledge in the field of heat and mass transfer devices and processes. Basic knowledge and skills in the field of drying, heating, cooling of various media and heat carriers will be presented.* |
| Content | *General information about heat exchangers. Calculation of heat exchangers, regenerative heat exchangers, contact and contact-surface water heaters, heat pipes, compatibility of the material and heat carrier of the heat pipe, features of heat transfer in the layer* |
| Examination forms | *Exam tickets* |
| Study and examination requirements | *Upon completion of the course, the student must demonstrate the ability to analyze, synthesize and design. Define the basic concepts and terminology, the fundamental laws of heat and mass transfer, which are the basis for the functioning of heat exchangers, ideas about the working processes occurring in heat exchangers, about the properties of working fluids and coolants.* |
| Reading list | *1. Task book on technical thermodynamics and the theory of heat and mass transfer, Afanasiev V.N., Isaev S.I., Kozhinov I.A., 2011.**2. Zavrin V.G. Heat and mass transfer equipment of enterprises. Tutorial. - Tomsk: TPU, 2004. - 163 p.* |

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| Module designation | ERG532 - Electrical apparatus |
| Semester(s) in which this module is taught | *6* |
| The person responsible for the module | *Lhidolda Yerkin, Muratkizi Ayim, Dauletkhanova Alua* |
| Language | Kazakh / Russian |
| Attitude to the curriculum | Required component, basic discipline |
| Teaching methods | Lecture and laboratory session |
| Workload (incl. contact hours, hours of independent work) | 2 hours of lectures per week, 1 hour for a laboratory lesson and 1 hour for an office IWST per week (total contact 60 hours and 15 hours for an office IWST) |
| Credit scores | *5* |
| Necessary and recommended prerequisites for joining the module | *The student must master the module " ERG176* Electrical and technical material science *"* |
| Module objectives/expected learning outcomes | *The purpose of the course is to provide students with knowledge in the field of theory and design of modern electrical control devices, protection and switching of high-voltage and low-voltage electrical networks. As a result of mastering the discipline "Electrical devices", the student will:**- know the types of electrical devices used for control, protection and switching in high-voltage and low-voltage electrical networks, electrical installations and automation circuits;**- know the design and materials used for the manufacture of electrical devices;**- be able to draw up circuits using various electrical devices to perform a specific task;**- be able to analyze the state of operation and reliability of electrical devices in industrial conditions;**- have the skills to select and test electrical devices for various circuits.* |
| Content | *The discipline covers the basic theoretical information on which electrical apparatus engineering is based, the study of switching, protection and control devices used in high and low voltage electrical networks is carried out.* |
| Examination forms | *Written exam* |
| Requirements for training and exams | * Execution and protection of the IWS on schedule;
* Performance and protection of laboratory work on schedule;
* Attendance of classes is mandatory according to the schedule;
* Mandatory passing of intermediate and boundary controls.
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| List of literature | 1. *Yu. К. Rozanov. Electrical and electronic devices. In 2 volumes. – Moscow: Academy, 2010 y.*
2. *О. B. Bul. Methods of calculation of magnetic systems of electrical devices: Magnetic circuits, fields and the REMM program. - Moscow. Energy, 2006 y. - 357 p.*
3. *А. G. Godzhello, В.Е.Rainin. Electrical and electronic devices. Textbook and workshop for academic Bachelor's degree. – М., 2010 y.*
4. *А. А. Chunikhin. Electrical devices. - Moscow. Energy, 2005. - 590 p.*
5. *Y. Y. Aliev, B. М. Аbramov. Electrical devices. Directory. –M., Radiosoft, 2004.*
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| Module designation | *EPG 507 - Superchargers and heat engines* |
| Semester(s) in which the module is taught | *6* |
| Person responsible for the module | *Umyshev Dias Raibekovich* |
| Language | *Kazakh, Russian* |
| Relation to curriculum | *elective*  |
| Teaching methods | *lecture, practical classes, independent work* |
| Workload (incl. contact hours, self-study hours) | *5* *cr:**Lecture - 30h, practical work - 15h., student independent work (independent work of the student with the teacher) -105 h.* |
| Credit points | *5 cr:**Lecture - 2* *cr, hands-on training work - 1* *cr., student independent work -1* *cr, independent work of the student with the teacher – 1* *cr.* |
| Required and recommended prerequisites for joining the module | *existing competencies in thermal power engineering* |
| Module objectives / intended learning outcomes | *The key question is: what learning outcomes should students achieve as part of the module?**As part of the course, the student will master the practical use of the applied methods for calculating the performance of pumps, superchargers and motors.**Acquire heat: methods of transportation of liquids and gas;*  *determination of water network parameters.* *Skills: Cognitive and practical abilities for which knowledge is used.**- Competencies: students know the designs of superchargers;*  *indicators of the efficiency of the superchargers.* *Chill, calculate the load on the pump.**It is possible to determine the required amount of pumping equipment and ways to connect to the network.* |
| Content | *Types of superchargers.*  *Features and principles of operation of pumping equipment. Diagrams of installation of pumps in the network.*  *Technical and economic indicators.* |
| Examination forms | *Exam tickets, test control.* |
| Study and examination requirements | *Timely delivery of works. Protection of independent work, successful passage of intermediate control.* |
| Reading list | 1. Dobrokhotov Valentin Dmitrievich Centrifugal natural gas superchargers 1972.
2. Heat engines and superchargers. Lecture notes for bachelors studying in the specialty 5В071700 - "Heat Power Engineering". - Almaty: AUES, 2011. - 65 p.
3. Heat engines and superchargers : a textbook / V.I. Lyash-kov. – Tambov : Izd-vo Tamb. state techn. un-ta, 2009. – 124 p.
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| Module designation | *EPG 178 – Electric power networks and systems* |
| Semester(s) in which the module is taught | *6* |
| Person responsible for the module | *Abitayeva Rakhimash Shanrakbayevna* |
| Language | *Russian, Kazakh* |
| Relation to curriculum |  *elective*  |
| Teaching methods | *lecture, practical classes, independent work* |
| Workload (incl. contact hours, self-study hours) | *5* *cr:**Lecture - 15h, labor. -15 h., practical work - 15h., student independent work (independent work of the student with the teacher) -90 h.* |
| Credit points | *5 cr:**Lecture - 2* *cr, labor. -1cr., pract. - 1* *cr., student independent work -1* *cr, independent work of the student with the teacher – 1* *cr.* |
| Required and recommended prerequisites for joining the module | *Theoretical foundations of electrical engineering**Electrical Materials Science* |
| Module objectives / intended learning outcomes | As part of the course, the student will master the practical use of the applied methods for calculating the parameters of the elements of the electrical network, power loss and voltage during the transmission of electrical energy, as well as the choice of the cross section of wires and cable cores. |
| Content | Acquire knowledge: methods of transmission of electric energy; determination of parameters of the electric network; on issues of quality of electric energy. |
| Examination forms | Skills: cognitive and practical abilities for which knowledge is used. |
| Study and examination requirements | - Competencies: students know the design of the electrical network; indicators of the quality of electrical energy; power flow distribution over networks and their calculations. |
| Reading list | 1. *Электрооборудование электрических сетей, станций и подстанций. Под общей редакцией Немировского А.Е. Учебное пособие// М.: Вологда: Инфра-Инженерия, 2019.*
2. *Электроэнергетические системы и сети. Версия 1.0 [Электронный ресурс]: конспект лекций/ А. А. Герасименко, Е. С. Кинев, Т. М. Чупак. – Электрон. дан. (7 Мб). – Красноярск: ИПК СФУ, 2008.*
3. *Электроснабжение. Кудрин Б.И. – 2-ое изд., перераб и доп. –М.: Академия, 2012. 352с.*
4. *Электрические сети и системы. Абитаева Р.Ш., Онгар Б. Учебное пособие//Алматы.: Принт, 2020.*
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| Module designation | *ERG 534 – Renewable energy*  |
| Semester(s) in which the module is taught | *6* |
| Person responsible for the module | *Bekbayev Amangeldy* |
| Language | *Kazakh, Russian* |
| Relation to curriculum | *elective*  |
| Teaching methods | *lecture, practical classes, independent work* |
| Workload (incl. contact hours, self-study hours) | *5* *cr:**Lecture - 30h, practical work - 15h., student independent work (independent work of the student with the teacher) -105 h.* |
| Credit points | *5 cr:**Lecture - 2* *cr, hands-on training work - 1* *cr., student independent work -1* *cr, independent work of the student with the teacher – 1* *cr.* |
| Required and recommended prerequisites for joining the module | *Introduction to the specialty.* |
| Module objectives / intended learning outcomes | The course is intended for students of the OP "Energetics" the purpose of the discipline "Renewable Energy" is to create students' basic ideas about renewable energy, its importance in modern society, the history of its development, the impact on technical, social progress, the biosphere and ecology. |
| Content | Acquire knowledge: revealing to students the importance of renewable energy sources, and renewable energy as one of the subsystems of a single global system of functioning of human society in the formation of a scientific picture of the world and its role in the development of the country. |
| Examination forms | Skills: cognitive and practical abilities for which knowledge is used. |
| Study and examination requirements | - Competencies: students have the skills to choose modern equipment and devices for voltage regulation and reactive power compensation, as well as to analyze the efficiency and reliability of the electrical network and power systems with renewable energy sources. |
| Reading list | *1.Быстрицкий Г.Ф. Основы энергетики. Учебник для студентов вузов обучающихся по направлениям «Электротехника, электромеханика и электротехнология» и «Электроэнергетика». М.: ИНФРА-М. 2005.278 с.* *2.Веников В.А., Путятин Е.В. Введение в специальность. Электроэнергетика. Учебное пособие для электроэнергетических специальностей втузов. М.: Высшая школа.1988.239с.* *3.Веселовский О.Н., Шнейберг Я.А. Энергетическая техника и ее развитие. Учеб. пособие для энергетич. и электротехн. специальностей вузов. М.: Высшая школа. 1976. 304 с.* *4.Тонконогий А.В.,Аспандияров Б.Б. Энергетика Казахстана.Алма-Ата:Знание.1978.35с.* *5. Баймиров М.Е. Комбинированные автономные возобновляемые энергосистемы. - А.: «Эвро» 2011.* *6. Алхосов А.Б. Возобновляемые источники энергии. - М.: «МЭИ», 2011.* |

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| Module designation | *Technical Thermodynamics* |
| Semester(s) in which the module is taught | *5* |
| Person responsible for the module | *Umyshev Dias* |
| Language | *Russian, Kazakh* |
| Relation to curriculum | *elective*  |
| Teaching methods | *lecture, practical work* |
| Workload (incl. contact hours, self-study hours) | *5cr:* *lecture -30 h, practical work – 15 h. Siw-60h., siwl – 45h.* |
| Credit points | *5cr:* *lecture -2 cr, prartical work – 1 cr. Siw-1 cr., siwl – 1cr.* |
| Required and recommended prerequisites for joining the module | *Physics 3* |
| Module objectives / intended learning outcomes | *As part of the course, students study the main thermodynamic parameters: temperature, heat capacity, volume, pressure, enthalpy, entropy, as well as thermidanmic processes of Brynot, Rankine, Trinkler cycles.* |
| Content | *Thermodynamic parameters. Heat capacity. Enthalpy and entropy. Thermodynamic cycles. Thermodynamic processes. Isochoric, isobaric, isothermal processes. Brighton cycle. Rankine cycle.* |
| Examination forms | *Exam tickets* |
| Study and examination requirements | *Students should be able to calculate the thermodynamic cycles of gas turbine, steam turbine installations, and should also be able to determine the thermal efficiency of heat engines.* |
| Reading list | *1. Nashchokin V.V. Technical thermodynamics and heat transfer: Proc. allowance for non-energy. specialist. universities. -3rd ed., Rev. and additional - M.: Higher. school, 1980.- 472 p.**2. Chechetkin A.V., Zanemonets N.A. Heat engineering: Textbook for chemical-technol. specialist. universities. - M.: Higher. school, 1986. - 344 p.**3. Heat Engineering: A Textbook for Engineering and Technology. specialist. universities / Ed. A.P. Baskakova. - 2nd ed., revised. -M.: Energoatomizdat, 1991. - 224 p.**4. Kirillin V.A. and others. Technical thermodynamics: Uchebn. for heat power special. universities / Kirillin V.A., Sychev V.V., Sheindlin A.E. - 4th ed., revised. - M.: Energoatomizdat, 1983. - 416 p..* |

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| Module designation | *Boiler plants and steam generators* |
| Semester(s) in which the module is taught | *5* |
| Person responsible for the module | *Umyshev Dias* |
| Language | *Russian, Kazakh* |
| Relation to curriculum | *elective*  |
| Teaching methods | *lecture, practical work* |
| Workload (incl. contact hours, self-study hours) | *5cr:* *lecture -30 h, practical work – 15 h. Siw-60h., siwl – 45h.* |
| Credit points | *5cr:* *lecture -2 cr, prartical work – 1 cr. Siw-1 cr., siwl – 1cr.* |
| Required and recommended prerequisites for joining the module | *None* |
| Module objectives / intended learning outcomes | *To acquaint students with various designs of steam and hot water boilers that use both natural organic fuels and heat waste from various technological processes for their work;**Teach students to perform heat engineering, hydraulic and aerodynamic calculations of boiler units;**To acquaint students with the basics of operation of boiler units and the implementation of adjustment and research work.* |
| Content | *Boiler installation. Air path. Water path. Furnace chambers of boilers. Fuel preparation. Operation of the boiler plant. Calculation of the main elements of the boiler plant.* |
| Examination forms | *Exam tickets* |
| Study and examination requirements | *Students must independently understand the regulatory methods of calculation and apply them to solve the problem;**Student must be able to use programs of thermal and hydrodynamic calculation of elements of the boiler unit, search and analyze scientific and technical information on boiler technology, choose a boiler unit in accordance with the specified requirements for the parameters of the coolant or the characteristics of the energy source.* |
| Reading list | *1. Lipov Yu.M., Tretyakov Yu.M. Boiler plants and steam generators. - Moscow-Izhevsk: Research Center "Regular and Chaotic Dynamics", 2003, 592 pages.**2. Kibarin A.A., Orumbaev R.K., Khodanova T.V. Boiler installations of thermal power plants. Textbook // Almaty: AUES, 2015. - 119 p.**3. Thermal calculation of boilers (normative method). - St. Petersburg: NPO TsKTI, 1998. - 295 p. 4. Lipov Yu.M. Thermal calculation of a steam boiler: a textbook for universities / Yu.M. Lipov; Ed. V.V. Sapozhnikova.- M.: RHD, 2001.- 176 p.* |

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| Module designation | *Hydrogas dynamics of media in thermal power plants* |
| Semester(s) in which the module is taught | *6* |
| Person responsible for the module | *Umyshev Dias* |
| Language | *Russian, Kazakh* |
| Relation to curriculum | *elective*  |
| Teaching methods | *lecture, practical work* |
| Workload (incl. contact hours, self-study hours) | *5cr:* *lecture -30 h, practical work – 15 h. Siw-60h., siwl – 45h.* |
| Credit points | *5cr:* *lecture -2 cr, prartical work – 1 cr. Siw-1 cr., siwl – 1cr.* |
| Required and recommended prerequisites for joining the module | *None* |
| Module objectives / intended learning outcomes | *The purpose of mastering the discipline is to develop the skills of theoretical and experimental research in the mechanics of fluid and gas, and their use in the field of thermal power engineering.* |
| Content | *Basic concepts of fluid dynamics, basic concepts of fluid dynamics. Force of liquid and gas pressure on solid walls. Fundamentals of hydrodynamics. Bernoulli's equation for real fluid flow* |
| Examination forms | *Exam tickets* |
| Study and examination requirements | *Students must be able to calculate the hydrodynamic parameters of a liquid (gas) flow with an external flow around bodies and flow in channels (pipes), flow parts of hydro-gas-dynamic machines, carry out hydraulic calculation of pipelines, calculate temperature fields (fields of substance concentrations) in process fluid and gas flows* |
| Reading list | *1. Shterenlicht, D.V. Hydraulics [text]: a textbook for universities / D.V. Shterenlicht - M.: KolosS, 2008. - 655, p. – ISBN 5-9532-0142-7.**2. Lapshev N.N. Hydraulics [text]: textbook / N.N. Lapshev - M .: Academy, 2010. - 272, p. − ISBN 978-5-7695-6714-8.**3. Girgidov, D.A. Mechanics of fluid and gas (hydraulics) [text]: textbook for universities / D.A. Girgidov - St. Petersburg: Publishing House of the St. Petersburg State Polytechnical University, 2003. - 545, p. – ISBN 5-7422-0258-1.**4. Abramovich, G.N. Applied gas dynamics [text]: a textbook for universities / G.N. Abramovich - M.: Nauka, 1976. - 888, p.* |

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| Module designation | *Fundamentals of the theory of fuel combustion and combustion devices* |
| Semester(s) in which the module is taught | *6* |
| Person responsible for the module | *Umyshev Dias* |
| Language | *Russian, Kazakh* |
| Relation to curriculum | *elective*  |
| Teaching methods | *lecture, practical work* |
| Workload (incl. contact hours, self-study hours) | *5cr:* *lecture -30 h, practical work – 15 h. Siw-60h., siwl – 45h.* |
| Credit points | *5cr:* *lecture -2 cr, prartical work – 1 cr. Siw-1 cr., siwl – 1cr.* |
| Required and recommended prerequisites for joining the module | *None* |
| Module objectives / intended learning outcomes | *To acquaint with theories of thermal and chain explosion, ignition and propagation of flame, detonation and shock waves. To form knowledge of the conditions for the initiation and propagation of combustion, the conditions for the transition of combustion into an explosion, the parameters of combustion of gases, liquids and solid combustible materials. Ensure the assimilation of methods for calculating the volume and composition of combustion products, the heat and temperature of combustion, the main indicators of fire danger.* |
| Content | *Introduction to combustion theory. Basic concepts and definitions. The phenomena of combustion and explosion. General characteristics. Chemical thermodynamics of combustion and explosion. Calculation of thermal effects of combustion reactions. Kinetics of combustion and explosion reactions. Calculation of the rate of combustion reactions* |
| Examination forms | *Exam tickets* |
| Study and examination requirements | *Students should be able to calculate the theoretical amount of air needed to burn solid, liquid and gaseous fuels. Students must know the necessary conditions to ensure efficient combustion in combustion devices, and must also be able to calculate the theoretical volumes of substances formed during combustion.* |
| Reading list | *1. Frank-Kamenetsky D.A. Fundamentals of macrokinetics. Diffusion and heat transfer in chemical kinetics [Text]: [textbook-monograph] / D. A. Frank-Kamenetsky. - 4th ed. - Dogloprudny: Intellect, 2008. - 407 p.**2. Kukin P.P. Theory of combustion and explosion [Text]: a textbook for university students studying in the direction 280100 "Life safety" specialty 280101.65 "Life safety in the technosphere" / P. P. Kukin, V. V. Yushin, S. G. Emelyanov; State. educate. institution of higher prof. education "South-West. state. Unt", Ros. state technol. un-t im. K. E. Tsiolkovsky (MATI - RSTU). - Moscow: Yurayt, 2017. -435 p.**3. Ganopolsky, M.I. Results of experimental studies of air shock waves during explosions on the earth's surface [Electronic resource] - Electron. Dan. - Moscow: Mining Book, 2011. - 38 p. - Access mode: https://e.lanbook.com/book/1498.* |

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| Module designation | *Heat engines and GTU* |
| Semester(s) in which the module is taught | *6* |
| Person responsible for the module | *Umyshev Dias* |
| Language | *Russian, Kazakh* |
| Relation to curriculum | *elective*  |
| Teaching methods | *lecture, practical work* |
| Workload (incl. contact hours, self-study hours) | *5cr:* *lecture -30 h, practical work – 15 h. Siw-60h., siwl – 45h.* |
| Credit points | *5cr:* *lecture -2 cr, prartical work – 1 cr. Siw-1 cr., siwl – 1cr.* |
| Required and recommended prerequisites for joining the module | *Superchargers and heat engines* |
| Module objectives / intended learning outcomes | *Students must be able to know the designs of superchargers, indicators of the efficiency of the superchargers. Chill, calculate the load on the pump. The construction of heat engines such as gas turbines, steam turbines and internal combustion engines.* |
| Content | *Types of superchargers and heat engines. Features and principles of operation of heat egnines. Diagrams of installation of heat engines in the network. Technical and economic indicators.* |
| Examination forms | *Exam tickets* |
| Study and examination requirements | *Students should be able to calculate the thermodynamics parameters of heat engines and gas turbines. Students should be able to recognize schemes of different types of heat engines.* |
| Reading list | *1. Dobrokhotov Valentin Dmitrievich Centrifugal natural gas superchargers 1972.**2. Heat engines and superchargers. Lecture notes for bachelors studying in the specialty 5В071700 - "Heat Power Engineering". - Almaty: AUES, 2011. - 65 p.**3. Heat engines and superchargers : a textbook / V.I. Lyash-kov. – Tambov : Izd-vo Tamb. state techn. un-ta, 2009. – 124 p.* |

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| Module designation | *ERG 555 – Laboratory workshop on modern industrial technologies in the electric power industry II* |
| Semester(s) in which the module is taught | *6* |
| Person responsible for the module | *Shakenov Kalizhan* |
| Language | *Russian, Kazakh* |
| Relation to curriculum | *specialisation* |
| Teaching methods | *laboratory work* |
| Workload (incl. contact hours, self-study hours) | *5cr:* *laboratory work – 45h. student independent work (independent work of the student with the teacher) -60 h.* |
| Credit points | *5кр:* *laboratory work – 3 cr. student independent work (independent work of the student with the teacher) – 2 кр.* |
| Required and recommended prerequisites for joining the module | *Laboratory workshop on modern industrial technologies in the electric power industry I* |
| Module objectives / intended learning outcomes | *As part of the course, the student will master the practical use of the concept of converting electrical energy into other types of energy for the own needs of industrial enterprises with its simultaneous delivery in the required direction.**Students will acquire skills in the field of energy, as well as methods for working with various electrical devices and their research.* *Competencies: students know the structure of electrical installations and systems, the interconnections of their various links in the chain.* |
| Content | *Study of methods for switching on an asynchronous motor. Electromagnetic compatibility. Electric drive based on ATV31 and ATV71. Exploring the Habilis system. Reactive power compensation.* |
| Examination forms | *Exam tickets* |
| Study and examination requirements | *The student must be able to read diagrams and work on the stand and know the basic installations used in enterprises and the principle of operation of various systems.* |
| Reading list | *1. Shekhovtsov V.P. Electrical and electromechanical equipment. – M.: Forum: Infra-M, 2008. – 407p.**2. Katsman M. Electrical machines. M .: Higher School, 1990, - 463s.**3. Goldberg O.D., Helemskaya S.P. Electromechanics. - M.: Publishing Center. Academy, 2007. - 512 p.* |

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| Module designation | *ERG 525 – Electrical part of power stations*  |
| Semester(s) in which the module is taught | *6* |
| Person responsible for the module | *Abitayeva Rakhimash Shanrakbayevna* |
| Language | *Russian, Kazakh* |
| Relation to curriculum |  *elective*  |
| Teaching methods | *lecture, practical classes, independent work* |
| Workload (incl. contact hours, self-study hours) | *5* *cr:**Lecture - 15h, labor. -15 h., practical work - 15h., student independent work (independent work of the student with the teacher) -90 h.* |
| Credit points | *5 cr:**Lecture - 2* *cr, labor. -1cr., pract. - 1* *cr., student independent work -1* *cr, independent work of the student with the teacher – 1* *cr.* |
| Required and recommended prerequisites for joining the module | *Theoretical foundations of electrical engineering**Electrical Materials Science* |
| Module objectives / intended learning outcomes | *As part of the course, the student will master the practical use of the methods used to calculate short-circuit currents, as well as the choice of the section of tires, wires and cable cores.**Acquire knowledge: methods of generating electric energy; determining the power of transformers; issues of constructing power output circuits, switchgear circuits.**Skills: cognitive and practical abilities for which knowledge is used.**- Competencies: students know the design of electrical devices up to and above 1000 V; the choice of transformers and generators.**They know how to determine short-circuit currents and the choice of electrical devices, bus sections, wires and cable cores.**The choice of the scheme of RC,CN stations and substations, transformers and autotransformers.* |
| Content | *Characteristics of energy and electrical systems. Structural designs of overhead and cable power transmission lines. Replacement circuits of the network and transformers. Loss of power, voltage, electricity. Technical and economic indicators. The quality of electrical energy. Network connection diagram or network configuration.transformers and autotransformers.* |
| Examination forms | *Exam tickets, test control.* |
| Study and examination requirements | *Mandatory participation in training sessions according to the schedule, which determines the readiness for the lesson. In case of absence from the lesson, the student is obliged to notify the teacher within a day and explain the plan for self-study of the lesson:**- - mandatory reading of the submitted materials before the lesson;**- delivery of tasks on time. There are penalties of -10% for late delivery;**- 20% non-participation in the audience (for a good reason with supporting documents) - rating "F (Fail)";**- plagiarism and cheating during the execution of the task are not allowed;**- mandatory use of electronic gadgets in the classroom, which is welcome, but it is unacceptable to use them in the exam.* |
| Reading list | 1. *Электрооборудование электрических сетей, станций и подстанций. Под общей редакцией Немировского А.Е. Учебное пособие// М.: Вологда: Инфра-Инженерия, 2019.*
2. *Электроэнергетические системы и сети. Версия 1.0 [Электронный ресурс]: конспект лекций/ А. А. Герасименко, Е. С. Кинев, Т. М. Чупак. – Электрон. дан. (7 Мб). – Красноярск: ИПК СФУ, 2008.*
3. *Электроснабжение. Кудрин Б.И. – 2-ое изд., перераб и доп. –М.: Академия, 2012. 352с.*
4. *Электрические сети и системы. Абитаева Р.Ш., Онгар Б. Учебное пособие//Алматы.: Принт, 2020.*
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| Module designation | *ERG 504 - Laboratory workshop on modern industrial technologies in the electric power industry I* |
| Semester(s) in which the module is taught | *5* |
| Person responsible for the module | *Akhambaev Ruslan Sametovich* |
| Language | *Russian, Kazakh* |
| Relation to curriculum | *specialisation* |
| Teaching methods | *laboratory work* |
| Workload (incl. contact hours, self-study hours) | *5cr:* *laboratory work – 45h., student independent work (independent work of the student with the teacher) -60 h.* |
| Credit points | *5кр:* *laboratory work – 3 cr. student independent work (independent work of the student with the teacher) – 2 кр.* |
| Required and recommended prerequisites for joining the module | *Information and communication technologies, Existing competencies in electrical engineering.* |
| Module objectives / intended learning outcomes | *The key question is: what learning outcomes should students achieve within the module?**As a result of mastering the discipline " Laboratory workshop on modern industrial technologies in the electric power industry I " the student must:****know:****- The simplest programming languages;**- the principle of operation of the main elements of the ES;**- Fundamentals of industrial electronics;**- methods for regulating the parameters of the ES mode;****be able to:****- read electrical diagrams;**- work with computer programs;**- collect and analyze the received data;****master the skills:****Unity software environment Pro ;**- regulation of electrical equipment parameters;**- work with ES schemes.* |
| Content | *Variables Animation tables and operator screens, boolean variables - tables and screens, programming of travel and stops in automatic mode, inductive, capacitive and end sensors.* |
| Examination forms | *Exam tickets, test questions .* |
| Study and examination requirements | *- Availability of the appropriate requirements of the Unity program pro computer and computer technology;**- Availability of an Internet channel with a speed of at least 0.5 Mbps;**- Personal account with a photo of the face on the avatar and corporate mail on the Microsoft 365 platform;**- Attendance at scheduled classes.* |
| Reading list | 1. *Gustav Olsson , Gianguido Piani . Digital automation and control systems. - St. Petersburg: Nevsky Dialect, 2001. -* 557 *p.: ill.*
2. *Aristova, N. I. Industrial software and hardware on*

*Russian market for process control systems [Text ]: scientific publication / N.I. Aristova, A.I. Korneev. - M.: Nauchtehlitizdat , 2001. - 402 p. - Zagl . region : Industrial software and hardware in the domestic market for process control systems.*1. *Gell , P. Electronic devices with programmable components [Text ]: per. from fr. / P. Gell . - M. : DMK Press, 2001. - 176 p.*
2. *G.N. Gorbachev , E.N. Chaplygin. Industrial electronics. For university students / Ed. V.A. Labuntsova . – M.: Energoatomzdat , 1988. – 320 p.*
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| Module designation | *ERG 527 –* *Electrical machines* |
| Semester(s) in which the module is taught | *5* |
| Person responsible for the module | *Maldybayeva Tolkyn Sydykkyzy* |
| Language | *Russian, Kazakh* |
| Relation to curriculum | *compulsory discipline* |
| Teaching methods | *lecture, laboratory work, independent work* |
| Workload (incl. contact hours, self-study hours) | *5cr:* *Lecture - 30h, laboratory work - 15h. student independent work (independent work of the student with the teacher) -90 h.* |
| Credit points | *5cr:* *Lecture - 2* *cr, laboratory work - 1* *cr. student independent work -2 cr., independent work of the student with the teacher – 1 cr.* |
| Required and recommended prerequisites for joining the module | *Physics, Theoretical Foundations of Electrical Engineering**Existing competencies in electrical engineering.* |
| Module objectives / intended learning outcomes | *Key question: what learning outcomes should students achieve within the module?* *As a result of mastering the discipline "Electrical machines" the student should:* *be able to:**- carry out starting, speed control and disconnection from the mains of an electric machine;**- take down the main characteristics of electrical machines when testing them for suitability for operation;**- distinguish different types of electrical machines from each other by external signs**- choose and use mathematical models of electric machines and calculation methods;**- determine the main parameters of electrical machines modes of operation of a particular type when using them at various objects;**- to use applied programs for the calculation of electrical machines, their parameters and characteristics.* *know:**- basic types of electric machines and transformers and areas of their application;**- methods of measuring electrical and magnetic quantities;**- principle of operation of basic electrical machines and apparatus, their working and starting characteristics;**- Basic constructional design of electric machines;**- The laws of electromechanics and generalized electrical machine.* |
| Content | *study of the theoretical foundations of the transformer, DC and AC machines, their main parameters and characteristics in order to apply them in practice and prepare for the understanding of the course on electric drive.* |
| Examination forms | *Examination tickets, test questions.* |
| Study and examination requirements | *- Availability of a computer and computer equipment;**- Availability of an Internet channel with a speed of at least 0.5 Mbit/sec;**- Personal account with a photo of your face on the avatar and corporate e-mail on the Microsoft 365 platform;**- Attendance at classes according to the schedule.* |
| Reading list | 1. *Bespalov, V.Ya. electrical machines: Textbook for students of institutions of higher professional education / V.Y. Bespalov, N.F. Kotelenets. - Moscow: IC Academy, 2013. - 320 р.*
2. *2. Bruskin A.E. Electrical machines and micromachines: Textbook / A.E. Bruskin, A.E. Zokhorovich, V.S. Khvostov. - Moscow: Alliance, 2016. - 528 р.*
3. *3. Woldek, A. Electrical machines AC machines / A. Woldek. - St. Petersburg: Peter, 2010. - 350 р.*
4. *4. Ignatovich, V.M. Electrical machines and transformers: Textbook for Academic Bachelor / V.M. Ignatovich, Sh.S. Roiz. - Lyubertsy: Yurite, 2016. - 181 р.*
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| Module designation | ***ERG529-Power and electrical equipment*** |
| Semester(s) in which the module is taught | *5* |
| Person responsible for the module | *Abdissatar Berdibekov*  |
| Language | *kazakh, russian* |
| Relation to curriculum | *elective*  |
| Teaching methods | *lecture, practical classes, independent work* |
| Workload (incl. contact hours, self-study hours) | *Total workload: 5 credits**Lectures-30h, practical classes – 15h, independent work – 105h.* |
| Credit points | *5* |
| Required and recommended prerequisites for joining the module | *Theoretical foundations of electrical engineering,**Existing competencies in electrical engineering.* |
| Module objectives / intended learning outcomes | *The purpose of the course: students acquire knowledge on the basics and trends in the development of energy and electrical equipment industry.**As a result of mastering the discipline "Energy and electrical equipment", the student will know:**- the structure of power and electrical equipment systems;**- the principle of operation and the relationship between its various links of the main EO;**- areas of application of electro technological installations for various purposes;**- the composition of electricity consumers in various industries.**be able to:**- - calculate the energy parameters of the main elements of EO;**- use the principles of electrical energy conversion on various types of electrical installations;**possess skills:**- readings of basic electrical diagrams of EO;**- comparison of the energy characteristics of EOS for various purposes.* |
| Content | *Basic terms and definitions; classification of EO of industrial enterprises; Electrical equipment of general industrial installations; Electrical equipment of lifting and transport installations; Electrical equipment of metalworking machines; Electrical equipment of electro technological installations.* |
| Examination forms | *Exam tickets, test questions.* |
| Study and examination requirements |  *- Availability of a computer and computer equipment;**- Availability of an Internet channel with a speed of at least 0.5 Mbit/sec;**- Personal account with a photo of the person on the avatar and corporate mail on the Microsoft 365 platform;**- Attendance of classes according to the schedule.* |
| Reading list | *[1] Shekhovtsov V.P. Electrical and electromechanical equipment. – M.: Forum: Infra-M, 2008.**[2] Kudrin B.I. Electrical equipment of industry. –M.: "Academy", 2008.**[3] Rekus G.G., Electrical equipment of production. – M.: Higher School, 2007.**[4] Bolotov A.V., Shepel G.A. Electrotechnological installations. – M.: HSE, 1988.**[5] Sokolova E.M. Electrical and electromechanical equipment: General industrial mechanisms and household appliances. – M.: "Academy", 2005.* |

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| Module designation | *ERG 530 –«* *Power supply of enterprises»* |
| Semester(s) in which the module is taught | *5* |
| Person responsible for the module | *Maldybayeva Tolkyn Sydykkyzy* |
| Language | *Russian, Kazakh* |
| Relation to curriculum |  *elective*  |
| Teaching methods | *lecture, laboratory work, practical work, independent work* |
| Workload (incl. contact hours, self-study hours) | *5* *cr:**Lecture - 15h, labor. -15 h., practical work - 15h., student independent work (independent work of the student with the teacher) -90 h.* |
| Credit points | *5 cr:**Lecture - 2* *cr, labor. -1cr., pract. - 1* *cr., student independent work -1* *cr, independent work of the student with the teacher – 1* *cr.* |
| Required and recommended prerequisites for joining the module | *Physics**existing competencies in electrical engineering.* |
| Module objectives / intended learning outcomes | *Key question: what learning outcomes should students achieve in the module?* *As a result of mastering the discipline "* *Power supply of enterprises " the student should:****know:*** *- the basic element base of electronics;**- principles of operation of basic electronic devices;**- basic characteristics and parameters of electronic devices;**- electronic converters structure;**- reading electronic circuits;****be able to****:**- perform basic calculations of electronic devices;**- assemble circuits of electronic converters;**know how to:* *- apply methods of calculation of the most common electronic devices;**- work with electronic converters.* |
| Content | *Studying methods of calculation, design and optimization analysis of power supply systems, acquiring knowledge and practical skills in the reliable and safe operation of electrical equipment.* |
| Examination forms | *Examination tickets, test questions.* |
| Study and examination requirements | *- Availability of a computer and computer equipment;**- Availability of an Internet channel with a speed of at least 0.5 Mbit/sec;**- Personal account with a photo of your face on the avatar and corporate e-mail on the Microsoft 365 platform;**- Attendance at classes according to the schedule.* |
| Reading list | 1. *1. Sibikin U.D., Sibikin M.U., Yashkov V.A. Electric power supply of industrial enterprises and installations. - Moscow: Higher School, 2001. - 336 р.*
2. *2. Kireeva, E.A.; Orlov, V.V.; Starkova, L.E. Electrical power supply of the workshops at the industrial enterprises. - Energoprogress Scientific and Technical Foundation, 2003. - 120 р.*
3. *3. Kudrin, B.I. Electrical supply of the industrial enterprises. - Moscow: Intermet Engineering, 2005. -672 р.*
4. *4. Kudrin V.I., Prokopchik V.V. Electrical power supply of the industrial enterprises: Textbook for Universities, Minsk: Vyssh.shk.*
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| Module designation | *ERG 521-Heat and mass transfer equipment in heat power engineering* |
| Semester(s) in which the module is taught | *4* |
| Person responsible for the module | *Nygymanova Ainur* |
| Language | *kazakh* |
| Relation to curriculum |  *elective*  |
| Teaching methods | *lecture, practice* |
| Workload (incl. contact hours, self-study hours) | *5* *cr:**Lecture - 30h, practical work - 15h., student independent work (independent work of the student with the teacher) -105 h.* |
| Credit points | *5 cr:**Lecture - 2* *cr, hands-on training work - 1* *cr., student independent work -1* *cr, independent work of the student with the teacher – 1* *cr.* |
| Required and recommended prerequisites for joining the module | *existing competencies in Thermal power engineering* |
| Module objectives / intended learning outcomes | *The key question is: what learning outcomes should students achieve within the module?* *As part of the course, the student will master the practical use of knowledge in the field of heat and mass exchange devices and processes. Basic knowledge and skills in the field of drying, heating, cooling of various media and heat carriers will be presented**After completing the course, the student must demonstrate the ability to analyze, synthesize and design. To define the basic concepts and terminology of the fundamental laws of heat and mass transfer, which are the basis for the functioning of heat exchangers, ideas about the working processes occurring in heat exchangers, about the properties of working bodies and heat carriers.* *The student should be able to: calculate heat exchange processes; determine the main criteria for heat exchange; heat transferred from one body to another. At the end of the course, the student should know: the basics of heat exchange processes; the main types of heat exchangers; the main criteria for choosing certain devices; design features of various heat exchangers.* |
| Content | *The main provisions of thermal conductivity. Thermal conductivity in stationary mode. Fundamentals of similarity theory and modeling. Convective heat exchange. Heat transfer during forced longitudinal washing of a flat surface. Heat transfer during forced transverse washing of pipes and bundles of pipes. Heat transfer during forced fluid flow in pipes. Heat transfer during the free movement of the liquid. Heat exchange during condensation of pure steam. Heat exchange during boiling of single-component liquids. Heat exchange by radiation.* |
| Examination forms | *Exam tickets, test control.* |
| Study and examination requirements | *The student must come prepared for lectures and practical classes. Timely protection and full performance of all types of work (practical and independent) is required. The student should not be late and miss classes, be punctual and mandatory. It is planned to reduce the maximum score by 10% for untimely work. If a student is forced to skip the intermediate certification for good reasons, they must warn the teacher in advance before it, so that there is an opportunity to pass the boundary control in advance. Skipping an exam for a disrespectful reason deprives you of the right to take it. If you miss the exam for a good reason, a special permit is issued and the date, time and place of the exam are assigned.* |
| Reading list | *1. F. F. Tsvetkov, B. A. Grigoriev. Teplomassoobmen, Moscow: Mei publishing house,2005.-550s**2.V. P. Isachenko, V. A. Osipova, A. S. Sukomel. Teploperedacha, Publishing House "Energy", Moscow-114, 1975.**3. M. A. Mikheev, I. M. Mikheeva. Fundamentals of thermoperedachi, energy production, Moscow, 1977**4. Nygymanova A. S." theoretical foundations of heat engineering", specialty 0907000-" Thermal Engineering heating equipment and heat supply systems (by type)", educational literature**5. Girgidov A.D. technical mechanics of gas and gas. nodded., St. Petersburg State Technical University, 1999 -395 P**6. Altschul A. D. hydraulic propulsion. - 2nd ed.Moscow: Nedra publ., 1982. -223 P.**7. F. M. Kosterev, V. I. Kushnyrev. Theoretical foundations of thermal engineering. Moscow: Energiya publ., 1978. – 360 P.* |

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| Module designation | *Life safety* |
| Semester(s) in which the module is taught | *3 и 4* |
| Person responsible for the module | *Shevtsova Vladlena Stepanovna* |
| Language | *Russian* |
| Relation to curriculum |  ***elective / specialisation*** *Names of other study programmes with which the module is shared* |
| Teaching methods | *Lecture* |
| Workload (incl. contact hours, self-study hours) | *1 credit:* *lecture-15 hours, Independent Work -15hours.* |
| Credit points | *1 credit:**lecture-15 hours, Independent Work -15hours.* |
| Required and recommended prerequisites for joining the module | *No* |
| Module objectives / intended learning outcomes | *Key question: What learning results should students achieve?* *As a result of mastering the discipline "Life safety", the student must:****know****:**- a culture of safety, consciousness and risk assessment, in which safety issues are considered as the most important priorities of human life;**- a culture of professional safety, the ability to identify hazards and assess risks in the field of their professional activities;**- willingness to apply professional knowledge to minimize negative production factors, ensure safety and improve working conditions in the field of their professional activities;**- motivation and ability to independently improve the level of life safety culture;**- ability to substantiate their decisions in terms of life safety.****be able to:****- logically and consistently identify the dangers that surround him and his environment;**- work with legal documents in the field of life safety;**- develop measures to reduce risks for their own and public safety, including production.* |
| Content | *Module "Life safety"; Sections: Risk assessment analysis. Types and working conditions; Identification and impact on humans of harmful and dangerous environmental factors; Physical factors (noise, vibrations, electromagnetic fields). Protecting humans and the environment from negative production factors; Providing comfortable conditions for human life and activity. Life safety management; Emergencies at radiation and chemical hazardous facilities. Ways to protect the population in emergency situations; Liquidation of consequences of emergency situations; Electrical safety. Fire safety; Responsibility for violation of the requirements of legislation in the field of life safety.* |
| Examination forms | *Exam tickets, test questions.* |
| Study and examination requirements | *- Availability of a computer and computer equipment;**- Availability of an Internet channel with a speed of at least 0.5 Mbit/sec;**- Personal account with a photo of the person on the avatar and corporate mail on the Microsoft 365 platform;**- Attendance of classes according to the schedule.* |
| Reading list | *1. Life safety: a short course of lectures / Comp.: A.V. Khizov, I.I. Kuzmin // Saratov State Agrarian University. - Saratov, 2017. - 61 p.**2. Theory of activity safety: a textbook for bachelors of the direction 20.03.01 "Technospheric safety" / O. N. Rusak. - St. Petersburg: SPbGLTU, 2015. - 48 p.**3. Life safety [Electronic resource]: textbook. for universities / E. A. Arustamov [and others]; Ed. E. A. Arustamova. - 10th ed., revised. and additional - M. : Dashkov i K, 2006. - 476 p. - ISBN 5-94798-832-1.**4. Shevtsova V. S. Organizational and legal foundations of life safety: Proc. allowance. - Almaty: KazNRTU, 2021. - 121 p.* |

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| Module designation | *Installation, adjustment and operation of electrical equipment* |
| Semester(s) in which the module is taught | *3* |
| Person responsible for the module | *Shakenov Kalizhan* |
| Language | *Russian* |
| Relation to curriculum | *elective*  |
| Teaching methods | *lecture, laboratory work* |
| Workload (incl. contact hours, self-study hours) | *5cr:* *lecture -30 h, laboratory work – 15 h. Siw-60h., siwl – 45h.* |
| Credit points | *5cr:* *lecture -2 cr, laboratory work – 1 cr. Siw-1 cr., siwl – 1cr.* |
| Required and recommended prerequisites for joining the module | *None* |
| Module objectives / intended learning outcomes | *As part of the course, the student will acquire knowledge on the practical application of advanced industrial methods of installation, commissioning, and operation of electrical equipment.**Students will acquire skills in the installation, adjustment of various types of electrical installations.* *Competences: students know modern methods of organizing and performing installation, commissioning and maintenance of electrical installations and automation equipment based on energy regulatory documents.* |
| Content | *General issues of installation and operation of electrical installations and electrical equipment. Installation of electrical equipment. Installation of electrical equipment of transformer substations and distribution devices. Installation of complete transformer substations and distribution devices. Operation, maintenance and repair of electrical equipment.* |
| Examination forms | *Exam tickets* |
| Study and examination requirements | *The student must be able to perform installation, commissioning of various types of electrical installations and know systemic, integrated approaches to solving issues of selection, placement of equipment, installation, commissioning and operation of electrical equipment.* |
| Reading list | *1. Sibikin Yu.D. Installation, operation and repair of electrical equipment. M.: Higher school, 2003. - 462 p.**2. Kutsenko G.F. Installation, operation and repair of electrical installations. - Minsk: Design PRO, 2003. - 272 p.**3. Batitsky V.A. Installation, adjustment and operation of automation systems. – M.: Nedra, 1986. – 224 p.* |

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| Module designation | *Digital control systems for electric drives* |
| Semester(s) in which the module is taught | *3* |
| Person responsible for the module | *Shakenov Kalizhan* |
| Language | *Russian* |
| Relation to curriculum | *elective*  |
| Teaching methods | *lecture, laboratory work* |
| Workload (incl. contact hours, self-study hours) | *5cr:* *lecture -30 h, laboratory work – 15 h. Siw-60h., siwl – 45h.* |
| Credit points | *5cr:* *lecture -2 cr, laboratory work – 1 cr. Siw-1 cr., siwl – 1cr.* |
| Required and recommended prerequisites for joining the module | *None* |
| Module objectives / intended learning outcomes | *As part of the course, the student will master the knowledge of building and implementing modern digital control systems for electric drives.**Students will acquire skills in the field of control systems for electric drives in industrial enterprises.* *Competencies: students know the methods of calculating and constructing the characteristics of electric drives and the choice of their control systems.* |
| Content | *Structure of digital control systems. Description of processes in the digital control system. Synthesis of regulators of a digital control system. Operation of the PI controller. Sequential correction and subordinate regulation.* |
| Examination forms | *Exam tickets* |
| Study and examination requirements | *The student must be able to calculate and select the power and control elements of an automated digitally controlled electric drive and know the design, principle of operation, methods of regulating the speed of digitally controlled electric drives.* |
| Reading list | *1. Anuchin A.S. Electric drive control systems. — M.: MEI, 2015. — 373 p.**2. Alekseev K.B., Palaguta K.A. Microcontroller control of the electric drive. M.: MGIU, 2008. - 298 p.**3. Digital control systems for electric drives. Ed. HELL. Teachers. - Kryvyi Rih: GVUZ "KNU", 2014. - 159 p.* |

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| Module designation | *ERG 519 - Theoretical fundamentals of heat engineering* |
| Semester(s) in which the module is taught | *3* |
| Person responsible for the module | *Nygymanova Ainur* |
| Language | *kazakh* |
| Relation to curriculum |  *elective*  |
| Teaching methods | *lecture, practice* |
| Workload (incl. contact hours, self-study hours) | *5* *cr:**Lecture - 30h, practical work - 15h., student independent work (independent work of the student with the teacher) -105 h.* |
| Credit points | *5 cr:**Lecture - 2* *cr, hands-on training work - 1* *cr., student independent work -1* *cr, independent work of the student with the teacher – 1* *cr.* |
| Required and recommended prerequisites for joining the module | *existing competencies in Thermal power engineering* |
| Module objectives / intended learning outcomes | *The key question is: what learning outcomes should students achieve within the module?**As part of the course, the student will master the practical use of knowledge in the field of heat engineering and energy. Basic knowledge and skills in the field of heat engineering, as well as methods of calculation and design of heat engineering devices will be presented.**After completing the course, the student must demonstrate the ability to analyze, synthesize and design To determine the basic concepts and terminology of the fundamental laws of heat engineering, which are the basis for the functioning of heat machines and apparatuses, ideas about the working processes occurring in heat machines and their efficiency, about the properties of working bodies and heat carriers, as well as calculate costs.**The student should be able to: calculate heat exchange processes; determine the main criteria; heat transferred from one body to another.* *At the end of the course, the student should know: fundamentals of heat exchange processes; criteria of convective heat exchange; criteria of radiant heat exchange; criteria of thermal conductivity.* |
| Content | *Introduction. Thermodynamic systems and thermodynamic parameters. The main provisions of thermal conductivity. Unambiguity conditions. Convective heat exchange. Simulation of convective heat transfer. Similarity equations. Heat exchange during flow. Heat exchange during turbulent flow. Heat exchange by radiation. Heat exchangers. The first law of thermodynamics. Entropy and gases. Real gases are water vapor and air.* |
| Examination forms | *Exam tickets, test control.* |
| Study and examination requirements | *The student must come prepared for lectures and practical classes. Timely protection and full performance of all types of work (practical and independent) is required. The student should not be late and miss classes, be punctual and mandatory. It is planned to reduce the maximum score by 10% for untimely work. If a student is forced to skip the intermediate certification for good reasons, they must warn the teacher in advance before it, so that there is an opportunity to pass the boundary control in advance. Skipping an exam for a disrespectful reason deprives you of the right to take it. If you miss the exam for a good reason, a special permit is issued and the date, time and place of the exam are assigned.* |
| Reading list | *1. Loytsyansky L. G. mechanics of zhidkosti and Gaza. - 7-e nodded. Moscow: Drofa publ., 2003. -840 P.**2. Shvydky V. S., Yaroshenko Yu. G., I. D. The mechanics of fire and gas. Educational aid for universities, 2003. - 464 P.**3. V. P. Isachenko, V. A. Osipova, A. S. Sukomel. Teploperedacha, Energy Publishing House, Moscow-114, 1975**4.M. A. Mikheev, I. M. Mikheeva. Fundamentals of thermoperedachi, energy production, Moscow, 1977**5. Nygymanova A. S." theoretical foundations of heat engineering", specialty 0907000-" thermal and technical heating equipment and heat supply systems (by type)", educational literature**6. F. M. Kosterev, V. I. Kushnyrev. Theoretical foundations of thermal engineering. Moscow: Energiya publ., 1978. – 360 P.**7. F. F. Tsvetkov, B. A. Grigoriev. Teplomassoobmen, Moscow: Mei publishing house,2005.-550s* |

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| Module designation | *Ecology and sustainable development* |
| Semester(s) in which the module is taught | *3 и 4* |
| Person responsible for the module | *Еликбаев Бахытжан Кошкинбаевич* |
| Language | *Kazakh (Qazaq)* |
| Relation to curriculum |  ***elective / specialisation*** *Names of other study programmes with which the module is shared* |
| Teaching methods | *lecture* |
| Workload (incl. contact hours, self-study hours) | *1 credit:* *lecture-15ч, Independent Work -15ч.* |
| Credit points | *1 credit:* *Лекция-15ч, . Independent Work -15ч.* |
| Required and recommended prerequisites for joining the module | *No* |
| Module objectives / intended learning outcomes | *Key question: What learning outcomes should students achieve Key question: What learning outcomes should students achieve within the module?**As a result of mastering the discipline "Ecology and sustainable development", the student must:****know****:**-the main patterns that determine the interaction of living organisms with the environment;**- basic principles of nature protection and rational use of natural resources;**- socio-ecological consequences of anthropogenic activities;**- the concept, strategies, problems of sustainable development and practical approaches to their solution at the global, regional and local levels.****be able to:****- identify and analyze natural and anthropogenic environmental processes and possible ways to regulate them;**- to use the acquired knowledge about the laws of interaction between living organisms and the environment in practical activities to preserve sustainable development.****possess skills****:**-definition of modern strategies for the sustainable development of mankind, aimed at the systematic change of traditional forms of management and lifestyle of people in order to preserve the stability of the biosphere and the development of society without catastrophic crises.* |
| Content | *Module "Ecology and sustainable development"; Sections; Ecology of individuals, Ecology of populations, Ecology of communities; the biosphere and its sustainability; global environmental problems; sustainable development: concept, indicators, goals of sustainable development; ways to achieve sustainable development: green economy, green technologies and efficient use of natural resources; environmental institutions; actual environmental problems and measures for sustainable development of the Republic of Kazakhstan.* |
| Examination forms | *Exam tickets, test questions.* |
| Study and examination requirements | *- Availability of a computer and computer equipment;**- Availability of an Internet channel with a speed of at least 0.5 Mbit/sec;**- Personal account with a photo of the person on the avatar and corporate mail on the Microsoft 365 platform;**- Attendance of classes according to the schedule.* |
| Reading list | *Экология және тұрақты даму оқулық / М.С. Тонкопий, Г.С. Сатбаева, Н.П. Ишкулова [и др.].- Алматы: Экономика, 2014.- 316 б.**Баешова А.Қ.Экология және тұрақты даму : оқу құралы. Алматы: Қазақ ун-ті, 2013. - 152 б.: - ISBN 978-601-247-218-9.**Бейсенова Р.Р. Экология және тұрақты даму пәнінен лекциялар жинағы. Астана, 2010. — 223 б.**Әлинов М.Ш. Экология және тұрақты даму. Алматы: Бастау, — 2012. — 272 б. ISBN 978-601-7275-58-7.**Нұрғызарынов А. Экология және тұрақты даму. Астана: Фолиант, 2014. — 344 б.**Тонкопий М.С., Сатбаева Г.С., Имкулова Н.П., Анимисова Н.М. Экология және тұрақты даму: оқулық: ҚР Білім және ғылым м-гі. Алматы: ЖШС РПБК «Дәуір», 2011 – 312 б.*  |

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| Module designation | LNG10432 ‘Russian language. Academic degree (В1)’ |
| Semester(s) in which the module is taught | 1 and 2 |
| Person responsible for the module | Mukhataeva A. |
| Language | Russian |
| Relation to curriculum | Compulsory  |
| Teaching methods | practical classes, IWS, IWST |
| Workload | 3 credits: practical classes – 3 times per week (2-offline, 1-online). Additionally, contact hours are held for 30 minutes per group. |
| Credit points | 3 credits |
| Required and recommended prerequisites for joining the module | The student passed the diagnostic test. The student successfully completed the previous level of the discipline and was transferred further according to the level-by-level system of education. The student registered for the course on the SSO portal in a timely manner, taking into account the prerequisites. |
| Module objectives / intended learning outcomes | The student **must be able to:** After completing the course **‘Russian language. Academic level (B1)’** the student **must** **demonstrate** *the ability to analyze, synthesize, express judgments, give an adequate assessment, self-assessment; to solve real communicative tasks.* At the end of the course the student **should know:** *how to conduct business negotiations, draw up documents correctly, extract the necessary information from texts, compose texts in a scientific and professional way; how to apply the acquired theoretical knowledge and practical skills in professional and interpersonal speech, which contributes to the effective training of specialists with engineering education.* |
| Content | Course **‘Russian language. Academic level (B1)’** is represented by 13 topics, the *content* of which is aimed at enhancing and systematizing knowledge, skills in reading, listening, speaking, writing, the formation of speech skills in various types of speech activity on the material of socio-political, socio-cultural, educational-professional areas. |
| Examination forms | Subject **‘Russian language. Academic level (B1)’** –A written exam includes: 1. Test on the studied material. 2. Drawing up personal official business documents. 3. Writing an essay on a given topic (120-150 words). |
| Study and examination requirements | **Requirements for training:****Late delivery policy:**  The student must be prepared for practical classes. Timely protection and full performance of all types of work (practical and independent) are required. The student should not be late and miss classes, be punctual and obligatory. There is a 10% reduction in the maximum score for late submissions. If you are forced to miss the intermediate certification for good reasons, you must notify the teacher in advance so that you have the opportunity to pass, pass the boundary control in advance. Missing an exam for an unexcused reason deprives you of the right to take it. If you miss an exam for a good reason, a special permit is issued and the date, time and place of the exam are set.**Class Attendance Policy:** The student should not be late and miss classes, be punctual and obligatory. The student must come prepared for practical classes. It requires timely delivery of practical work, the full implementation of all types of work (practical and independent).**Academic Conduct and Ethics Policy:** Be tolerant and respect other people's opinions.  Formulate objections in the correct form.*Plagiarism and other forms of dishonest work are unacceptable*. Prompting and cheating during exams, passing an exam for another student are not allowed. A student found to falsify any course information will receive a final grade of ‘F’. *Activity* in practical classes is mandatory and is one of the components of your final score / grade. Missing a class can affect your academic performance and final grade. Every *two late arrivals* and/or departures before the end of the class for any reason *will be counted as one missed class.* However, class attendance does not in itself mean an increase in points. Your constant *active participation* in the classroom is required. A mandatory requirement of the course is preparation for each lesson. It is necessary to view the indicated sections of the textbook and additional material not only in preparation for practical exercises, but also before attending the corresponding lecture. Such preparation will facilitate your perception of new material and will contribute to your active acquisition of knowledge within the walls of the university. As part of the training in the discipline, any manifestations of corruption in any form are unacceptable. The organizer of such actions (teacher, students or third parties on their behalf) bear full responsibility for violation of the laws of the Republic of Kazakhstan. **Help**: For advice on the implementation of independent work, their delivery and protection, as well as for additional information on the material covered and all other questions about the course being taught, please contact the teacher during his office hours or via electronic means of communication around the clock. **For distance learning**: Mandatory participation in training sessions according to the schedule, which determines the readiness for the lesson. In case of absence from the lesson, the student is obliged to notify the teacher within 24 hours and explain the plan for independent study of the lesson. - mandatory reading of the presented materials before class;  - Submission of assignments on time. There are -10% penalties for late delivery;  - 20% absence on practical classes – grade ‘F (Fail)’ - plagiarism and cheating when completing a task are unacceptable  - Mandatory use of electronic gadgets in the classroom, which is welcome, but use in the exam is unacceptable.  - Any form of corruption in any form is unacceptable within the framework of discipline training. The organizer of such actions (teacher, students or third parties on their behalf) bear full responsibility for violation of the laws of the Republic of Kazakhstan.**Exam requirements:****a) Before the exam:** - Prepare a workplace: to pass a remote exam, a student must have a stationary computer (desktop) or portable (laptop) with a webcam (built-in or external) and an Internet connection speed of at least 500 kbps. The absence of these funds in the remote exam means the non-admission of a student with an F (Fail) grade.  - The student can use the computer in the university library, but it is recommended to take a seat 30 minutes before the exam and bring your own headphones (headphone). Entrance to the university only with a student card, a mask and no temperature.**b) During the exam:** - It is forbidden to turn off the cameras, get up from your seat, talk to strangers.  - It is necessary to observe the principle of academic honesty, since in case of serious suspicions that the student performed this work on his own, the teacher or proctor has every right to remove the student from the exam with an F (unsatisfactory) grade.  - If, when writing an exam, a student has serious technical problems with an online connection to the exam class for a long time, the teacher has the right to schedule a re-exam with a different exam task. Re-scheduling an exam for technical reasons is provided only 1 time!**C) At the end of the exam:** - It is necessary to hand over the answer sheet to the teacher on time, so if the student is not sure about the quality of the Internet connection, then the transfer should be started in advance. The teacher has the right not to accept the answer sheet after the exam has expired and give you an F (fail) grade.  - There are no additional tasks for the exam to increase the grade if it is low.  - In case the student does not agree with the grade received, he/she has the right to appeal within 2 days after the final score is posted in the electronic journal on the SSO portal. |
| Reading list | **‘Russian language. Academic level (B1)’:** 1. Aksarina N. Technology of scientific text preparation: ump. – M., 2014. – 112 p. 2. Demidova A. Scientific style of speech. Formulation of scientific work. – M., 2012. – 201 p. 3. Kolesnikova N. From abstract to dissertation – M., 2012. - 285 p. 4. Salagaev V. Specificity of business documents. – Almaty, 2015. – 340 p. 5. Shayakhmetova N. Russian language. Scientific style training – Almaty.: "Evero", 2007. – 189 p. 6. Altaeva A., Mukhamadiev Kh. Scientific style of speech of the Russian language in mining and metallurgy – Almaty, 2016. – 160 p. 7. Ovsienko Yu. Russian language. Middle stage of education – M.: 2008, pp. 223-231. |

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| Module designation | LNG10431 ‘Academic Kazakh language (В1)’ |
| Semester(s) in which the module is taught | 3 |
| Person responsible for the module | Omurzakova A.  |
| Language | Kazakh |
| Relation to curriculum | Compulsory |
| Teaching methods | practical classes, IWS, IWST |
| Workload | 3 credits: practical classes – 3 times per week (2-offline, 1-online). Additionally, contact hours are held for 30 minutes per group. |
| Credit points | 5 credits: practical classes – 3 cr., IWST – 2 cr. |
| Required and recommended prerequisites for joining the module | The student passed the diagnostic test. |
| Module objectives / intended learning outcomes | As a result of mastering the discipline ‘**Academic Kazakh language(B1)**’ the **student must**:  *- demonstrate the ability to analyze, synthesize, express judgments, give an adequate assessment, self-assessment;*  *- linguistic means to solve real communicative tasks;*  *- conduct business negotiations, draw up documents correctly, extract the necessary information from texts, compose texts in a scientific and professional way;*  *- must be able to apply the acquired theoretical knowledge and practical skills in professional and interpersonal speech, which contributes to the effective training of specialists with engineering education.* |
| Content |  Lexical and linguistic material (at the level of text and sentence) satisfies two main principles of language teaching: communicativeness and consistency.  The selection of linguistic material is determined by the importance of its functioning in the studied areas of communication. Lexical material is organized thematically.  The main unit of the organization of educational material is the text, which is of a cognitive and developmental nature, reflects the specifics of educational, popular science literature. |
| Examination forms | Exam tickets, test questions. |
| Study and examination requirements | - Availability of a computer and computer equipment; - Availability of an Internet channel with a speed of at least 0.5 Mbps; - Personal account with a photo of the face on the avatar and corporate mail on the Microsoft 365 platform; - Attendance at scheduled classes. |
| Reading list | 1. Suleymenova E., Anyktagysh Kazakh tili- Kazakh language, 1996. 2. Suleimenova E. Beinezhazba Kazakh tili- Kazakh language, 1996. 3. Khazimova A. Іs kaғazdaryn kazak tilinde zhүrgizu, 2004. 4. Bozbayeva-Hung A. T. Kazakh tili, 2017. 5. Zhaksylykova K. Kazakh tili (zhalgastyrushy money), 2008 |

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| Module designation | LNG10421 ‘Basic Kazakh language (А2)’ |
| Semester(s) in which the module is taught | 3 |
| Person responsible for the module | Koyanbekova S., Nurmukhan A’ |
| Language | Kazakh |
| Relation to curriculum | Compulsory  |
| Teaching methods | practical classes, IWS, IWST |
| Workload | 3 credits: practical classes – 3 times per week (2-offline, 1-online). Additionally, contact hours are held for 30 minutes per group. |
| Credit points | 5 credits: practical classes – 3 cr., IWST – 2 cr. |
| Required and recommended prerequisites for joining the module | The student passed the diagnostic test. |
| Module objectives / intended learning outcomes | As a result of mastering the discipline ‘**Basic Kazakh language (А2)**’ the student **must**:  - to master the practical use of the skills of reading, writing and understanding sounding speech based on the simultaneous development of the basics of grammar (phonetics, morphology and syntax) and word usage in the course of constant repeated repetition with a gradual complication of tasks;  - demonstrate the ability to analyze, synthesize and design skills and abilities corresponding to the all-European level B1 (Threshold according to the ALTE classification), that is, it is on the threshold of the level of independent language proficiency;  - have a conversation on everyday topics; describe your experiences; tell your opinion; retell and evaluate the content of a book read, a film seen;  - create simple texts on well-known topics, including those related to professional activities. |
| Content |  The language material of the course is selected in such a way that the student, learning the lexical and grammatical minimum, has the opportunity to get acquainted with typical communicative situations and find himself in such situations, be able to correctly assess them and choose the appropriate model (strategy) of speech behavior. In this case, the main emphasis of learning is transferred from the process of transferring knowledge to learning the ability to use the target language in the course of various types of speech activity, which are reading (subject to reading comprehension), listening (under the same condition) and the production of texts of a certain complexity with a certain degree of grammatical and lexical correctness. |
| Examination forms | Exam tickets, test questions. |
| Study and examination requirements | - Availability of a computer and computer equipment; - Availability of an Internet channel with a speed of at least 0.5 Mbps; - Personal account with a photo of the face on the avatar and corporate mail on the Microsoft 365 platform; - Attendance at scheduled classes. |
| Reading list |  1. Kazakh tili. Bazalyk money / Authors: G.K. Dosmambetova, A.K. Balabekov, A.T. Bozbayeva-Hung, A.Zh. Khazimova, B.O. Salykhova. Astana: Ulttyk testileu ortalygy, 2016 – 320 p. Қ 17 ISBN 978-601-7504-37-3 Sіlteme electrodes: <https://tilqural.kz/assets/books/0b2a5801ac721ebac75358f351c0dd33.pdf>  2. Kuzekova, G. Masakova. Kazakh style: Bazalyk money (A2): Oku kuraly. - Astana: 2018. – 224 p. Silteme electrodes: <https://tilqural.kz/assets/books/d76b6b1027365e54f79e08d1acbe3fd8.pdf>  3. Tanymger - 2. Learning Kazakh is easy! – Almaty: Mektep, 2011. – 192 p. vAK 80/81 66K 81.2 Kas-9  4. Z.S. Kuzekova, T.T. Ayapova, F.Sh. Orazbayeva, M.K. Mamaeva Kazakh tilin bazalyk dengeyde mengerudin deңgeylik takyryptyk lexical minima / Ekinshі basylym. - Astana: "Ulttyk testileu ortalygy" RMKK, 2017. – 72 p. |

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| Module designation | Philosophy |
| Semester(s) in which the module is taught | *3,4* |
| Person responsible for the module | *Mendybayev Serik Kukaevich* |
| Language | *Russian* |
| Attitude towards the curriculum | *Required Component**base* |
| Form of education | *lecture, practical exercises, SRO, SROP* |
| Workload (incl. contact hours, self-employment hours | *150 academic hours* *Lecture - 15 hours, practical classes - 30 hours. SRO (including SROP) - 105 hours* |
| Credit scores | *5 credits: contact - 3 (lecture - 1 credit, practice - 2 credits), non-contact - 2 credits (SROP, SRO)* |
| Module objectives/intended learning outcomes | ***The goal is to know and understand the specifics of philosophy as a science, as the basis for the formation and development of critical thinking and worldview, to see the vital and practical purpose of philosophy.****- to develop alternative ways of thinking and understanding to technocracy, the ability to see the universal, universal and valuable content in special scientific and vocational knowledge and cognition, to love and appreciate one's work, profession, to respect the work of other people**- understand philosophy as the ethics of personal and social life, work and knowledge, as the basis of the morality of society, culture**- to know the basic concepts, themes, schools and personalities of philosophy to master the historical experience of scientific critical and creative thinking****Skills and abilities (professional, managerial, communicative…) obtained during the course****- development of constructive critical thinking, outlook;**- the ability to effectively use modern technologies for the development of critical thinking in the future practice of scientific and professional activities;**- development of one's vision and understanding of the problems of life, society, practice, knowledge;**- be able to substantiate and defend one's views, position, conduct a discussion, debate, dialogue;**- development of a culture of professionalism, professional attitude to work, to practical life;**- the ability to argue and defend one's views, positions, to lead a discussion, a constructive dialogue, the ability to work in a team;**- development of personality skills, freedom and responsibility, social, political and business culture, religious tolerance and tolerance;* |
| Content | *Philosophy forms and develops critical and creative thinking, worldview and culture, provides students with knowledge about the most common and fundamental problems of being and endows them with a methodology for solving various theoretical practical issues. Philosophy expands the horizon of the student's vision of the modern world, forms citizenship and patriotism, contributes to the education of self-esteem, awareness of the value of human existence. It teaches how to think and act correctly, develops the skills of practical and cognitive activities, helps to seek and find ways and means of life in harmony with oneself, society, and the world around.* |
| Teaching methods | *In the classroom, technologies for the development of critical, creative and analytical thinking are used: case studies, essay writing, etc.* |
| Exam forms | *Exam tickets* |
| Tuition and Exam Requirements | *- availability of a computer and computer equipment;**- availability of an Internet channel with a speed of at least 0.5 Mbps;**- personal account with a photo of the face on the avatar and corporate mail on the Microsoft 365 platform;**- attendance at scheduled classes.* |
| References | Merab Mamardashvili My experience is not typical, St. Petersburg, Azbuka, 2000 www.yanko.lib.ru2 Bertrand Russell A History of Western Philosophyhttp://royallib.com/book/rassel\_bertran/istoriya\_zapodnoy\_filosofii.htm3 Skirbek G., Gilier N. History of Philosophy. M., Vlados, 20034 Philosophy. Textbook (under the editorship of V.D. Gubin and others) M., 20015 Golubintsev V.O. etc. Philosophy for technical universities. Rostov-on-Don, 2010,6 Modern Western Philosophy. Minsk, Book House, 2009 |

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| Module designation | *Theoretical foundations of electrical engineering* |
| Semester(s) in which the module is taught | *3 и 4* |
| The person responsible for the module | *Абдыкадыров Аскар Айтмырзаевич* |
| Language | *Kazakh (Qazaq)* |
| Attitude to the curriculum | ***Compulsory / elective / specialisation*** *Names of other study programmes with which the module is shared* |
| Teaching methods | *lecture* |
| Workload (incl. contact hours, self-employment hours) | *1 credit:* *lecture-15ч, Independent Work -15ч.* |
| credit scores | *1 credit:* *Лекция-15ч, . Independent Work -15ч.* |
| Necessary and recommended prerequisites for joining the module | *No* |
| Module objectives/expected learning outcomes | Key question is: what learning outcomes should students achieve within the module? As a result of mastering the discipline "Theoretical foundations of electrical engineering", the student must:**know:** - basic concepts and definitions, fundamental laws used in electrical engineering, properties and characteristics of electric and magnetic circuits; -methods of calculation of three-phase circuits;- device, operating principle, characteristics and research methods of transformers; -device, operating principle and characteristics of electric machines as a generator and motor; **be able to:** - be able to calculate electrical circuits by analytical and numerical methods, choose the best optimal calculation method, determine the main characteristics of the electrical circuit and give a physical justification for the results obtained; - turn on electrical appliances, apparatuses and machines, manage them and monitor their efficient and safe operation; -apply the knowledge gained in this discipline in practice to successfully solve.**possess skills :** The study of the discipline "Theoretical foundations of Electrical Engineering" is preceded by courses in such fundamental sciences as physics and mathematics. From the mathematics course, students should learn the following sections: solving systems of linear algebraic equations, the theory of complex numbers, the basics of differential integral calculus, vector algebra. From the physics course – electrostatic field, direct electric current, magnetic field, electromagnetic induction, magnetic properties of matter. |
| Content | The module Course "Theoretical foundations of electrical engineering" occupies an important place among general technical disciplines that determine the theoretical level of professional training of specialists in the modern training system. The main purpose of teaching the discipline "Electrical Engineering" is to master students' knowledge about electrical and magnetic phenomena and their use for practical purposes. This discipline is basic for understanding the automation processes of various production equipment, in which electrical and electronic devices are widely used. The course "Theoretical foundations of Electrical Engineering" provides comprehensive training for future specialists: a high professional level, the development of creative abilities, the ability to formulate and solve problems of the studied specialty at a high scientific level, the ability to creatively apply and independently improve their knowledge. |
| Examination forms | *Exam tickets, test questions.* |
| Requirements for training and exams | *- Availability of a computer and computer equipment;**- Availability of an Internet channel with a speed of at least 0.5 Mbit/sec;**- Personal account with a photo of the person on the avatar and corporate mail on the Microsoft 365 platform;**- Attendance of classes according to the schedule.* |
| Literature | 1. Atabekov, G.I. Theoretical foundations of electrical engineering. Linear electric circuits: A textbook / G.I.Atabekov. - 7th ed., ster. - St. Petersburg : Lan, 2009. - 592 p. - URL: https://e.lanbook.com/reader/book/90 2. Basharin, S.A. Theoretical foundations of electrical engineering: Theory of electric circuits and electromagnetic field: textbook. manual for students. higher. studies. institutions/ S.A. Basharin. - 4th ed., reprint. and additional - M.: Academy, 2010. - 368 p. (10 copies ) 3. Butyrin P.A., Korovkin N.V. Theoretical foundations of electrical engineering. Internet testing of basic knowledge. Moscow: Publishing House 'Lan', 2012. - 336 p. - URL: <https://e.lanbook.com/reader/book/3550> 4. Bychkov, Yu.A. Fundamentals of theoretical electrical engineering: A textbook.- St. Petersburg: Publishing house 'Lan', 2008. - 592 p. -URL: <https://e.lanbook.com/reader/book/36/#1> 5. Zhavoronkov, M.A. Electrical engineering and electronics: studies. manual for students. hr-th higher prof. education / M.A. Zhavoronkov. - 4th ed., ispr. - M.: Academy, 2011. - 400s. (10 copies) 6. Novozhilov, O.P. Electrical engineering and electronics: textbook for bachelors / O.P. Novozhilov. - 2nd ed., ispr. and add. - M.: Yurayt, 2013. - 653 p. (9 copies ) 7. Markelov, S.N. Electrical engineering and electronics: studies. manual / S.N. Markelov, B.Ya. Sazanov. - M.: Forum; INFRA-M, 2014. - 272 p. (7 copies) 8. Theoretical foundations of electrical engineering: In 3 volumes: Vol. 3. 4uchebnik for universities / K.S. Demirchyan, L.R.Neiman, N.V. Korovkin, V.L. Chechurin. - 4th ed. - St. Petersburg. : Peter, 2006. - 377 p. (5 copies ) 9. Collection of tasks on the basics of theoretical electrical engineering [Electronic resource]: textbook. manual / Yu.A. Bychkov [et al.]. - Electron. dan. - Saint Petersburg: Lan, 2011. - 400 p. -URL: https://e.lanbook.com/reader/book/703/#1 . |

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| Module designation | *Mathematics I* |
| Semester(s) in which the module is taught | *autumn semester (1 semester)* |
| Person responsible for the module | *Keltenova Raushan Turlybekova* |
| Language | *russian* |
| Relation to curriculum | *Compulsory*  |
| Teaching methods | *Lecture, practical classes, SRO* |
| Workload (incl. contact hours, self-study hours) | *5/1/0/2/2**Lecture – 15 credits**Practical classes – 30 credits* |
| Credit points | *Lecture – 15 credits**Practical classes – 30 credits* |
| Required and recommended prerequisites for joining the module | *No* |
| Module objectives / intended learning outcomes | *The key question is: what learning outcomes should students achieve within the module?**As a result of mastering the discipline "Mathematics I", the student must:****know:****-laws of operating with matrices and their application for solving systems of linear equations;**-definitions of the basic concepts: limit, derivative, differentials of various orders and be able to apply them to the study of functions;**-methods of finding extremums of functions, methods of studying their qualitative properties;**-Taylor's formula and the basic forms of residual terms;**-elements of analytical geometry: various equations of straight lines, equations of curves of the second order.****be able to:****- operate with matrices: perform arithmetic operations on them, search for inverse matrices;**- to find derivatives, differentials, extremes of functions of one variable, areas of monotony and areas of convexity and concavity, inflection points, build asymptotes; to find complete, partial derivatives and differentials, extremes of functions of several variables;**- apply Taylor's formula to approximate calculations;**- write out various types of equations of straight lines, second-order curves, find the angle between straight lines on the plane.* |
| Content | *Module "Mathematics I" sections: Linear algebra and analytical geometry; Introduction to analysis; Differential calculus of a function of one variable; Differential calculus of a function of several variables.* |
| Examination forms | *Exam tickets, test questions* |
| Study and examination requirements | *- Availability of a computer and computer equipment;**- Availability of an Internet channel with a speed of at least 0.5 Mbit/sec;**- Personal account with a photo of the person on the avatar and corporate mail on the Microsoft 365 platform;**- Attendance of classes according to the schedule.* |
| Reading list | *[1] Bugrov Ya.S., Nikolsky S.M. Higher Mathematics. M. Bustard. 2018 Vol.1-2.**[2] Kudryavtsev V.A., Demidovich V.P. A short course of higher mathematics – M.: AST, Astrel, 2001- 656 p**. [3] Berman G. N.B. Collection of problems on the course of mathematical analysis - St. Petersburg: Publishing House "Lan", 2017. - 492 p**.[4] Ryabushko A.P. Collection of individual tasks in higher mathematics. Ch. 1, 2, 3- Minsk.:Higher School, 2014**[5] Lungu K.N., Written D.T. Collection of problems in higher mathematics. - M.: Iris-press, 2020.* |

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| Module designation | Mathematics III |
| Semester(s) in which the module is taught | fall semester (1 semester) |
| Person responsible for the module | *Tulesheva Gulnara Alipovna* |
| Language | *russian* |
| Relation to curriculum | *Compulsory*  |
| Teaching methods | *Lecture, practical classes, SRO* |
| Workload (incl. contact hours, self-study hours) | *5/1/0/2/2**Lecture – 15 credits**Practical classes – 30 credits* |
| Credit points | *Lecture – 15 credits**Practical classes – 30 credits* |
| Required and recommended prerequisites for joining the module | *No* |
| Module objectives / intended learning outcomes | *The key question is: what learning outcomes should students achieve within the module?**As a result of mastering the discipline "Mathematics I", the student must:****know:****- definitions of the basic concepts of partial derivative, differential, directional derivative, gradient, divergence;**- methods for finding extremums of functions of many variables;**- Taylor 's formula and the basic forms of residual terms;**- definitions of multiples, curvilinear and surface integrals;**- formulas for calculating areas, volumes, formulas for calculating masses, moments and other physical quantities;**- various equations of straight lines and planes, methods for specifying surfaces and methods for finding normals and tangent planes to them.****be able to:****- calculate partial derivatives, find extremes of functions of many variables;**- apply Taylor's formula to approximate calculations;**- calculate multiples, curvilinear and surface integrals;**- apply integrals to solving problems of calculating areas, volumes, to calculating physical quantities (masses, charges, work of forces, etc.);**- apply linear algebra methods to solving systems of equations, vector algebra to solving problems of analytical geometry;**- be able to find and use the necessary literature.* |
| Content | *Module «Mathematics III» sections: Determinants; Elements of vector algebra; Functions of many variables; Partial derivatives; Chain rule and Differentiation of implicit functions; Extremes of functions of many variables; Lagrange multiplier method; Double integral and its properties; Triple integral; Surface integrals of the I kind; Surface integrals of the II kind; Vector field.* |
| Examination forms | *Exam tickets, test questions* |
| Study and examination requirements | *- Availability of a computer and computer equipment;**- Availability of an Internet channel with a speed of at least 0.5 Mbit/sec;**- A personal account with a photo of the person on the avatar and corporate mail on the Microsoft 365 platform (or personal account students);**- Conducting classes according to the schedule.* |
| Reading list | *[1] D. Written Preparing for the math exam, - Moscow: Iris Press, 2008 https://www.twirpx.com/file/1704111 /.**[2] Ryabushko A.P. Collection of individual tasks in higher mathematics. Ch. 1, 2, 3, - Minsk.: Higher School, 2013.**[3] Lungu K.N., Written D. T. Collection of problems in higher mathematics, Moscow: Iris-press, 2020.**[4] Danko P.E., Popov A.G., Kozhevnikov T.Ya. Higher mathematics in exercises and problems. In 2 h.Ch.I,2: - Peace and Education, 2020.* |

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| Module designation | *LNG 1086 Academic English 2* |
| Semester(s) in which the module is taught | *2* |
| Person responsible for the module | *Bukabayeva Bakytgul Erdesbayena* |
| Language | *English* |
| Relation to curriculum | *Compulsory*  |
| Teaching methods | *Practical classes* |
| Workload (incl. contact hours, self-study hours) | *General workload:**Contact hours:3*  |
| Credit points | *5 ECTS* |
| Required and recommended prerequisites for joining the module | *No* |
| Module objectives / intended learning outcomes | *-* The purpose of the course is to further develop and consolidate students’ knowledge and awareness of academic discourse, language structures, and lexis. It is focused on further developing reading, writing, listening and speaking skills, as well as encouraging learners to apply various approaches to deal with new vocabulary, improve grammatical skills, critical thinking and independent study.Upon successful completion of the course, students **will be able to**: **In Listening:**• Understand the key information and language of academic lectures and presentations• Understand how the lecture material is organized• Listen for the main points• Recognize signposting language• Identify supporting arguments• Take notes while listening**In Reading:**• Skim a text to understand its main idea, style, and purpose• Predict the content of a text• Scan a text for particular information• Evaluating different sources• Taking notes and using them to write a summary• Recognize definitions, explanations and examples**In Writing:**• Analyze paragraph structure• Recognize cohesion in a paragraph• Organize information in a logical way• Write topic, supporting and concluding sentences• Plan and write an essay• Understand references• Avoid plagiarism**In Speaking:**• Structure and signpost a short presentation• Give a short presentation and provide peer feedback• Offer and respond to opinions• Participate in a discussion• Use a text to support opinion• Compare and contrast |
| Content | Free trade and fair trade. Distinguishing between facts, speculation and reported opinions. Expressing certainty, uncertainty and caution. Recognizing what information is important. Identifying a point of view.Conserving the past. Establishing criteria. Dealing with longer texts. Indicating reason or result.Wonders of the modern world. Making inferences. How to make reading easier*Olympic business. Recognizing the structure of an interview.* *Making notes.*Communication and technology. Interpreting and translating |
| Examination forms | *Multivariate test* |
| Tuition and Exam Requirements | *Mandatory participation in training sessions according to the schedule, which determines the readiness for the lesson. In case of absence from the lesson, the student is obliged to notify the teacher within 24 hours and explain the plan for independent study of the lesson:**- mandatory reading of the presented materials before class;**-submitting assignments on time.**- 20% non-participation in classrooms (for a good reason with supporting documents) - grade "F (Fail)";**- plagiarism and cheating when completing a task are not allowed;**- mandatory use of electronic gadgets in the classroom, which is welcome, but use in the exam is unacceptable.* |
| Reference | *Required**1. Philpot Sarah. Headway Academic Skills: Reading, Writing, and Study Skills [Текст] : level 3: student`s b. / Philpot Sarah, Curnick Lesley. - Oxford : Oxford University Press, 2011. - 96 p. - ISBN 978- 0-19-474161-3 http://e-lib.satbayev.university/MegaPro/Download/MObject/102* *2. Harrison Richard. Headway Academic Skills: Listening, Speaking, and Study Skills [Текст] : level 3: student`s b. / Harrison Richard; ed. Lis and John Soars. - Oxford : Oxford Unіversіty Press, 2015. – 104 p. : ill. - ISBN 978-0-19-474158-3* [*http://elib.satbayev.university/MegaPro/Download/MObject/50*](http://elib.satbayev.university/MegaPro/Download/MObject/50)*Supplementary**Chazal Edward de. Oxford EAP: a course in English for Academic Purposes: Intermediate / B1+ [Текст] : student's b. / Chazal Edward de, Rogers Louis. - Oxford : Oxford Unіversіty Press, 2013. - 224 p. : ill. + DVD-ROM. - ISBN 978-0-19-400201-1. http://e- lib.satbayev.university/MegaPro/Download/MObject/12**2. Zemach E Dorothy. Academic Writing from paragraph to essay [Электронный ресурс] / Zemach E Dorothy, Rumisek A Lisa. - Oxford : Macmillan, 2005. - 133 p. : ill. - ISBN 1-4050-8606-8. http://e- lib.satbayev.university/MegaPro/Download/MObject/141**3. Dummett Paul. Oxford EAP. A course in English for Academic Purposes: Pre-Intermediate / B1. : textb. / Dummett Paul, Hird Jon. - Oxford : Oxford Unіversіty Press, 2015. - 176 p. : ill. + CD-ROM. - ISBN 978-0-19- 400208-0**http://e lib.satbayev.university/MegaPro/Download/MObject/11* |

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| Module designation | ***ERG176* Electrical and technical material science** |
| Semester(s) in which this module is taught | *2* |
| The person responsible for the module | *Khidolda Yerkin* |
| Language | Kazakh / Russian |
| Attitude to the curriculum | Required component, basic discipline |
| Teaching methods | Lecture and practical lesson |
| Workload (incl. contact hours, hours of independent work) | 2 hours of lectures, 1 hour for a practical lesson and 1 hour for an office IWST per week (total contact 45 hours and 15 hours for an office IWST) |
| Credit scores | *5* |
| Necessary and recommended prerequisites for joining the module | *The student must master the module "ERG104 - Introduction to specialty"* |
| Module objectives/expected learning outcomes | *The purpose of the course is to provide students with knowledge in the field of physics of processes occurring in magnetic, conductive, semiconductor and dielectric materials.**As a result of mastering the module, students will:**- know the properties of modern electrical materials, their application;**- to know the dependence of the reliability of the power system on the correct choice of electrical materials;**- be able to find the relationship between the structure of the substance and the properties that determine the further use of materials in energy;**- possess the skills of calculating parameters and selecting electrical materials for specific conditions of their application.* |
| Content | *The behavior of materials under the influence of magnetic, electric, thermal fields, as well as mechanical influences, the action of the environment is described. The classification of various electrical materials, the scope of their application and the requirements applied to them are given.* |
| Examination forms | *Written exam* |
| Requirements for training and exams | * Execution and protection of the SRS on schedule;
* Attendance of classes is mandatory according to the schedule;
* Mandatory passing of intermediate and boundary controls.
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| List of literature | 1. *Bekmagambetova К.Kh.* Electrical Materials Science*:* Study guide*. – Almaty:* publishing house *«Gylym», 2001 y.*
2. *Cherepakhin А.А.* Electrical engineering and structural materials science. Textbook*. –* Moscow*: Vischoye obrzovanye, 2017 y., - 349 p.*
3. *Yan P.Jones. Materials Science for Electrical and Electronic Engineers. –USA, Oxford University Press, 2001 – 354 p.*
4. *Dudkin А.N., Кim V.S* Electrical Materials Science*.* Moscow*:Lan, 2016 y.*
5. *Мoroz N.К. Electrical Materials Science. Учебник. –* Moscow*: Infra-Injenerya, 2019 y.*
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| Module designation | ***ERG158-* *Reading electrical diagrams*** |
| Semester(s) in which the module is taught | *2* |
| Person responsible for the module | *Abdissatar Berdibekov (kaz), (rus)* |
| Language | *kazakh, russian* |
| Relation to curriculum | *elective*  |
| Teaching methods | *lecture, practical classes, independent work* |
| Workload (incl. contact hours, self-study hours) | *Total workload: 6 credits**Lectures-15h, practical classes – 30h, independent work – 45h..* |
| Credit points | *6* |
| Required and recommended prerequisites for joining the module | *Physics 1**existing competencies in electrical engineering.* |
| Module objectives / intended learning outcomes | *The key question is: what learning outcomes should students achieve within the module?**As a result of mastering the discipline "Reading electrical circuits", the student must:**know:**-conditionally graphic, alphanumeric designations used in electrical circuits;**- basic rules for the execution of circuit diagrams, connection diagrams and connections;**- basic rules for the execution of location drawings and electrical drawings;**be able to:**- read circuit diagrams of power electrical equipment;**- read wiring diagrams and connections of electromechanical equipment;**-read location drawings and electrical drawings of electrical installations;**possess skills:**correct understanding and reading of various types of electrical circuits.* |
| Content | *General information about drawings and diagrams of electrical installations; Conventional graphic designations in electrical circuits; Regulatory documents and standards for the development of electrical circuits; General rules for the execution of circuits; Electrical structural, functional and schematic diagrams.* |
| Examination forms | *Exam tickets, test questions.* |
| Study and examination requirements |  *- Availability of a computer and computer equipment;**- Availability of an Internet channel with a speed of at least 0.5 Mbit/sec;**- Personal account with a photo of the person on the avatar and corporate mail on the Microsoft 365 platform;**- Attendance of classes according to the schedule.* |
| Reading list | *[1] Suvorin A.V. Electrical circuits of electrical installations.- Rostov n/A: Phoenix, 2016.**[2]Kamnev V.N. Reading of diagrams and drawings of electrical installations. - M.: Higher School, 1990.**[3] Technique of reading automatic control circuits and technological control / Edited by A.S. Klyuev. – M.: Energoatomizdat, 1991.**[4] Alexandrov K.K., Kuzmina E.G.Electrotechnical drawings and diagrams. – Moscow: Energoatomizdat, 1990.* |

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| Module designation | ***ERG175-* *Electrical and thermal measurements*** |
| Semester(s) in which the module is taught | *2* |
| Person responsible for the module | *Abdissatar Berdibekov*  |
| Language | *kazakh, russian* |
| Relation to curriculum | *elective*  |
| Teaching methods | *lecture, practical classes, independent work* |
| Workload (incl. contact hours, self-study hours) | *Total workload: 5 credits**Lectures-30h, practical classes – 15h, independent work – 30h.* |
| Credit points | *5* |
| Required and recommended prerequisites for joining the module | *Physics 1**existing competencies in electrical engineering.* |
| Module objectives / intended learning outcomes | *The key question is: what learning outcomes should students achieve within the module?**As a result of mastering the discipline "Electrical and thermal measurements", the student must:**know:**- basic concepts of metrology, physical quantities and units of measurement;**- general laws and rules of measurement;**- principles of construction of modern measuring devices and their capabilities;**- methods and means of measuring various quantities;**be able to:**- choose the right physical quantities when solving practical problems;**- to determine the errors of measurement results;**possess skills:**- selection of measuring instruments in accordance with the required accuracy and operating conditions;**- - research of metrological norms and rules in the field of professional activity.* |
| Content | *Physical properties and quantities; Measurement scales; Measurement and its basic operations; The main stages of measurements; Postulates of measurement theory; The concept of testing and control; System standards of physical quantities and their units; Basic concepts of error theory.* |
| Examination forms | *Exam tickets, test questions.* |
| Study and examination requirements |  *- Availability of a computer and computer equipment;**- Availability of an Internet channel with a speed of at least 0.5 Mbit/sec;**- Personal account with a photo of the person on the avatar and corporate mail on the Microsoft 365 platform;**- Attendance of classes according to the schedule.* |
| Reading list | *[1] Sergeev A.G., Krokhin V.V. Metrology. – M.: Logos, 2001.**[2] Zaitsev S.A. et al. Metrology, standardization and certification in the energy sector. –M.: "Academy", 2009.**[3] Metrology, standardization, certification and electrical measuring equipment. Edited by K.K.Kim.– St. Petersburg: Peter, 2006.**[4] Shishmarev V.Yu. Metrology, standardization, certification and technical regulation. – M.: "Academy", 2016.**[5] Yesenkulova Zh.Zh., Akanova Zh.Zh., Kasenova A.M. Standartau, certificattau zhane metrology negizderi.–Almaty: Ekonomika, 2014.**[6] Kirgizbaeva K.Zh. Metrologiya negizderi.-Kagandy: Medet Group, 2018.**[7] Rakhmanova J.S. Metrology.-Almaty: Evero, 2015.**[8] Zhanbyrov, Zh.G., Mashekov S.A. Metrologiya negizderi.- Almaty: Epigraph, 2016.* |

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| Module designation | *LNG 1086 Academic English 2* |
| Semester(s) in which the module is taught | *2* |
| Person responsible for the module | *Букабаева Бакытгуль Ердесбаевна* |
| Language | *английский* |
| Relation to curriculum | *Compulsory*  |
| Teaching methods | *Практическое занятие* |
| Workload (incl. contact hours, self-study hours) | *Общая рабочая нагрузка:**Контактные часы:3*  |
| Credit points | *5 ECTS* |
| Required and recommended prerequisites for joining the module | *-* The purpose of the course is to further develop and consolidate students’ knowledge and awareness of academic discourse, language structures, and lexis. It is focused on further developing reading, writing, listening and speaking skills, as well as encouraging learners to apply various approaches to deal with new vocabulary, improve grammatical skills, critical thinking and independent study.Upon successful completion of the course, students **will be able to**: **In Listening:**• Understand the key information and language of academic lectures and presentations• Understand how the lecture material is organized• Listen for the main points • Recognize signposting language• Identify supporting arguments • Take notes while listening**In Reading:**• Skim a text to understand its main idea, style, and purpose• Predict the content of a text• Scan a text for particular information• Evaluating different sources• Taking notes and using them to write a summary• Recognize definitions, explanations and examples**In Writing:**• Analyze paragraph structure• Recognize cohesion in a paragraph• Organize information in a logical way• Write topic, supporting and concluding sentences• Plan and write an essay • Understand references• Avoid plagiarism**In Speaking:**• Structure and signpost a short presentation• Give a short presentation and provide peer feedback• Offer and respond to opinions • Participate in a discussion• Use a text to support opinion • Compare and contrast |
| Module objectives / intended learning outcomes | Free trade and fair trade. Distinguishing between facts, speculation and reported opinions. Expressing certainty, uncertainty and caution. Recognizing what information is important. Identifying a point of view.Conserving the past. Establishing criteria. Dealing with longer texts. Indicating reason or result.Wonders of the modern world. Making inferences. How to make reading easier*Olympic business. Recognizing the structure of an interview.* *Making notes.*Communication and technology. Interpreting and translating |
| Content | *Многовариантный тест* |
| Examination forms | *Обязательное участие на учебных занятиях согласно расписанию, которая определяет готовность к занятию. В случае отсутствия на занятии студент обязан в течение суток известить преподавателя и объяснить план самостоятельного изучения занятия:**- обязательное прочтение представленных материалов до занятия;**- сдача заданий вовремя.* *- 20% неучастия в аудиториях (по уважительной причине с подтверждающими документами) - оценка «F (Fail)»;**- плагиат и списывание при выполнении задания не допустимы;**- обязательное использование электронных гаджетов на занятии, что приветствуется, но недопустимо использование на экзамене.* |
| Study and examination requirements | *Required**1. Philpot Sarah. Headway Academic Skills: Reading, Writing, and Study Skills [Текст] : level 3: student`s b. / Philpot Sarah, Curnick Lesley. - Oxford : Oxford University Press, 2011. - 96 p. - ISBN 978- 0-19-474161-3 http://e-lib.satbayev.university/MegaPro/Download/MObject/102* *2. Harrison Richard. Headway Academic Skills: Listening, Speaking, and Study Skills [Текст] : level 3: student`s b. / Harrison Richard; ed. Lis and John Soars. - Oxford : Oxford Unіversіty Press, 2015. – 104 p. : ill. - ISBN 978-0-19-474158-3* [*http://elib.satbayev.university/MegaPro/Download/MObject/50*](http://elib.satbayev.university/MegaPro/Download/MObject/50)*Supplementary**Chazal Edward de. Oxford EAP: a course in English for Academic Purposes: Intermediate / B1+ [Текст] : student's b. / Chazal Edward de, Rogers Louis. - Oxford : Oxford Unіversіty Press, 2013. - 224 p. : ill. + DVD-ROM. - ISBN 978-0-19-400201-1. http://e- lib.satbayev.university/MegaPro/Download/MObject/12**2. Zemach E Dorothy. Academic Writing from paragraph to essay [Электронный ресурс] / Zemach E Dorothy, Rumisek A Lisa. - Oxford : Macmillan, 2005. - 133 p. : ill. - ISBN 1-4050-8606-8. http://e- lib.satbayev.university/MegaPro/Download/MObject/141**3. Dummett Paul. Oxford EAP. A course in English for Academic Purposes: Pre-Intermediate / B1. : textb. / Dummett Paul, Hird Jon. - Oxford : Oxford Unіversіty Press, 2015. - 176 p. : ill. + CD-ROM. - ISBN 978-0-19- 400208-0**http://e lib.satbayev.university/MegaPro/Download/MObject/11* |

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| Module designation | Cultural science |
| Semester(s) in which the module is taught | Fall and Spring Semesters (1 and 2) Course 1 |
| Person responsible for the module | **Anassova Kalamkas Temirkulovna** |
| Language |  Russian |
| Relation to curriculum |  Required componentBasic discipline |
| Teaching methods | Lecture, practical classes, SRO, SROP |
| Workload (incl. contact hours, self-study hours) | 15 academic hoursLecture-15h |
| Credit points | 2 credits: contact - 1 (lecture - 1 credit), contactless - 1 credit (SROP, SRO) |
| Required and recommended prerequisites for joining the module |  The goal is to form ideas about culture as a social phenomenon, the development of a socio-humanitarian worldview as the basis for the modernization of social consciousness through the formation of cultural identity, the ability to analyze and assess cultural situations based on an understanding of the nature of cultural processes, the specifics of cultural objects, the role of cultural values ​ ​ in intercultural communication.  Tasks:- give students the necessary minimum of theoretical knowledge about the essence, structure, functions, mechanism and historical types of culture;- develop the ability to understand and respect various national-cultural concepts, to productive communication of representatives of different cultures;- help to navigate the world of cultural symbols, directions in art;- promote a harmonious combination of special and humanitarian knowledge, the formation of cultural orientations and personality attitudes;- give an objective assessment of the national cultural heritage from the standpoint of maintaining the status of Kazakh culture, the Kazakh language and their role in the formation of cultural and national identity;- assess the state of modern Kazakh culture, identify and justify the prospects for its development and areas of modernization; to build programs of professional activities taking into account cultural characteristics; |
| Module objectives / intended learning outcomes |  The course «Cultural Studies» will help students to develop an orientation towards humanitarian values, will help to master the spiritual wealth created by humanity. The development of not only an individual, but also the entire society is impossible without studying the cultural heritage created by previous generations, and this study itself, in turn, will be impossible without acquiring certain skills and cultural literacy. The course aims to humanize technical education. |
| Content | The classes use various technologies for the development of critical thinking: stage case, essay writing, (Mind Map), etc. |
| Examination forms | Examination cards |
| Study and examination requirements | - Availability of computer and computer equipment;- Availability of Internet channel with speed of at least 0.5 Mbit/s;- A personal account with a face photo on an avatar and corporate mail on the Microsoft 365 platform;- Attending classes according to the schedule. |
| Reading list | 1. Нуржанов Б.Г., Ержанова А.М. Культурология. - Алматы, 2011.
2. Тимошинов В.И. Культурология: Казахстан-Евразия-Восток-Запад:Учебное пособие. – 400 с. Алматы, 2001
3. Бейсенова Г.А. Проблемы глобализации и идентичности – А.,Print, 2009.
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| Module designation | Sociology |
| Semester(s) in which the module is taught | Fall and spring semesters 2.3 course. |
| Person responsible for the module | Yesbergenova Gulnur Bakitbekovna |
| Language | Russian, Kazakh. |
| Relation to curriculum | Elective  |
| Teaching methods | Lecture |
| Workload (incl. contact hours, self-study hours) | 1 creditLecture-15h. |
| Credit points | Lecture-1 credit |
| Required and recommended prerequisites for joining the module | To master this discipline, knowledge, skills and skills acquired in the following disciplines are required:- Modern history of Kazakhstan;- introduction to the specialty;- History of Kazakhstan,"People and society. |
| Module objectives / intended learning outcomes |  The goal of the program is to form a socio-humanitarian worldview of students in the context of solving the problems of modernizing public consciousness, determined by the state program «Looking to the Future: Modernizing Public Consciousness».After completing the course.The student must be able to:- reasonably discuss problematic issues on the course,develop and conduct research on social problems to master the skills: writing analytical reports specialized subjects:- draw up a program of sociological research; compile a toolkit for sociological research;- acquire skills: preparing a brief report as a result of sociological research, making practical recommendations.- correctly express and reasonably defend their own opinion on issues of social importance.At the end of the course, the student should know:- the ratio of natural and social in the formation and development of the individual and the determination of human behavior, society as a holistic system and its systemic properties.- the history of sociology; main sociological directions and schools;- methods of conducting sociological research; the basics of family sociology;- basic concepts, features of the family situation in the country and the world and trends of its changes;- various forms of cultural manifestation in the context of modernist tendencies, structure and distribution of cultural potential in society; main subcultural directions. |
| Content |  The course consists of a problem-oriented course of lectures, involving discussive and polemical discussions of their subject content. This procedure for building a training course is based on the preliminary information readiness of students on the materials of the topics and problems of the specified course, the readiness of students for a reasoned discussion of the problems of the upcoming lecture. To do this, the teacher must provide students with problematic issues and a list of literature of upcoming lectures in advance. Students must read materials before each lecture.  |
| Examination forms | Test questions. |
| Study and examination requirements | Availability of computer and computer equipment;- Availability of Internet channel with speed of at least 0.5 Mbit/s;- A personal account with a face photo on an avatar and corporate mail on the Microsoft 365 platform;- Attending classes according to the schedule.  |
| Reading list | 1. Biekenov K.U., Biekenova S.K., Kenzhakimova G.A. «Sociology: Academic Special». - Almaty: Evero, 2016. – 584 pages.2. «Sociology. Basics of the general theory: a textbook» /Ed. G.V. Osipov, L.N. Moskvichev. - 2nd ed., Rev. and additional. - M.: Norma, 2015. – 912 pages.3. Giddens E. «Sociology » /With the participation of C. Birdsall: translation from english. Ed. 2nd, completely overwrought. and additional M.: Yeditorial URSS, 2005. - 632 p.4Ritzer J. «Modern Sociological Theories». 5th ed. - St. Peter, 2002. - 688 p.55. Garaja V.I. «Sociology of Religion»: Textbook. - 4th ed., Rev. and additional - M.: INFRA-M, 2014. - 304p. - (Higher education. Baccalaureate).6. Z. Zhanazarova «Family and Society». - Almaty: Kazakh university, 2014. – 133 pages.7. Giddens A., Sutton Ph. Sociology. Wiley Academic, 2017. (Gidens A, Sutton F. Soushiolodzha. Wiley Akademik, 2017)8. Abdiraiymova G.S., Burkhanova D.K. "Social structure of society and middle class": textbook / Almaty: Qazaq University, 2015. |

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| Module designation | *Modern history of Kazakhstan* |
| Semester(s) in which the module is taught | *Autumn and spring semesters (1 and 2) for students of the 1st year of education*  |
| Person responsible for the module | *Nurzhanova Aina Mardanovna* |
| Language | *Kazakh, Russian, English* |
| Relation to curriculum | *Required Component**Basic discipline* |
| Teaching methods | *lecture, practical exercises, IWS, independent work of a student with a teacher* |
| Workload (incl. contact hours, self-study hours) | *150 academic hours. Lecture - 15 hours, practical classes - 30 hours. ISW (including ISW with a teacher) - 105 hours* |
| Credit points | *5 credits: contact - 3 (lecture - 1 credit, practice - 2 credits), non-contact - 2 credits (ISW, including ISW with a teacher)*  |
| Required and recommended prerequisites for joining the module | *The goal is to give objective historical knowledge about the main stages of the history of modern Kazakhstan; direct students' attention to the problems of the formation and development of statehood and historical and cultural processes.**Tasks:**- systematization of historical knowledge about the main events of modern history that form the scientific worldview and civic position;**- creation of a scientifically based concept of the modern history of Kazakhstan;**- creation of an ideological and spiritual basis for the consolidation of a multi-ethnic and poly-confessional Kazakh society.**Learning outcomes:**- knowledge of the main periods of the history of the twentieth century and independent Kazakhstan;**- the ability to analyze the features and significance of the modern Kazakh model of development;**- be able to substantiate the fundamental role of historical knowledge in the formation of Kazakhstani identity and patriotism;* *- the ability to form one's own civic position on the priorities of mutual understanding, tolerance and democratic values of modern Kazakhstani society.* |
| Module objectives / intended learning outcomes | *The course is intended for students of all undergraduate specialties. The versatility and significance of the discipline "Modern History of Kazakhstan" is due to its huge role in strengthening the Kazakh identity, self-awareness of the people, the implementation of tasks related to the need for an intellectual breakthrough in the new millennium. This course covers the period of Kazakhstan's history from the beginning of the 20th century, the Soviet period and independent Kazakhstan. During the study of the course, great importance is given to the formation of an active civic position of students. The course is aimed at the humanization of technical education.* |
| Content | *In the classroom, various technologies for the development of critical thinking are used: case studies, essay writing (Mind Map) etc.* |
| Examination forms | *Exam tickets* |
| Study and examination requirements | *- Availability of a computer and computer equipment;**- Availability of an Internet channel with a speed of at least 0.5 Mbps;**- Personal account with a photo of the face on the avatar and corporate mail on the Microsoft 365 platform;**- Attendance at scheduled classes.* |
| Reading list | 1. *1. The history of Kazakhstan (from ancient times to the present day) in five volumes. - Almaty, Atamura, 2010.*
2. *2. Ayagan B., Abzhanov M.H., Seliverstov S.V., Bekenova M.S. Modern history of Kazakhstan: Textbook for students of non-historical specialties (bachelor's degree) of higher educational institutions/under the general editorship of B.G. Ayagan-Almaty: Raritet, 2010.*
3. *3. Modern history of Kazakhstan: Textbook/author. A. Aunasova, A. Suleimenov. Entr.ed. B. Ayagan-Almaty, Raritet, 2010.*
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| Module designation | Psychology |
| Semester(s) in which the module is taught | Autumn and spring semesters (1 and 2) for students of the 1st year of education  |
| Person responsible for the module | Zykova Natalia Mikhailovna  |
| Language | Russian |
| Relation to curriculum |  Required componentBasic discipline |
| Teaching methods | lecture, practical classes, SRO, SROP  |
| Workload (incl. contact hours, self-study hours) | 150 academic hours. Lecture-15h, practical classes - 30h. SRO (including SROP) - 105 hours |
| Credit points | 5 credits: contact - 3 (lecture - 1 credit, practice - 2 credits), contactless - 2 credits (SROP, SRO) |
| Required and recommended prerequisites for joining the module | The purpose of the Psychology module is to form a social and humanitarian worldview among students, expand their horizons, and increase the general culture and education of students. As a result of completing the course, students will be able to:- use methods of obtaining psychological information;- apply psychological knowledge to solve professional problems;- think critically;- explain the nature of situations in the field of social communication;- be able to find ways to solve conflict situations in society;- correctly express and reasonably defend their own position;- to know and assume your own identity. |
| Module objectives / intended learning outcomes |  The course is for students in all undergraduate majors. The course is unique and innovative in terms of content and material delivery. It contains elements of interactive interaction with students in the process of reading lecture material, as well as practical classes. The course includes sections: an introduction to psychology. Me and my motivation. Emotions and emotional intelligence. Human will and the psychology of self-regulation. Individual-typological personality features. Values, interests, norms as the spiritual basis of the individual. Psychology of the meaning of life and professional self-determination. Personality health psychology. Communication of individuals and groups. Perceptual side of communication. Interactive side of communication. Communicative side of communication. Concept and structure of socio-psychological conflict. Patterns of personality behavior in conflict. Techniques and techniques for effective communication. |
| Content | Various teaching methods and technologies are used in the classes: student-centered training, competence-oriented training, role-playing games and educational discussions of various formats, case stadiums (analysis of specific situations), project method (development and transformation of own experience and competence). |
| Examination forms | Examination cards |
| Study and examination requirements | - Availability of computer and computer equipment;- Availability of Internet channel with speed of at least 0.5 Mbit/s;- A personal account with a face photo on an avatar and corporate mail on the Microsoft 365 platform;- Attending classes according to the schedule. |
| Reading list | Dzhakupov S.M. «Introduction to general psychology». - A.: Kazakh University, 2014y.Ilyin E.P. «Psychology of communication and interpersonal relations». - St. Petersburg: Peter, 2009. - 576 s. silt. - (Masters of Psychology, series).Maklakov A.G. «General Psychology». Textbook for universities. Moscow: Yurite, 2018.Maslow A. «Motivation and Personality». - St. Petersburg: 2008. – 352 pages.Grishina N.V. «Psychology of Conflict». st. Petersburg: 2008. - 464 p. silt. - (Masters of Psychology, series).Efimova N.S. «Social Psychology». - Moscow: Yurite, 2017.E.P. Ilyin. «Psychology of creativity, creativity, endowments». - St. Petersburg, 2011. – 448 pages.Vinogradova, S. M. «Psychology of Mass Communication»: textbook/S. M. Vinogradova, G.S. Melnik. - Moscow: Yurite, 2014. – 512 pages.  |

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| Module designation | Political science |
| Semester(s) in which the module is taught | Fall and Spring Semesters (1 and 2) Course 1 |
| Person responsible for the module |  Manapova Saniyam Ilyaevna |
| Language | Russian |
| Relation to curriculum |  Basic discipline |
| Teaching methods | Lecture, practical classes, SRS |
| Workload (incl. contact hours, self-study hours) | 30 academic hoursLecture-15h, CPS- 15 hours |
| Credit points | 2 credits: contact - 2 (lecture - 1 credit,), contactless - 1 credit (SRS) |
| Required and recommended prerequisites for joining the module |  The goal is to form students' knowledge of the theory of politics, laws and patterns of political life and the ability to use political science knowledge in future professional activities Course Task:Study of laws, basic norms and peculiarities of interaction between states and other subjects of international relations in modern conditions. Particularly significant is the study of decision-making mechanisms, roles and functions of critical institutions in the system of international conflict resolution and consensus-building among States. Corresponding place in political research.Training outcomes:analyze the peculiarities of political systems and the functioning of political institutions;- to critically evaluate theoretical approaches of political science;- identify the interrelationships and patterns of the political process; - compare political systems, institutions and actors in the inter-country and subnational context, on the basis of knowledge gained and mastered methods. |
| Module objectives / intended learning outcomes |  The course is intended for students of all undergraduate specialties, political science is a necessary theoretical basis for the further development of political research and for the introduction of scientific developments into real politics. It explores real political systems, ways of organizing society and the state, types of political regimes, forms of state structure, the activities of political parties and public organizations, the state of political consciousness and political culture, patterns of political behavior, problems of efficiency and legitimacy of political leadership, ways of forming institutions of power and more. |
| Content | The classes use the case method, the "Six Thinking Hats" method, the «Fishbone» method, and essay writing. |
| Examination forms | Еxamination cards. |
| Study and examination requirements | - Availability of computer and computer equipment;- Availability of Internet channel with speed of at least 0.5 Mbit/s;- A personal account with a face photo on an avatar and corporate mail on the Microsoft 365 platform;- Attending classes according to the schedule. |
| Reading list | 1. Kazakhstan Political Science Encyclopedia/Ed. T.T. Mustafina. - Almaty, 1998y.2. Pushkareva, G.V. Political Science: textbook and workshop for universities/G.V. Pushkarev. - Moscow: Yurite Publishing House, 2021. – 295 pages.3. G.M. Sergazina, R.N. Abylkalykova/Political Science: a textbook (2nd edition). - Karaganda: Medet Group LLP. — 2019. 270 pages. |

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| Module designation | *PHY 1111 «Physics 1 2»* |
| Semester(s) in which the module is taught | *1* |
| Person responsible for the module | *Duametuly Bakhyt* |
| Language | *kaz* |
| Relation to curriculum | *Demanding* |
| Teaching methods | *lecture, practice, laboratory work* |
| Workload (incl. contact hours, self-study hours) | *Total workload:**Contact hours:1 hour lecture,1 hour practice, 1 hour laboratory* *Private tuition, including exam preparation, specified in hours 24 \* 90 hours* |
| Credit points | *5 ECTS* |
| Required and recommended prerequisites for joining the module | *No* |
| Module objectives / intended learning outcomes | *At the end of the course, the student should know:**-modern ideas about the state of matter (matter and fields), achievements of science of the 20th-21st centuries in the field of fundamental physics;**- fundamentals of conducting experimental studies with modern measuring equipment and processing their results;* |
| Content | *The PHY1111 course is designed for students of all educational programs.**As part of the course, the student will master the practical use of the fundamental laws of physics.**Basic knowledge and skills in the field of mechanics, molecular physics and electrostatics will be presented.**1 The final stage of the course is the passing of a written exam.**2 The student must be able to:**- to use knowledge of physical laws and theories to explain the structure of matter, forces and interactions in nature, the origin of fields and apply them in solving practical problems;**- explain the applied significance of the most important achievements in the field of physics for the development of energy, transport, communications, medicine, environmental protection;* *- to assess the degree of reliability of the results obtained using experimental or theoretical research methods;* |
| Examination forms | *Problem solving* |
| Study and examination requirements | *Mandatory participation in training sessions according to the schedule, which determines the readiness for the lesson. In case of absence from the lesson, the student is obliged to notify the teacher within a day and explain the plan for self-study of the lesson:**- - mandatory reading of the submitted materials before the lesson;**- - delivery of tasks on time. There are penalties of -10% for late delivery;**- 20% non-participation in the audience (for a good reason with supporting documents) - rating "F (Fail)";**- plagiarism and cheating during the execution of the task are not allowed;**- mandatory use of electronic gadgets in the classroom, which is welcome, but it is unacceptable to use them in the exam.* |
| Reading list | *[1] Трофимова Т.И. Курс физики: Учеб. пособие для вузов. М.: Академия, 2004.- 560с.**(учебник в pdf-формате: https://fktpm.ru/file/45-kurs-fiziki-trofimova-taisija-ivanovna-ucheb-posobie.pdf)* *[2] Савельев И.В. Курс общей физики. Т.1. Механика, колебания и волны, молекулярная физи-ка. –М.: Наука, Гл.ред.физ.-мат., 2005.-508с. (http://mat.net.ua/mat/biblioteka-fizika/Savelyev-fizika-t1.pdf)**[3] Савельев И.В. Курс общей физики. Т.2. Электричество. –М.: Наука, Гл.ред.физ.-мат., 2005.-426с. (http://mat.net.ua/mat/biblioteka-fizika/Savelyev-fizika-t2.pdf)**[4] Сулеева Л.Б. Электронный учебник. Механика и молекулярная физика. Изд. КазНТУ, 2004г.* *[5] Сулеева Л.Б. Механика и молекулярная физика. Физический практикум. Изд-во КазНТУ, 2003.**[6] Волькенштейн В.С. Сборник задач по общему курсу физики для студентов технических вузов Изд. доп., перераб. - 327 с. {Специалист} СПб: СпецЛит, 2002 г.* |

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| Module designation | LNG10442 ‘Advanced Russian language (В2)’  |
| Semester(s) in which the module is taught | 1 and 2 |
| Person responsible for the module | Junusov T.  |
| Language | Russian |
| Relation to curriculum | Compulsory  |
| Teaching methods | practical classes, IWS, IWST |
| Workload | 3 credits: practical classes – 3 times per week (2-offline, 1-online). Additionally, contact hours are held for 30 minutes per group. |
| Credit points | 3 credits |
| Required and recommended prerequisites for joining the module | The student successfully completed the previous level of the discipline and was transferred further according to the level-by-level system of education. The student registered for the course on the SSO portal in a timely manner, taking into account the prerequisites. |
| Module objectives / intended learning outcomes | After completing the course **LNG10442 ‘Advanced Russian language (В2)’**the student **must demonstrate** the ability *to analyze, choose the necessary language means for communication, highlight structural text-forming elements, isolate the logical and compositional structure of a scientific text, prepare and analyze public speeches, demonstrate a high level of informational training.*The student **must be able to:***read, understand and interpret scientific texts, correctly interpret the information received from them about language units; own methods of processing textual material, annotate, abstract texts; be able to work with special dictionaries; carry out communication of a professional nature, demonstrating a high level of formation of information competence; be able to follow the rules of speech etiquette.*At the end of the course the student **should know**: - linguistic means appropriate for a particular communicative situation; how to build statements taking into account literary norms and the communicative situation;  - be able to highlight structural text-forming elements (topic, communicative task, micro-themes, given and new information, text-forming possibilities of the sentence, ways of developing information in the text);  - how to isolate the logical and compositional structure of a scientific text;  - how to prepare oral public statements (message, report) and analyze listened public speeches;  - how to carry out communication of a professional nature, demonstrating a high level of formation of information training;  - how to use dictionaries and correctly interpret the information received from them about language units;  - follow the rules of etiquette. |
| Content | The course **‘Advanced Russian language (B2)’** is represented by 4 modules, the content of which is aimed at activating and systematizing the knowledge, skills and abilities necessary for constructing oral and written texts, for making presentations, for participating in dialogues, polylogues, etc.  |
| Examination forms | Subject **‘Russian language. Academic level (B1)’** –A written exam includes: 1. Test on the studied material. 2. Compilation of a secondary text (abstract, abstract-summary, abstract-summary). 3. Completion of a grammar task. 4. Writing an essay (200-230 words). |
| Study and examination requirements | **Requirements for training:****Late delivery policy:**  The student must be prepared for practical classes. Timely protection and full performance of all types of work (practical and independent) are required. The student should not be late and miss classes, be punctual and obligatory. There is a 10% reduction in the maximum score for late submissions. If you are forced to miss the intermediate certification for good reasons, you must notify the teacher in advance so that you have the opportunity to pass, pass the boundary control in advance. Missing an exam for an unexcused reason deprives you of the right to take it. If you miss an exam for a good reason, a special permit is issued and the date, time and place of the exam are set.**Class Attendance Policy:** The student should not be late and miss classes, be punctual and obligatory. The student must come prepared for practical classes. It requires timely delivery of practical work, the full implementation of all types of work (practical and independent).**Academic Conduct and Ethics Policy:** Be tolerant and respect other people's opinions.  Formulate objections in the correct form.*Plagiarism and other forms of dishonest work are unacceptable*. Prompting and cheating during exams, passing an exam for another student are not allowed. A student found to falsify any course information will receive a final grade of ‘F’. *Activity* in practical classes is mandatory and is one of the components of your final score / grade. Missing a class can affect your academic performance and final grade. Every *two late arrivals* and/or departures before the end of the class for any reason *will be counted as one missed class.* However, class attendance does not in itself mean an increase in points. Your constant active participation in the classroom is required. A mandatory requirement of the course is preparation for each lesson. It is necessary to view the indicated sections of the textbook and additional material not only in preparation for practical exercises, but also before attending the corresponding lecture. Such preparation will facilitate your perception of new material and will contribute to your active acquisition of knowledge within the walls of the university. As part of the training in the discipline, any manifestations of corruption in any form are unacceptable. The organizer of such actions (teacher, students or third parties on their behalf) bear full responsibility for violation of the laws of the Republic of Kazakhstan. **Help**: For advice on the implementation of independent work, their delivery and protection, as well as for additional information on the material covered and all other questions about the course being taught, please contact the teacher during his office hours or via electronic means of communication around the clock. **For distance learning**: Mandatory participation in training sessions according to the schedule, which determines the readiness for the lesson. In case of absence from the lesson, the student is obliged to notify the teacher within 24 hours and explain the plan for independent study of the lesson. - mandatory reading of the presented materials before class;  - Submission of assignments on time. There are -10% penalties for late delivery;  - 20% absence on practical classes – grade ‘F (Fail)’ - plagiarism and cheating when completing a task are unacceptable  - Mandatory use of electronic gadgets in the classroom, which is welcome, but use in the exam is unacceptable.  - Any form of corruption in any form is unacceptable within the framework of discipline training. The organizer of such actions (teacher, students or third parties on their behalf) bear full responsibility for violation of the laws of the Republic of Kazakhstan.**Exam requirements:****a) Before the exam:** - Prepare a workplace: to pass a remote exam, a student must have a stationary computer (desktop) or portable (laptop) with a webcam (built-in or external) and an Internet connection speed of at least 500 kbps. The absence of these funds in the remote exam means the non-admission of a student with an F (Fail) grade.  - The student can use the computer in the university library, but it is recommended to take a seat 30 minutes before the exam and bring your own headphones (headphone). Entrance to the university only with a student card, a mask and no temperature.**b) During the exam:** - It is forbidden to turn off the cameras, get up from your seat, talk to strangers.  - It is necessary to observe the principle of academic honesty, since in case of serious suspicions that the student performed this work on his own, the teacher or proctor has every right to remove the student from the exam with an F (unsatisfactory) grade.  - If, when writing an exam, a student has serious technical problems with an online connection to the exam class for a long time, the teacher has the right to schedule a re-exam with a different exam task. Re-scheduling an exam for technical reasons is provided only 1 time!**C) At the end of the exam:** - It is necessary to hand over the answer sheet to the teacher on time, so if the student is not sure about the quality of the Internet connection, then the transfer should be started in advance. The teacher has the right not to accept the answer sheet after the exam has expired and give you an F (fail) grade.  - There are no additional tasks for the exam to increase the grade if it is low.  - In case the student does not agree with the grade received, he/she has the right to appeal within 2 days after the final score is posted in the electronic journal on the SSO portal. |
| Reading list | **‘Advanced Russian language (В2)’:** 1. Vvedenskaya L., Pavlova L., Kashaeva E. Russian language and culture of speech: Textbook. - Ed.25th. - Rostov n / D: Phoenix, 2008. - 539 p.  2. Pavlova T., Adskova T. Russian language: Scientific style. Work with text: Textbook. - Almaty: KazNITU, 2016. - 137 p.  3. Fedosyuk M., Ladyzhenskaya T., Mikhailova O., Nikolina N. Russian Language for Non-Philologists: Textbook. – M.: Flinta: Nauka, 2003. – 256 p.  4. Rosenthal D. Handbook of Spelling and Literary Editing. - M.: Book, 2002. - 336 p.  5. Russian language and culture of speech. Seventeen practical exercises / Ed. Ganapolskaya E., Khokhlova. A. - St. Petersburg: Peter, 2010. - 336 p.  6. Demeubekova K. Scientific style textbook: - Almaty: KazNITU, 2016. - 141 p.  7. Safargalieva A. Development of Scientific Speech Skills: Textbook. - Almaty: KazNTU, 2013. - 162 p. 8. Russian language and culture of speech: Textbook / Ed. IN AND. Maksimov. - M: Gardariki, 2000. - 413 p.  |

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| Module designation | *Training Practice* |
| Semester(s) in which the module is taught | *2* |
| Person responsible for the module | *Shakenov Kalizhan* |
| Language | *Russian, Kazakh* |
| Attitude towards the curriculum | *specialisation* |
| Teaching methods | *laboratory work* |
| Workload (incl. contact hours, self-employment hours) | *2кр:* *laboratory work – 30 h.*  |
| Credit scores | *2кр:* *laboratory work – 2 cr.*  |
| Required and Recommended Prerequisites for Attaching to the Module | *-* |
| Module objectives / intended learning outcomes | *As part of the course, the student will master the practical use of theoretical knowledge of the conversion of electrical energy into other types of energy.**Students will acquire skills in the field of energy, as well as methods of working with various electrical devices and their research.* *Competencies: students know the structure of electrical installations and systems, the interconnections of their various links in the chain.* |
| Content | *Study of methods for switching on an asynchronous motor. Study and execution of installation works of electrical installations, devices, wires and their tips.* |
| Exam forms | *Report* |
| Tuition and Exam Requirements | *The student must be able to read diagrams and work on the stand and know the basic installations used in enterprises and the principle of operation of various systems.* |
| Bibliography | *1. Shekhovtsov V.P. Electrical and electromechanical equipment. – M.: Forum: Infra-M, 2008. – 407p.**2. Katsman M. Electrical machines. M .: Higher School, 1990, - 463s.**3. Goldberg O.D., Helemskaya S.P. Electromechanics. - M.: Publishing Center. Academy, 2007. - 512 p.* |

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| Module designation | *Industrial internshipI* |
| Semester(s) in which the module is taught | *4* |
| Person responsible for the module | *Shakenov Kalizhan* |
| Language | *Russian, Kazakh* |
| Attitude towards the curriculum | *specialisation* |
| Teaching methods | *practical work* |
| Workload (incl. contact hours, self-employment hours) | *2кр:* *practical work – 30 h.*  |
| Credit scores | *2кр:* *practical work – 2 cr.*  |
| Required and Recommended Prerequisites for Attaching to the Module | *-* |
| Module objectives / intended learning outcomes | *As part of the course, the student will master the practical use of theoretical knowledge in industrial enterprises.**Students will acquire skills in the field of energy, as well as methods of working with various electrical devices and their operation.* *Competencies: students know the structure of electrical installations and systems, the interconnections of their various links in the chain in real conditions.* |
| Content | *Inspection and preventive maintenance. Performance of repair and installation works of electrical installations, devices, wires and their tips. Assembly of electrical cabinets.* |
| Exam forms | *Report* |
| Tuition and Exam Requirements | *The student must be able to read diagrams and know the basic installations used in enterprises and the principle of operation of various systems.* |
| Bibliography | *1. Shekhovtsov V.P. Electrical and electromechanical equipment. – M.: Forum: Infra-M, 2008. – 407p.**2. Katsman M. Electrical machines. M .: Higher School, 1990, - 463s.**3. Goldberg O.D., Helemskaya S.P. Electromechanics. - M.: Publishing Center. Academy, 2007. - 512 p.* |

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| Module designation | *Industrial internshipII* |
| Semester(s) in which the module is taught | *6* |
| Person responsible for the module | *Shakenov Kalizhan* |
| Language | *Russian, Kazakh* |
| Attitude towards the curriculum | *specialisation* |
| Teaching methods | *practical work* |
| Workload (incl. contact hours, self-employment hours) | *4кр:* *practical work – 60 h.*  |
| Credit scores | *4кр:* *practical work – 4 cr.*  |
| Required and Recommended Prerequisites for Attaching to the Module | *-* |
| Module objectives / intended learning outcomes | *As part of the course, the student will master the practical use of theoretical knowledge in industrial enterprises.**Students will acquire skills in the field of energy, as well as methods of working with various electrical devices and their operation.* *Competencies: students know the structure of electrical installations and systems, the interconnections of their various links in the chain in real conditions.* |
| Content | *Inspection and preventive maintenance. Performance of repair and installation works of electrical installations, devices, wires and their tips. Assembly of electrical cabinets.* |
| Exam forms | *Report* |
| Tuition and Exam Requirements | *The student must be able to read diagrams and know the basic installations used in enterprises and the principle of operation of various systems.* |
| Bibliography | *1. Shekhovtsov V.P. Electrical and electromechanical equipment. – M.: Forum: Infra-M, 2008. – 407p.**2. Katsman M. Electrical machines. M .: Higher School, 1990, - 463s.**3. Goldberg O.D., Helemskaya S.P. Electromechanics. - M.: Publishing Center. Academy, 2007. - 512 p.* |