

Satbayev University
Institute of Industrial Automation and Digitalization
Department of Power Engineering

CURRICULUM PROGRAM

«POWER ENGINEERING»
Bachelor of Technology and Technology
Electrical engineering and power engineering

on the basis of the following specialties of the expired Classifier of specialties: 5B071700 - Heat power engineering and 5B071800 – Electrical power engineering

1st edition
in accordance with the GOSO Higher Education 2018

Almaty 2021

The program was drawn up and signed by the parties:

From KazNRTU named after K.I.Satpayev:

- 1 Head of the
Department of Power Engineering,
PhD, associate professor
- 2 Director of the Institute of Industrial
Automation and Digitalization,
PhD
- 3 Chairman of the educational and
methodological group of the Department
of Power Engineering, Candidate of
Technical Sciences, Associate Professor

 Ye. Sarsenbayev


 B. Omarbekov

 Ye. Khidolda

From employers - Director
LLP "Lighting Technologies Kazakhstan"


 G.E. Abdykalykov

Approved at a meeting of the Educational and Methodological Council of the
Kazakh National Research Technical University named after K.I. Satbayev.
Minutes No. 4 dated 14.01.2020

Qualification:

Level 6 of the National Qualifications Framework:
6B071 Engineering and Engineering (Bachelor)

Professional competencies: Power Engineering, heat and power engineering,
electric power engineering, thermal installations, electric power systems and
networks, power supply, renewable energy

1 Summary of the program

The professional activities of the program's graduates are directed to the field of Electric Power Engineering, heat and electrical engineering.

The direction of the specialty and specialization program covers engineering and engineering.

The aim of the educational program is to teach students general education, basic and specialized disciplines with the achievement of appropriate competencies.

The objectives and content of the educational program can be found in Section 9 of the "Description of Disciplines."

If the full course of the bachelor's degree is successfully completed, the graduate is awarded an academic degree in engineering and technology in electrical and Power Engineering.

The bachelor's education program "Power Engineering" differs from the existing educational programs in the specialties 5B071700 - "Heat Power Engineering" and 5B071800 - "Electric Power Engineering" by updating the internal content of disciplines related to the production, transmission and consumption of thermal and electrical Power Engineering and the addition of disciplines on renewable Power Engineering. A number of disciplines have proposed new content, including approaches based on Power Engineering conservation and Power Engineering efficiency in Power Engineering plants, and includes several courses on modern industrial technologies in the Electric Power Engineering industry.

The educational program has increased the volume of mathematical, natural science, basic and language disciplines. Specialized disciplines have been added, which can be divided into four groups: disciplines in thermal Power Engineering, disciplines in Electric Power Engineering, disciplines on alternative Power Engineering and laboratory workshops on the use of modern technology. As a result, we have an educational program that has innovative and practical content and is aimed at implementing the Digital Kazakhstan program.

The educational program includes the following innovative disciplines:

- laboratory workshop on modern industrial technologies in the electric power industry (1, 2, 3);
- Power Engineering audit and Power Engineering saving in enterprises;
- renewable Power Engineering;
- modelling in Power Engineering systems
- calculating and designing Electric Power Engineering systems;
- calculating and designing power grids and systems;
- calculating and designing thermal exchange equipment;
- calculating and designing an automated electric drive.

In the process of mastering the educational program, bachelor of engineering and technology in electrical engineering and Power Engineering should have the following key competencies.

The Bachelor should:

have an idea:

- about modern thermal and Electric Power Engineering facilities, autonomous power sources and renewable Power Engineering facilities, promising directions for Power Engineering development;
- modern approaches to calculating and designing Power Engineering systems, as well as the use of software tools for the management and evaluation of Power Engineering systems;
- about modern elements and installations of Power Engineering systems (devices, devices, conductors, equipment, executive mechanisms, microprocessors, etc.).

to know:

- theoretical and experimental research methods to create promising new directions in the field of electrical engineering and Power Engineering;
- principles of work, specifications and design features of Power Engineering products developed and used;
- standards, methodical and regulatory materials, design, installation and operation of electrical and thermal installations of the Power Engineering industry;

be able to:

- develop the principles of the organization and design of Power Engineering companies;
- use application packages to calculate, model and automate Power Engineering systems design;

to have skills:

- to formulate the basic feasibility and economic requirements for the Power Engineering systems being projected;
- the organization of work on the operation, installation and installation of electrical and thermal facilities;
- development and design on a modern elemental and technical basis of Power Engineering systems and individual devices.

The training includes production practices at such companies as: NK KEGOC, AIK, ALES, Almaty Thermal Networks LLP, VKREK, TATAK, Ontustik Heat Transit, Kazatomprom, Kazzink LLP, Karachaganak Petroleum Operating and others.

2 Requirements for incoming

Admission to the university is carried out on the applications of the applicant, who completed in full secondary, secondary-special education on a competitive basis in accordance with the points of the certificate issued on the results of a single national test with a minimum score - at least 65 points.

Special requirements for admission to the program apply to graduates of 12 summer schools, colleges, applied baccalaureate programs, NIS, etc. Such applicants must pass diagnostic testing in English, mathematics, physics and special subjects.

Rules for transferring credits for accelerated (reduced) education based on 12-year secondary, secondary technical and higher education

Code	Competence type	Description	Competence result	Responsible
Shared (Includes full training with possible additional, depending on the level of knowledge)				
G1	Communication	<ul style="list-style-type: none"> - Fugitive monolingual oral, written and communication skills - The ability not to communicate fluently with a second language - The ability to use communicative communication in different situations - There are basics to academic writing in their native language - Diagnostic language test 	Full 4-year study with a minimum of 240 academic loans (of which 120 contact classroom academic credits) with a possible re-recording of loans in the second language where students have an advanced level. The level of language is determined by passing the diagnostic test	Department of Kazakh and Russian, Department of English
G2	Mathematical Literacy	<ul style="list-style-type: none"> - Basic mathematical thinking at the communication level - the ability to solve situational problems on the basis of the mathematical apparatus of algebra and began mathematical analysis - Diagnostic test for mathematical literacy in algebra 	Full 4-year study with a minimum of 240 academic loans (of which 120 are contact auditory academic loans). With a positive test of diagnostic test, the level of mathematics 1, the negative - the level of algebra and the beginning of the analysis	Mathematics Department
G3	Basic literacy in science disciplines	<ul style="list-style-type: none"> - A basic understanding of the scientific picture of the world with an understanding of the basic laws of science - Understanding basic hypotheses, laws, methods, drawing conclusions and assessing errors 	Full 4-year study with a minimum of 240 academic loans (of which 120 are contact auditory academic loans). With a positive test of diagnostic test level Physics 1, General Chemistry, at negative - the level of the Beginning of Physics and basic basics of chemistry	Departments in the fields of natural sciences
Specific (includes reduced tuition by re-counting credits depending on the level of competence knowledge for graduates of				

12-year schools, colleges, universities, including humanitarian and economic areas)				
S1	Communication	<ul style="list-style-type: none"> - Fugitive bilingual oral, written and communication skills - The ability not to communicate fluently with a third language - writing skills of different styles and genres - skills of deep understanding and interpretation of one's own work of a certain level of complexity (essay) - basic aesthetic and theoretical literacy as a condition of full perception, interpretation of the original text 	Full re-repayment of credits by language (Kazakh and Russian)	Department of Kazakh and Russian
S2	Mathematical Literacy	<ul style="list-style-type: none"> - Special mathematical thinking using induction and deduction, generalization and specification, analysis and synthesis, classification and systematization, abstraction and analogy - The ability to formulate, substantiate and prove positions - Application of common mathematical concepts, formulas and extended spatial perception for mathematical tasks - Full understanding of the basics of mathematical analysis 	Re-credit for The Discipline of Mathematics (Calculus) I	Mathematics Department
S3	Special literacy in science disciplines (Physics, Chemistry, Biology and Geography)	<ul style="list-style-type: none"> - A broad scientific perception of the world that suggests an understanding of natural phenomena - Critical perception to understand the phenomena of the world around - cognitive ability to formulate a scientific understanding of the forms of existence of matter, its interaction in nature 	Re-credits for Physics I, General Chemistry, General Biology, Introduction to Geology, Introduction to Geodesy; Training practice, etc.	Departments in the fields of natural sciences
S4	English language	<ul style="list-style-type: none"> - Readiness for further self-learning in English in various fields - Ready to gain experience in design and research using English 	Refilort English credits above academic to professional level (up to 15 credits)	Department of English
S5	Computer skills	<ul style="list-style-type: none"> - Basic programming skills in one modern language - Use software and applications 	Reset Credits on Discipline Introduction to Information and Communication Technologies	Department of Software Engineering

		to teach different disciplines	Information and Communication Technologies	
S6	Social and humanitarian competencies and behaviour	<ul style="list-style-type: none"> - Understanding and understanding the responsibility of every citizen for the development of the country and the world - The ability to discuss ethical and moral aspects in society, culture and science 	Re-credit for Kazakhstan's Modern History (excluding state exam)	Department of Public Discipline
		<ul style="list-style-type: none"> - Critical understanding and the ability to debate on modern scientific hypotheses and theories 	Re-credit credits for philosophy and other humanities	
PROFESSIONAL (includes reduced education by re-counting credits depending on the level of knowledge on competences for college graduates, AV schools, universities)				
P1	Professional competencies	<ul style="list-style-type: none"> - Critical perception and a deep understanding of professional competencies at level 5 or 6 - The ability to discuss and debate professional issues within the framework of the mastered program 	Re-credits for basic professional disciplines, including introduction to specialty, engineering ethics, robotic technology, automation technology, theoretical basics of electrical engineering, technological measurements and instruments, mathematical basics of control theory, electronic automation devices.	Releasing chair
P2	General Engineering Competencies	<ul style="list-style-type: none"> - Basic general engineering skills and knowledge, the ability to solve general engineering problems and problems - be able to use application packages to process experimental data, solve algebraic and differential equation systems 	Re-credit for general engineering disciplines (engineering graphics, outline geometry, electrical engineering basics, microelectronics basics.)	Releasing chair
P3	Engineering and computer competencies	<ul style="list-style-type: none"> - Basic skills in using computer programs and software systems to solve general engineering problems 	Re-credit for computer graphics discipline, computer modeling and programming in the MatLab environment.	Releasing chair
P4	Socio-economic competences	<ul style="list-style-type: none"> - Critical understanding and cognitive ability to reason on contemporary social and economic issues - A basic understanding of the economic assessment of research sites and the profitability of projects. 	Re-transfer credits for socio-humanitarian and technical and economic disciplines in the set-off of the electorate cycle	Releasing chair

The university may refuse to re-borrow credits if the low diagnostic level is confirmed or the final grades were lower than A and B.

3 Requirements for completing your studies and getting a diploma

General standard requirements for graduation and awarding a bachelor's degree: mastering at least 240 academic credits of theoretical training and final diploma work or state exam in specialty.

Special requirements for graduating from university under this program

graduate should know:

- theoretical and experimental research methods to create promising new directions in the field of electrical engineering and Power Engineering;
- principles of work, specifications and design features of Power Engineering products developed and used;
- standards, methodical and regulatory materials, design, installation and operation of electrical and thermal installations of the Power Engineering industry;

graduate should be able to:

- develop the principles of the organization and design of Power Engineering companies;
- use application packages to calculate, model and automate Power Engineering systems design;
- to formulate the basic feasibility and economic requirements for the Power Engineering systems being projected;
- to organize the operation, installation and installation of electrical and thermal facilities.

Training in this OP is completed by passing the state exam in the following disciplines or protection before the GAC diploma project (work).



CURRICULUM OF EDUCATIONAL PROGRAM for 2021-2022 academic year admission
Educational program 6807101 - "Power Engineering", Group of educational programs - 002 Electrical

Full-time study

Study duration : 4 years

Academic degree: **Ph.D. in Engineering and Technology**

Full-time										Part-time										Study duration: 4 years										Maximum credit load per semester: 24										Minimum credit load per semester: 18																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																															
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The decision of the Academic Council of KazHTU named after K. Satpayev. Protocol # 3, dated 25.06 2024

The decision of the Educational and Methodological Council of KazNRTU named after K. Satpayev, Protocol # 6 dated 14.06.20 21

The decision of the Academic Council of the Institute of Industrial Automation and Digitalization, Protocol # 16, dated 07.06.2021

Vice-Rector for academic work

B. A. Zhaytikov

Director of the Institute of Industrial Automation and Digitalization

B. O. Omsarbekov

Head of department "Power Engineering"

L.A. Sarsenitov

Representative of Specialty council

G. E. Abdylkalikov



APPROVED
Director of the Institute
of Industrial Automation and Digitalization

8.0. Omarbekov
2024 y.

ELECTIVE DISCIPLINES OF THE EDUCATIONAL PROGRAM for recruitment for the 2021-2022 academic year
Educational program 6B07101 - "Power Engineering"
Group of educational programs - 862 Electrical and Power Engineering

Full-time study

Study duration : 4 years

Academic degree: bachelor of engineering and technology

Year of study	Code of elective	Code of discipline	Name of discipline	Cycle	Credits	lec/lab/pr /30W	Prerequisites
3	5 semester (autumn 2023)						
	3215	ERG529	Power and electrotechnical equipment	B	5	2/0/1/2	ELC542
		ERG112	Boiler Plants and Steam Generators				ERG519
	Total:				5		
	6 semester (spring 2024)						
	3218	ERG178	Electric power networks and systems	B	5	1/1/1/2	
		ERG525	Electrical part of power stations				
	3219	ERG425	Hydrogasodynamics of media in heat power plants	B	5	2/0/1/2	
		ERG127	Transition processes in energy systems			ELC543	
	3220	ERG533	Theoretical Foundations of Fuel Combustion and Furnace Plants	B	5	2/0/1/2	
ERG500		Automated electric drive	1/2/2/2				
	ERG507	Blowers and Heat Engines			2/0/1/2		
Total:				15			
4	7 trimester (autumn 2024)						
	4306	ERG524	Main Machinery Operation of Heat Power Plant	S	5	2/0/1/2	ERG519
		ERG506	Modeling in power systems			1/2/0/2	
	4307	ERG508	Light technology and lighting	S	5	2/0/1/2	
		ERG510	Thermal machines and GTU				
	4308	ERG511	Calculation and projecting of power supply systems	S	5	2/0/1/2	ERG530
		ERG517	Calculation and projecting of electrical power networks and systems				ERG178
		ERG516	Calculation and Design of Heat Exchange Equipment				ERG521
		ERG138	Calculation and projecting of power stations and substations				ERG525
		ERG510	Calculation and projecting of systems of automated electrical drive				ERG500
	4309	ERG142	Relay protection of power systems	S	5	1/2/1/2	
		ERG126	Steam-Gas and Gas-Turbine Facilities for Heat and Nuclear Power Plants			2/0/1/2	
	4310	ERG502	Engineering design of electrical machines in the power industry	S	5	2/1/0/2	ERG527
		ERG111	Sources and Systems of Heat Supply of Plant Facilities and Housing				
	Total:				25		

The number of credits in elective disciplines for the entire period of study	
Cycles of disciplines	Loans
The cycle of general education (G)	0
The cycle of basic disciplines (B)	20
The cycle of special disciplines (S)	25
Total:	45

Decision of the Academic Council of the Institute of Industrial Automation and Digitalization. Minutes No 4, dated 27.06.2024.

Head of department "Power Engineering"

E.A. Sarsenbaev

5 Levels and volumes of knowledge, skills, skills and competencies

A - knowledge and understanding:

A1 - methods of building electrical, technological and functional schemes for the design of Power Engineering systems;

A2 - current trends in the development of technical and technological systems of Power Engineering facilities;

A3 - standards, methodical and regulatory materials accompanying the operation, installation and installation of thermal power and Electric Power Engineering facilities.

B - applying knowledge and understanding:

B1 - independent work and offer various options for solving professional problems using theoretical and practical knowledge;

B2 - to organize installation, installation and operation of Electric Power Engineering and thermal systems;

B3 - to organize the collection, storage and processing of information used in the field of professional activity.

C - the formation of judgments:

C1 - about modern Power Engineering industry facilities and process management systems;

C2 - on the application of modern autonomous Power Engineering systems of different categories of consumer approaches;

C3 - about modern technical devices and technological equipment of Power Engineering facilities (devices, devices, conductors, equipment, executive mechanisms, microprocessors, etc.).

D - personal abilities:

D1 - to be an Power Engineering engineer, electrical engineer of the production division of the operation of Power Engineering systems;

D2 - to be a specialist in the maintenance of electrical and thermal networks, and systems;

D3 - to be an engineer of the production unit for the repair of thermal and electrical installations;

D4 - to be able to organize work on setting up Power Engineering and electromechanical plants of industrial enterprises.

6 Competences at the end of training

B - Basic knowledge, skills and skills:

B1 is capable of philosophical analysis of social phenomena, personality behavior and other phenomena. I am ready to conduct a philosophical assessment of social phenomena;

B2 - to know and apply in practice the basics of engineering professional ethics;

B3 - to be able to analyze the current problems of the modern history of Kazakhstan.

P - Professional competencies, including in accordance with the requirements of industry professional standards:

P1 is a wide range of theoretical and practical knowledge in the professional field;

P2 - is able to analyze and solve problems on the theory of electrical circuits and heat technology;

P3 - is able to analyze thermal, electrical and installation schemes of technological production. I am ready to install, set up and operate thermal and electrical installations, and systems.

O - Human, social and ethical competences:

O1 - is able to freely use english as a means of business communication, a source of new knowledge in the field of electrical engineering and Power Engineering. I am ready to use the English language in the professional activities in the field of Electric Power Engineering and heat Power Engineering;

O2 - is able to freely master the Kazakh (Russian) language as a means of business communication, a source of new knowledge in the field of electrical engineering and Power Engineering. I am ready to use the Kazakh (Russian) language in professional activities in the field of Electric Power Engineering and heat Power Engineering;

O3 - to know and apply in work and life the basics of applied ethics and ethics of business communication;

O4 - to know and apply the basic concepts of professional ethics;

O5 - to know and apply in practice the "code of conduct of engineer";

O6 - to know and solve the problems of human influence on the environment.

C - Special and Management Competencies:

C1 - self-management and control of work and training processes within the framework of the organization's strategy, policies and objectives, discussion of the problem, reasoning of conclusions and competent operation of information;

C2 - *in the field of organizational and management activities*: to be the head of the group of the division for the operation, installation and repair of power plants in various industries;

C3 - *in the field of experimental research*: to be a specialist in experimental research of thermal and electric power facilities;

C4 - *in the field of research*: to be an engineer of a scientific laboratory for the research and development of modern Power Engineering installations and systems in various industries;

C4 - *in the field of design*: to be an engineer in the development and design of electric power plants, and systems in various industries.

7 Minor Supplemental Education Policy

When mastering at least 12 credits in the disciplines of the program, including mandatory disciplines:

M1 - English;

M2 - Modern History of Kazakhstan;

M3 - Physics 1 and 2;

M4 - Mathematics 1, 2, 3;

M5 - The Theoretical Basics of Electrical Engineering;

M6 - The Theoretical Basics of Heat Engineering;

M7 - Electric cars.

the graduate is assigned an additional Minor specialty with the issuance of an annex to the diploma of the established sample.

8 ECTS diploma application

The application is developed according to the standards of the European Commission, Council of Europe and UNESCO / CEPES. This document is for academic recognition only and does not constitute official proof of education. Without a diploma of higher education is not valid. Purpose of filling European application - the provision of sufficient data on the holder of the diploma, his qualifications, the level of this qualification, the content of the training program, the results, the functional purpose of the qualification, as well as information about the national education system. In the application model, which will be used for the transfer of estimates, the European system of transfer or credit transfer (ECTS) is used. The European Diploma Supplement provides an opportunity to continue education in foreign universities, as well as to confirm national higher education for foreign employers. When traveling abroad for professional recognition will require additional legalization of the diploma of education. The European Diploma Supplement is completed in English upon individual request and is issued free of charge.

9 Description of disciplines

English

CODE - LNG108

CREDIT - 5 (0/0/3)

PREREQUISITES - diagnostic test/LNG1051-1056

LNG1051

COURSE GOALS AND OBJECTIVES

The "Beginner English" discipline is designed primarily for learning from scratch. This course is also suitable for those who have only general elementary knowledge of the language. After passing this level, the student will be able to confidently communicate on the basic topics in English, learn the basics of grammar and lay a certain foundation that will improve their skills in the next stage of learning English.

Постреквизиты курса: Elementary English.

LNG1052

COURSE GOALS AND OBJECTIVES

"Elementary English" discipline is the foundation of english language learning, which aims to develop students' basic skills (reading and listening) and productive skills (writing and speech), analysis of basic knowledge, use and memorization of the main grammar rules and mastering the features of pronunciation and elementary vocabulary, as well as encouraging self-learning and critical thinking.

Course pre-editing: Beginner.

Course post-quest: General 1.

LNG1053

COURSE GOALS AND OBJECTIVES

The aim of the GeneralEnglish1 course is to provide students with the opportunity to gain sufficient knowledge to become more free in everyday social and academic settings. Students are working to improve pronunciation, vocabulary and grammar. At this level, the main task will be to consolidate the skills gained earlier, learn to compose and properly apply complex syntax designs in the English language, as well as achieve a really good pronunciation.

Препреквизиты курса: Elementary English.

Course post-quest: General 2.

LNG1054

COURSE GOALS AND OBJECTIVES

The General English 2 course is for students who continue to study General English 1. The course is focused on the ability to actively use in practice most aspects of the Times of English, conditional sentences, phrases in passive

collateral, etc. At this stage the student will be able to support the conversation with several interlocutors or express his point of view. The student significantly expands his vocabulary, which will allow him to freely express his thoughts in any environment. At the same time, the speech will be supplemented by various synonyms and antonyms of already familiar words, phrasal verbs and steady expressions.

Course pre-30s: General 1.

Постреквизиты курса: Academic English.

LNG1055

COURSE GOALS AND OBJECTIVES

The main purpose of the Academic English course is to develop academic language skills. Discipline is a language style that is used when writing academic papers (paragraph, abstract, essay, presentation, etc.) This course is designed to help students become more successful and effective in their learning, developing critical thinking skills and self-learning.

Course pre-30s: General 2.

Post-31s of the course: Professional English.

LNG1056

COURSE GOALS AND OBJECTIVES

"Business English" is an English language for business communication, business and career. Knowledge of business English is useful for negotiation and business correspondence, preparation of presentations and informal communication with business partners.

The peculiarities of training are that it is necessary not only to master vocabulary, but also to learn new skills: presentational, communicative, linguistic, professional.

Препреквизиты курса: IELTS score 5.0 и/или Academic English

Постреквизиты курса: Professional English, IELTS score 5.5-6.0

LNG1057

COURSE GOALS AND OBJECTIVES

The "Professional English" course is designed for B2-level students, whose aim is to improve the language competence of students in their respective professional fields. The main purpose of the course is to teach students to work with texts, both audio and written, by specialty. The curriculum is based on the necessary vocabulary (words and terms) often used in English for special purposes. Students will acquire professional English language skills through integrated content and language training, master vocabulary to read and understand original sources with a high degree of independence, and practice different communication models and vocabulary in specific professional situations.

Course pre-editing: Business English.

Post-31s of the course: any elective course.

Kazakh (Russian) language

CODE - LNG104

CREDIT - 5 (0/0/3)

PREREQUISITES - diagnostic test

COURSE GOALS AND OBJECTIVES

- teach students to listen to statements on well-known topics related to home, school, and leisure time;
- understand texts on personal and professional topics that contain the most frequent words and expressions;
- be able to conduct a conversation on everyday topics; describe your experiences; Express your opinion; retell and evaluate the content of the book you read, the movie you saw;
- be able to create simple texts on well-known topics, including those related to professional activities.

SUMMARY OF THE COURSE

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. The main focus of training is transferred from the process of knowledge transfer to learning how to use the language being studied for various types of speech activities, such as reading (provided that the reading is understood), listening (provided that the same condition) and producing texts of a certain complexity with a certain degree of grammatical and lexical correctness. The material for classes is selected so that students, while studying the Kazakh/Russian language, acquire skills of reading, writing and understanding of spoken speech on the basis of 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.

KNOWLEDGE, SKILLS AT THE END OF THE COURSE

A student who actively organizes work in the classroom and conscientiously completes homework by the end of the first semester acquires skills that correspond to the pan-European level A2 (Threshold according to the ALTE classification), that is, they are on the threshold of independent language proficiency.

Modern history of Kazakhstan

CODE - HUM100

CREDIT - 5 (1/0/2)

PREREQUISITES – no

COURSE GOALS AND OBJECTIVES

The aim of the course is to familiarize engineering students with the basic theoretical and practical achievements of Soviet historical science on the history of modern Kazakhstan, comprehensive and systematic study of the main stages of formation and development of Kazakhstan society.

- analyze the features and contradictions of the history of Kazakhstan in the Soviet period;
- to reveal the historical content of the foundations of the laws of political, socio-economic, and cultural processes at the stages of the formation of an independent state;
- contribute to the formation of students ' citizenship;
- educate students in the spirit of patriotism and tolerance, belonging to their people and Fatherland;

SUMMARY OF THE COURSE

The course Modern history of Kazakhstan is an independent discipline and covers the period from the beginning of the twentieth century to the present day. Modern history of Kazakhstan studies the national liberation movement of the Kazakh intelligentsia at the beginning of the XX century, the period of creation of the Kazakh ASSR, as well as the process of formation of a multinational society.

KNOWLEDGE, SKILLS AT THE END OF THE COURSE

- knowledge of events, facts and phenomena of the Modern history of Kazakhstan;
- knowledge of the history of ethnic groups inhabiting Kazakhstan;
- knowledge of the main stages of the formation of the Kazakh state;
- ability to analyze complex historical events and predict their further development;
- ability to work with all types of historical sources;
- ability to write essays and scientific articles on the history of the Fatherland;
- ability to use historical concepts;
- ability to conduct a discussion;
- skills of independent analysis of historical facts, events and phenomena;
- public speaking skills.

Physics I

CODE – PHY111

CREDIT - 5 (1/1/1)

PREREQUISITE-diagnostic test /PHYS110-111

COURSE GOALS AND OBJECTIVES

the main purpose of teaching the course Physics I and Physics II is to form ideas about the modern physical picture of the world and the scientific worldview.

SUMMARY OF THE COURSE

The disciplines of Physics I and Physics II are the basis for theoretical training and engineering activities of graduates of higher technical schools and represent the core of physical knowledge necessary for an engineer operating in the world of physical laws. The course "Physics I" includes sections: physical foundations of mechanics, structure of matter and thermodynamics, electrostatics and electrodynamics. The discipline "Physics II" is a logical continuation of the study of the discipline "Physics I", and forms a holistic view of the course of General physics as one of the basic components of the General theoretical training of bachelors of engineering and technical profile. The discipline "Physics II" includes sections: magnetism, optics, nanostructures, fundamentals of quantum physics, atomic and nuclear physics.

KNOWLEDGE, SKILLS AT THE END OF THE COURSE

- skills to use knowledge of fundamental laws, theories of classical and modern physics, as well as the use of physical research methods as the basis of the system of professional activity.

Mathematics I

CODE – MAT101

CREDIT - 5 (1/0/2)

PREREQUISITE - Elementary Mathematics - school course/diagnostic test

COURSE GOALS AND OBJECTIVES

The main goal of the course is to give the future specialist a certain amount of knowledge on the sections of the course "Mathematics-I", necessary for studying related engineering disciplines. Introduce students to the ideas and concepts of mathematical analysis. The main focus is on the formation of basic knowledge and skills with a high degree of understanding of differential and integral calculus.

Course objective:

acquisition of knowledge necessary for effective use of rapidly developing mathematical methods; acquisition of skills in building and researching mathematical models; knowledge of fundamental sections of mathematics necessary for solving research and practical problems in the professional field.

SUMMARY OF THE COURSE

In the course "Mathematics-I" the following sections are presented: introduction to analysis, differential and integral calculus

KNOWLEDGE, SKILLS, SKILLS AT THE END OF THE COURSE

The study of this discipline will allow the student to apply the course "Mathematics-I" to solving simple practical problems, find tools sufficient for their research, and get numerical results in some standard situations.

Introduction to the specialty

CODE - ERG104

CREDIT - 5 (2/0/1)

PREREQUISITE – no

THE PURPOSE AND TASK OF THE COURSE

Students gain the knowledge, skills and skills necessary to successfully master general technical and special disciplines, as well as in subsequent production or management activities.

SUMMARY OF THE COURSE

Power Engineering resources and their use. Renewable and non-renewable Power Engineering sources. The main provisions of technical thermodynamics. The basics of the theory of heat exchange. Convective and radiant heat exchange. Modern ways of generating electric Power Engineering. Cycles of thermal, electrical, hydroelectric and nuclear power plants. Ways to convert different types of Power Engineering into electrical Power Engineering. Unconventional ways of generating Power Engineering. The concept of an electrical system. Power management. The impact of technology and Power Engineering on the biosphere.

KNOWLEDGE, SKILLS, SKILLS AT THE END OF THE COURSE

Students will know:

should understand the concept of providing Electric Power Engineering consumers, understand the structure of the Electric Power Engineering industry, the relationship between its various links, have an idea of the latest advances in digital protection technology and automation of elements of the power system, operational information complexes (OIC) integrated substation management systems, get an idea of the composition of Electric Power Engineering consumers in various industries.

Students will be able to:

- The ability to develop consumer Electric Power Engineering systems
- satisfying reliable and safe operation that delivers quality voltage at electrical Power Engineering receivers.

Political Science

CODE - HUM 128

CREDIT - 2 (1/0/0)

PREREQUISITE - no

PURPOSE AND OBJECTIVES OF THE COURSE

The purpose of the course is the political socialization of students of the Technical University, ensuring the political aspect of training a highly qualified specialist on the basis of modern world and domestic political thought.

The aim of the course is to give the future specialist primary political knowledge that will serve as a theoretical basis for understanding political processes, for the formation of political culture, developing a personal position and a clearer understanding of the measure of their responsibility.

BRIEF DESCRIPTION OF THE COURSE

The course of political science is designed to introduce students to the basics of political science and

form a general idea of politics, its main aspects, problems, patterns and interaction with other spheres of public life.

KNOWLEDGE, SKILLS, SKILLS AT THE END OF THE COURSE

At the end of the course, the student should know:

- basic conceptual apparatus of political science;
- basic methodological approaches and paradigms of political science
- the system of power relations

The student must be able to:

- analyze the features of political systems and the functioning of political institutions;
- critically evaluate the theoretical approaches of political science;
- to compare political systems, institutions and actors in the cross-country and subnational context, based on the knowledge gained and the methods mastered;
- to make proposals and recommendations to public authorities.

Formation of critical thinking skills and the ability to apply it in practice. Development of skills for describing and analyzing current problems of modern society, the essence of social processes and relationships.

Physical education I

CODE – KFK101

CREDIT - 2 (0/0/2)

PREREQUISITE - Basic concepts of motor activity (speed, endurance, coordination, strength, flexibility, etc.), knowledge in the field of valeology, anatomy, knowledge of sections: 1. Be careful! Coronavirus; 2. Strengthen the immune system; 3. Nutrition and health; 4. Body types in men and women; 5. What is heart rate; 6. CPK SU

Goals and objectives of the course

The purpose of the course: The purpose of physical education of Satbayev University students is to form a personality and the ability to use a variety of means of physical culture and sports to preserve and strengthen health, psychophysical training and self-preparation for future professional activity. Course objectives: in order to achieve this goal, it is planned to solve the following educational, educational, developmental and health-improving tasks:

Understanding the social role of physical culture in personal development and preparation for future professional activity;

Knowledge of the scientific, biological and practical foundations of physical culture and a healthy lifestyle;

Formation of a motivational and value attitude to physical culture, attitude to a healthy lifestyle, physical self-improvement and self-education, the need for regular physical exercise and sports;

Mastering a system of practical skills and abilities that ensure the preservation and strengthening of health, mental well-being, the development and improvement of psychophysical abilities, personality qualities and properties, self-determination in physical culture;

Provision of general and professionally applied physical fitness, which determines the psychophysical readiness of the student for the future profession;

Gaining experience in the creative use of physical culture and sports activities to achieve life and professional goals.

Familiarization with the rules of judging by sports.

Brief description of the course

The course is intended for 1st year students of all specialties As part of the course, the student will master the practical use of the skills of performing the basic elements of athletics techniques, sports games, gymnastics and a set of standards for general physical training, including professionally applied physical training or one of the sports, methods of conducting independent physical exercises. Basic knowledge and skills in the field of physical culture and sports will be presented, as well as methods of building and rationing the load during independent classes; methods of compiling complexes of hygienic gymnastics and general developmental exercises; The final stage of the course is a multivariate test

and/ or the fulfillment of the established standards for general physical, sports and professional applied training.

After completing the course, the student must understand the role of physical culture and a healthy lifestyle; know the basics of physical culture and a healthy lifestyle; possess a system of practical skills and abilities that ensure the preservation and strengthening of health, development and improvement of psychomotor abilities and qualities. The student must be able to: - to dose the load during wellness and independent physical exercises; - evaluate the volume and intensity of physical activity, taking into account age and health status; - use the methods and means of PFP; - use a set of exercises on OFP, SFP and include sports and outdoor games, national games. At the end of the course, the student should know: - the purpose and objectives of physical training;

- content of training sessions; - rules for building and rationing the load during independent studies; - rules and methodology for composing complexes of hygienic gymnastics and general developmental exercises; - orientation of professional and applied physical training; - sets of exercises on OFP, SFP and the content of games used in practical classes.

Knowledge, skills and abilities at the end of the course

Knowledge gained during the course of the discipline: during the course of the discipline, the student will gain knowledge in the implementation of morphofunctional control and self-control during physical education and sports, dosing of physical activity and its orientation. Skills and abilities (professional, managerial, communicative....) acquired during the course of the discipline: students master a system of skills and abilities that ensure the preservation and strengthening of health, mental well-being, development and improvement of psychophysical abilities, personality qualities and properties, self-determination in physical culture; knowledge in the field of professionally applied physical fitness; creative use of the acquired experience of physical culture and sports activities to achieve life and professional goals.

Physics II

CODE – PHY112

CREDIT - 5 (1/1/1)

PREREQUISITE-diagnostic test /PHYS110-111

COURSE GOALS AND OBJECTIVES

the main purpose of teaching the course Physics I and Physics II is to form ideas about the modern physical picture of the world and the scientific worldview.

SUMMARY OF THE COURSE

The disciplines of Physics I and Physics II are the basis for theoretical training and engineering activities of graduates of higher technical schools and represent the core of physical knowledge necessary for an engineer operating in the world of physical laws. The course "Physics I" includes sections: physical foundations of mechanics, structure of matter and thermodynamics, electrostatics and electrodynamics. The discipline "Physics II" is a logical continuation of the study of the discipline "Physics I", and forms a holistic view of the course of General physics as one of the basic components of the General theoretical training of bachelors of engineering and technical profile. The discipline "Physics II" includes sections: magnetism, optics, nanostructures, fundamentals of quantum physics, atomic and nuclear physics.

KNOWLEDGE, SKILLS AT THE END OF THE COURSE

- skills to use knowledge of fundamental laws, theories of classical and modern physics, as well as the use of physical research methods as the basis of the system of professional activity.

Mathematics II

CODE – MAT102

CREDIT - 5 (1/0/2)

PREREQUISITE- Mathematics 1

COURSE GOALS AND OBJECTIVES

The purpose of teaching the course "Mathematics II" is to form bachelor's ideas about modern mathematics as a whole as a logically coherent system of theoretical knowledge.

The goal of the course is to instill students with solid skills in solving mathematical problems and bring the solution to a practically acceptable result. Develop primary skills in mathematical research of applied issues and the ability to independently understand the mathematical apparatus contained in the literature related to the student's specialty.

SUMMARY OF THE COURSE

The course "Mathematics II" provides an accessible presentation of the sections: elements of linear algebra and analytical geometry, differential calculus of functions of many variables, multiple integrals. "Mathematics II" is a logical continuation of the course "Mathematics I".

KNOWLEDGE, SKILLS, SKILLS AT THE END OF THE COURSE

The study of this discipline will allow you to apply in practice the theoretical knowledge and skills obtained with a high degree of understanding in the course sections, use them at the appropriate level; translate into mathematical language the simplest problems posed in terms of other subject areas; acquire new mathematical knowledge using educational and information technologies; solve applied problems in the field of professional activity.

READING ELECTRICAL DIAGRAMS

CODE – ERG158

CREDIT – 5 (1/0/2)

PREREQUISITE – no.

PURPOSE AND OBJECTIVES OF THE COURSE

The purpose of the course is to form basic knowledge about devices and their interrelationships, as well as their graphic designations according to state standards and the unified system of design documentation (ESCD).

The objective of the course is:

- mastering theoretical knowledge to read drawings, process diagrams, power electrical equipment diagrams, specifications and technological documentation.
- study of conditionally graphic, alphanumeric designations used in electrical circuits;
- obtaining skills in performing electrical circuits and drawings in manual and computer ways;

BRIEF DESCRIPTION OF THE COURSE

After completing the course, the student must demonstrate the ability to:

- Read drawings, process diagrams, diagrams of power electrical equipment, specifications and technological documentation;
- Perform electrical equipment circuits according to the requirements of the ESCD.
- Make small schematic, electrical and wiring diagrams;

The student must 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;

The student should 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;
- Rules of registration and reading of design and technological documentation;
- Requirements of the state standards of the Unified System of Design Documentation (ESKD).

Physical education II

CODE – KFK102

CREDIT - 2 (0/0/2)

PREREQUISITE - Basic concepts of motor activity (speed, endurance, coordination, strength, flexibility, etc.), knowledge in the field of valeology, anatomy, knowledge of sections: 1. Be careful! Coronavirus; 2. Strengthen the immune system; 3. Nutrition and health; 4. Body types in men and women; 5. What is heart rate; 6. CPK SU

Goals and objectives of the course

The purpose of the course: The purpose of physical education of Satbayev University students is to form a personality and the ability to use a variety of means of physical culture and sports to preserve and strengthen health, psychophysical training and self-preparation for future professional activity. Course objectives: in order to achieve this goal, it is planned to solve the following educational, educational, developmental and health-improving tasks:

Understanding the social role of physical culture in personal development and preparation for future professional activity;

Knowledge of the scientific, biological and practical foundations of physical culture and a healthy lifestyle;

Formation of a motivational and value attitude to physical culture, attitude to a healthy lifestyle, physical self-improvement and self-education, the need for regular physical exercise and sports;

Mastering a system of practical skills and abilities that ensure the preservation and strengthening of health, mental well-being, the development and improvement of psychophysical abilities, personality qualities and properties, self-determination in physical culture;

Provision of general and professionally applied physical fitness, which determines the psychophysical readiness of the student for the future profession;

Gaining experience in the creative use of physical culture and sports activities to achieve life and professional goals.

Familiarization with the rules of judging by sports.

Brief description of the course

The course is intended for 1st year students of all specialties As part of the course, the student will master the practical use of the skills of performing the basic elements of athletics techniques, sports games, gymnastics and a set of standards for general physical training, including professionally applied physical training or one of the sports, methods of conducting independent physical exercises. Basic knowledge and skills in the field of physical culture and sports will be presented, as well as methods of building and rationing the load during independent classes; methods of compiling complexes of hygienic gymnastics and general developmental exercises; The final stage of the course is a multivariate test and/ or the fulfillment of the established standards for general physical, sports and professional applied training.

After completing the course, the student must understand the role of physical culture and a healthy lifestyle; know the basics of physical culture and a healthy lifestyle; possess a system of practical skills and abilities that ensure the preservation and strengthening of health, development and improvement of psychomotor abilities and qualities. The student must be able to: - to dose the load during wellness and independent physical exercises; - evaluate the volume and intensity of physical activity, taking into account age and health status; - use the methods and means of PFP; - use a set of exercises on OFP, SFP and include sports and outdoor games, national games. At the end of the course, the student should know: - the purpose and objectives of physical training;

- content of training sessions; - rules for building and rationing the load during independent studies; - rules and methodology for composing complexes of hygienic gymnastics and general developmental exercises; - orientation of professional and applied physical training; - sets of exercises on OFP, SFP and the content of games used in practical classes.

Knowledge, skills and abilities at the end of the course

Knowledge gained during the course of the discipline: during the course of the discipline, the student will gain knowledge in the implementation of morphofunctional control and self-control during physical education and sports, dosing of physical activity and its orientation. Skills and abilities (professional, managerial, communicative...) acquired during the course of the discipline: students master a system of skills and abilities that ensure the preservation and strengthening of health, mental well-being, development and improvement of psychophysical abilities, personality qualities and properties, self-determination in physical culture; knowledge in the field of professionally applied physical fitness; creative use of the acquired experience of physical culture and sports activities to achieve life and professional goals.

Cultural studies

CODE - HUM129

CREDIT - 2 (1/0/0)

PREREQUISITE - no

PURPOSE AND OBJECTIVES OF THE COURSE

The purpose of the course:

to form undergraduate students' understanding of the specifics of the development of national culture in the context of world culture and civilization, the need to preserve the cultural code of the Kazakh people, the ability in independent professional activity to carry out a strategy for preserving the cultural heritage of the Kazakh people in a dynamically changing multicultural world and society.

Course objectives:

- to describe the morphology and anatomy of culture as a system of parameters and forms in the contexts:

- nature, man, society;

- to explain the origin and essence of signs, meanings, archetypes, symbols as a system of cultural code through correlation with the type of material culture determined by the way of being;

- to organize information about the cultural heritage of the inhabitants of Kazakhstan and to determine the channels of their influence on the formation of the culture of the Kazakh people;

- to classify the cultural capital of the Turks, to organize the forms and channels of cultural interaction with the peoples of Western Europe, the Middle East, to identify their contribution to the intellectual and cultural history of mankind and the Kazakh people;

- provide reasoned and reasonable information about the various stages of the development of Kazakh culture as a factor in the preservation of cultural heritage and the Kazakh language, including modern state programs for its development and modernization;

- to give an objective assessment of the national.

BRIEF DESCRIPTION OF THE COURSE

The course is intended for students of the EP «Cultural Studies» aimed at the development of a socio-humanitarian worldview as the basis for the modernization of public consciousness through the formation of cultural identity, the ability to analyze and evaluate cultural situations based on understanding the nature of cultural processes, the specifics of cultural objects, the role of cultural values in intercultural communication.

KNOWLEDGE, SKILLS, SKILLS AT THE END OF THE COURSE

As part of the course, the student will master the practical use of methods of cultural studies in various aspects of life. The basic knowledge and skills in the field of philosophy and cultural studies will be presented, as well as methods of comparison, analysis, synthesis, and resolution of the situation by the method of dialogue.

At the end of the course, the student should know:

- information about the cultural heritage of the inhabitants of Kazakhstan and determine the channels of their influence on the formation of the culture of the Kazakh people;

- classification of the cultural capital of the Turks, to organize the forms and channels of cultural interaction with the peoples of Western Europe, the Middle East, to identify their contribution to the intellectual and cultural history of mankind and the Kazakh people;

- provide reasoned and reasonable information about the various stages of the development of Kazakh culture as a factor in the preservation of cultural heritage and the Kazakh language, including modern state programs for its development and modernization.

Electrical materials science

CODE - ERG176

CREDIT - 5 (2/0/1)

PREREQUISITES - NO

THE PURPOSE AND TASK OF THE COURSE

- Building knowledge of the principles of the use of electrical materials in electrical and electrical devices.

SUMMARY OF THE COURSE

Classification of electrical materials; dielectrics, their electrical conductivity, breakdown of gases, liquid and solid dielectrics; Thermal conductivity Radiation resistance of materials; Liquid dielectrics; Polymers Inorganic electrical insulation materials; conductor, superconducting and semiconductor materials. Magnetic materials, classification and properties of magnetic materials. The knowledge gained by students in the study of discipline. "Electrical materials science" is necessary for deeper assimilation of subsequent basic and special disciplines.

KNOWLEDGE, SKILLS, SKILLS AT THE END OF THE COURSE

Students will know:

- study of the modern classification of electrical materials and the relationship of their basic characteristics with the structure and processes they process when exposed to electromagnetic field, heat, humidity, chemically aggressive environments and other technological operational factors.

Students will be able to:

- Building a future specialist with high practical skills sufficient for successful manufacturing activities.

Environmental and the Sustainable development

CODE – CHE452

CREDIT - 2 (1/0/0)

PREREQUISITES - NO

PURPOSE AND OBJECTIVES OF THE COURSE

Purpose of the course: Formation of knowledge on global environmental problems of our time and ways of achieving sustainable development for mankind, to provide knowledge about the biosphere capacity of the economic development of civilization, the principles and methods of achieving sustainable development for mankind

Objective of the course:

- to understand the reasons for the origin and development of environmental problems of our time;
- to master a system-integrated approach in solving environmental problems of our time;
- to acquire practical skills in the development and implementation of long-term environmental programs for the sustainable development of civilization.

BRIEF DESCRIPTION OF THE COURSE

The subject of study is the biosphere, a unified system with numerous synergistic effects with unique properties that explain its function and role in supporting life on Earth. The biosphere is open to other spheres and exchanges matter, energy and information with other spheres. However, the huge and steadily increasing impact of human activities on the biosphere has reached a level where human activities have a significant impact on global cycles and flows, in the form of climate change, pollution, catastrophic depletion of biodiversity on Earth and other global problems of our time. Solutions to these problems are spelled out for sustainable development.

KNOWLEDGE, ABILITY, SKILLS TO COMPLETE THE COURSE

KNOW:

- Assessment of the state of the environment during global changes;
- the main stages of the development of civilization and environmental crises characteristic of each of them;
- principles of respect for nature and sustainable development of civilization;
- methodology for conducting field and laboratory environmental studies.

BE ABLE TO:

- analyze ecological processes and phenomena;

- to form an ecological worldview based on the use of the provisions of the concept of sustainable development.

OWN SKILLS:

- assessment of the state of the environment and human activities;
- analysis of the main stages of the development of civilization from the point of view of global ecology;
- acquisition of practical skills for adaptation and achieving sustainable development in the context of global changes.

Sociology

CODE - HUM127

CREDIT - 2 (1/0/0)

PRE-REQUISIT – NO

PURPOSE AND OBJECTIVES OF THE COURSE

The purpose of the course: the formation of theoretical knowledge about society as an integral system, its structural elements, connections and relationships between them, the features of their functioning and development, as well as about existing sociological theories explaining social phenomena and processes.

Objectives of mastering the discipline:

- study of the basic values of social culture and the willingness to rely on them in their personal, professional and general cultural development;
- study and understanding of the laws of development of society and the ability to operate with this knowledge in professional activities;
- the ability to analyze socially significant problems and processes, etc.

BRIEF DESCRIPTION OF THE COURSE

The discipline is designed to improve the quality of both general humanitarian and professional training of students. Knowledge in the field of sociology is the key to effective professional activity of a future specialist, which is impossible in modern society without understanding social processes, as well as without mastering the skills of their correct interpretation.

KNOWLEDGE, ABILITY, SKILLS TO COMPLETE THE COURSE

As a result of studying the discipline, the student must:

know:

- features of the sociological approach to the interpretation of the basic concepts and terms of the social sciences;
- basic classical sociological theories and schools;
- key concepts of sociology: society, group, socialization, social facts and social actions, norms, values, social structure, mobility, culture, social institution, social organization, social process, etc .;
- basic approaches to identifying and analyzing the social structure of society, social changes;
- the main regularities of the course of social processes and the mechanisms of functioning of the main social communities;
- patterns of socio-economic, political and managerial processes, the main approaches to their study, as well as features of their application;

be able to:

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- describe the processes and observed phenomena occurring in society using sociological terminology;
- explain differences in approaches to defining sociological concepts;
- consider social phenomena, institutions and processes from different points of view, argue their own position on the problem, comparing and comparing some theoretical perspectives;
- find, analyze and present factual data, analytical information about social groups, institutions, processes and phenomena, revealing abstract concepts using examples using various kinds of data;

own:

- the ability to use sociological knowledge in practice to analyze the phenomena and events of social reality;
- the skills of independent individual preparation, constructive communication and the performance of appropriate roles in the implementation of group projects, participation in the discussion;
- presentation of the results of individual and group analytical work in written and oral form;
- skills of academic and grammatically correct writing, text structuring, processing of sources, design of the reference apparatus.

Information and communication technologies

CODE – CSE677

CREDIT - 5 (2/1/0)

PREREQUISITES – NO

COURSE GOALS AND OBJECTIVES

- Learning how to apply modern information technology in the field of professional activities. The course's objectives include:
 - Uncover the basic concepts of computer system architecture;
 - Uncover the basic concepts of information and information technologies and substantive terminology;
 - Teach to work with software interfaces of operating systems;
 - Teach to work with data in a different view, both table structured and unstructured;
 - Teach to apply the basic principles of information security;
 - Uncover the concepts of data formats and media content. Learn how to work with typical media data processing applications. Use modern presentation approaches;
 - Discover the concepts of modern social, cloud and mail platforms, and how to work with them;
 - Learn to use algorithmization and programming techniques to solve business process automation problems

SUMMARY OF THE COURSE

The course contains a training program aimed at leveling students' basic knowledge in the field of information and communication technologies. Contains a complete set of topics, according to the MODEL GOSO Curriculum, with a predominance of nurturing practical data skills, algorithmization and programming. The course is designed to teach students not only basic concepts of architecture and modern infrastructure of information and communication technologies, but also to teach to use these tools to solve problems of an applied nature. To teach to optimize processes, to apply adequate models and methods of solving practical problems using modern methods and tools of information technology, to automate routine processes, to be productive and effective.

KNOWLEDGE, SKILLS, SKILLS AT THE END OF THE COURSE

Students will know:

- Computer device;
- The architecture of computing systems;
- Information and communication technology infrastructure;
- Interfaces of modern operating systems;

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- Modern tools for dealing with data of various nature and purpose;
 - Types of information security threats, principles, tools, and methods for data protection;
 - Python programming language.
- Students will be able to:
- Work with the interfaces of modern operating systems;
 - Work with state-of-the-art applied software to work with data of a different nature and purpose;
 - Apply modern social, cloud, mail platforms to organize business processes;
 - Programming in an algorithmic programming language;
 - Analyze, model, design, implement, test and evaluate information and communication technology systems

Mathematics III

CODE - MAT103

CREDIT - 5 (2/1/0)

PREREQUISITES - Mathematics I, Mathematics II

COURSE GOALS AND OBJECTIVES

The purpose of teaching the course "Mathematics III" is to develop basic knowledge and skills with a high degree of understanding in the course sections that help to analyze and solve theoretical and practical problems.

Course objective: instilling students with the ability to independently study educational literature, conduct theoretical-probabilistic and statistical analysis of applied problems; developing logical thinking and improving the General level of mathematical culture.

SUMMARY OF THE COURSE

The course "Mathematics III" includes sections: series theory, elements of probability theory and mathematical statistics and is a logical continuation of the discipline "Mathematics II".

KNOWLEDGE, SKILLS, SKILLS AT THE END OF THE COURSE

Student should know:

- the theory of numerical series;
- the theory of functional series;
- fourier's rows;
- elements of probability theory and mathematical statistics;

must be able to:

- solving problems on all sections of the series theory;
- to find the probability of events;
- find numerical characteristics of random values.
- use statistical methods to process experimental data;

The theoretical foundations of electrical engineering I

КОД – ELC542

CREDIT - 5 (2/1/0)

PREREQUISITES – Physics I

COURSE GOALS AND OBJECTIVES

Teaching students to choose the theoretical basics of electrical engineering, the principles and methods of calculating electrical circuits, scientific foundations and the modern state of electrical engineering. It deepens and develops the training of engineers who master modern construction and calculation technology, as well as the selection of electrical devices.

SUMMARY OF THE COURSE

Discipline examines: the basic concepts and definitions used in electrical engineering; Modern methods of modeling electromagnetic processes; Methods for analyzing electrical and magnetic circuits; Numerical methods of analyzing electrical circuits; Basic laws and principles of electrical engineering, properties and characteristics of electrical circuits; Methods for analyzing electrical circuits in established and transitional modes; choose the optimal method of calculation, determine the basic parameters and characteristics of electrical circuits.

KNOWLEDGE, SKILLS, SKILLS AT THE END OF THE COURSE

The course "Theoretical Basics of Electrical Engineering" gives students knowledge about electrical and magnetic phenomena, and their use for practical purposes and provides comprehensive training of future specialists: high professional level, development of creativity, ability to formulate and solve at a high scientific level the problems of the study specialty, the ability to creatively apply and solve problems independently.

Theoretical foundations of heat engineering

CODE-ERG519

CREDIT – 5 (2/0/1)

PREREQUISITES-Electrical materials science

COURSE GOALS AND OBJECTIVES

The discipline "Theoretical foundations of heat engineering" aims to give students extensive knowledge of the basic provisions and laws of thermodynamics, modern methods of analysis and calculation of thermodynamic processes and cycles of heat power plants, the fundamental laws and methods of analysis and calculation of heat and mass transfer processes, to develop practical skills in determining the characteristics of heat and mass transfer processes of heat power and heat technological installations and systems.

BRIEF DESCRIPTION OF THE COURSE

The discipline "Theoretical foundations of heat engineering" is included in the cycle basic disciplines and is a mandatory component for bachelors of higher educational institutions studying in the specialty 5B071700 - "heat power Engineering".

KNOWLEDGE, SKILLS, SKILLS at the END of the COURSE

Master knowledge in the field of heat and mass transfer, technical thermodynamics, and various types of heat exchange.

STUDENTS SHOULD HAVE AN IDEA THAT:

- the subject, research methods and applications of technical thermodynamics;
- about the technological scheme of thermal power stations and the main heat technologies;
- about the principles of operation of heat engines and installations;
- about the principles of operation of heat transformers;
- about heat recovery;
- on the phenomena of momentum, heat, and mass transfer;
- solutions of the heat conduction equation and the simplest system of convective heat transfer equations in a homogeneous medium with constant thermophysical properties under various conditions of unambiguity;
- solutions of problems of convective heat exchange by methods of thermal boundary layer, similarity of heat exchange phenomena, relaxation, finite differences and elements of physical analogies and modeling

of heat exchange processes;

- on heat and mass transfer during phase transitions and chemical transformations;
- on the basic concepts and laws of mass transfer and triple analogy;
- on radiant heat exchange, methods for calculating the resulting radiant flux;
- about heat transfer, methods of transfer intensification and calculation of heat exchangers;
- about Power Engineering and environmental problems of heat use;
- about modern scientific research in the field of heat engineering.

Electrical and thermal measurements

CODE - ERG 528

CREDIT - 5 (2/1/0)

PREREQUISITE - NO

THE PURPOSE AND TASK OF THE COURSE

Teaching the course "Electrical and Thermal Dimensions" aims to give students the basics of knowledge and skills necessary to solve the production and scientific tasks associated with the choice of methods and means of measurement, with the measurement of different physical values, with the assessment of the accuracy of measurement results.

SUMMARY OF THE COURSE

The "Electrical and Thermal Dimension" discipline is a profiling subject where students receive basic knowledge of theory, device, as well as their graphic designation according to state standards and a single system of design documents (ESCD). They also gain knowledge about metrology, measurement classification and their errors, methods of measuring various electrical and thermal values.

KNOWLEDGE, SKILLS, SKILLS AT THE END OF THE COURSE

Students will know:

As a result of studying the discipline, students should:

- know the basic concepts of action, properties, characteristics of common means of measuring different physical values;
- know the basic methods of measuring different physical values;
- to be able to choose methods and means of measurement;
- be able to take measurements and assess the accuracy of measurements;
- be able to check the means of measurement.

Physical education III

CODE – KFK103

CREDIT - 2 (0/0/2)

PREREQUISITE - Basic concepts of motor activity (speed, endurance, coordination, strength, flexibility, etc.), knowledge in the field of valeology, anatomy, knowledge of sections: 1. Be careful! Coronavirus; 2. Strengthen the immune system; 3. Nutrition and health; 4. Body types in men and women; 5. What is heart rate; 6. CPK SU

Goals and objectives of the course

The purpose of physical education of students of Satbayev University is the formation of personality and the ability to use a variety of means of physical culture and sports to preserve and strengthen health, psychophysical training and self-preparation for future professional activity.

Course Description: Course objectives: in order to achieve this goal, it is planned to solve the following educational, educational, developmental and health-improving tasks:

Understanding the social role of physical culture in personal development and preparation for future professional activity;

Knowledge of the scientific, biological and practical foundations of physical culture, and a healthy lifestyle;

Formation of a motivational and value attitude to physical culture, attitudes towards a healthy lifestyle, physical self-improvement and self-education, the need for regular physical exercise and sports;

Mastering a system of practical skills and abilities that ensure the preservation and strengthening of health, mental well-being, the development and improvement of psychophysical abilities, personality qualities and properties, self-determination in physical culture;

Provision of general and professionally applied physical fitness, which determines the psychophysical readiness of the student for the future profession;

Gaining experience in the creative use of physical culture and sports activities to achieve life and professional goals.

Familiarization with the rules of judging by sports

Brief description of the course

The course is intended for 2nd year students of all specialties

As part of the course, the student will master the forms and methods of forming a healthy lifestyle within the framework of the vocational education system. GET ACQUAINTED WITH THE NATURAL-SCIENTIFIC FOUNDATIONS OF PHYSICAL EDUCATION, MASTER MODERN HEALTH TECHNOLOGIES.

Master the basic methods of independent physical education and sports. And also as part of the course, the student will master the rules of judging in all sports.

The final stage of the course is the CONTROL STANDARDS (Presidential tests). Who evaluate their physical fitness.

After completing the course, the student must understand the role of physical culture and a healthy lifestyle; know the basics of physical culture and a healthy lifestyle; possess a system of practical skills and abilities that ensure the preservation and strengthening of health, development and improvement of psychomotor abilities and qualities.

The student must be able to:

- independently use modern wellness technologies;
- assess your health status to determine physical activity
- to use knowledge, methods and means of professionally applied physical training.

At the end of the course, the student should know:

- fundamentals of a healthy lifestyle (HLS);
- CONCEPTS OF THE SOCIO-BIOLOGICAL FOUNDATIONS OF PHYSICAL CULTURE;
- rules for building and rationing the load during independent studies; - rules and methodology for composing complexes of hygienic gymnastics and general developmental exercises;
- RULES OF REFEREEING IN THE STUDIED SPORTS.

Fundamentals of Entrepreneurship, Leadership and Anticorruption culture

CODE – MNG487

CREDIT – 5 (1/0/1)

PREREQUISITE – NO

PURPOSE AND OBJECTIVES OF THE COURSE

To form systematic knowledge about the basics of the organization of entrepreneurial activity. Develop organizational and managerial skills in conducting business. To form knowledge about the responsibility of business entities, the student must master aesthetic concepts and categories, the content and features of professional ethics in legal activity, possible ways (methods) of resolving moral conflict situations in the professional activity of a lawyer, the essence of professional and moral deformation and ways to prevent and overcome it, the features of lawyer etiquette, its basic norms and functions; be able to evaluate the facts and phenomena of professional activity from an ethical point of view, apply moral rules and norms of behavior in specific life situations.

BRIEF DESCRIPTION OF THE COURSE

Fundamentals of Entrepreneurship, leadership and anti-corruption culture

The discipline is aimed at forming students' organizational and legal form of the enterprise based on the goals of the enterprise and the specifics of the organization and functioning of enterprises in various forms; to assess the effectiveness of entrepreneurial activity; to assess external and internal risks for the enterprise; to develop business plans taking into account regulatory, resource, administrative and other conditions. Set goals and form tasks related to the implementation of professional functions. Organize team interaction to solve management tasks. Diagnose organizational culture, identify its strengths and weaknesses, develop proposals for its improvement. Develop measures to motivate and stimulate the organization's staff.

KNOWLEDGE, SKILLS, SKILLS AT THE END OF THE COURSE

To know: the typology of entrepreneurship; the role of the environment in the development of entrepreneurship; technology of entrepreneurial decision-making; the basic components of the internal environment of the company; organizational and legal forms of entrepreneurial activity; features of constituent documents; procedure for state registration and licensing of the enterprise; the mechanisms of functioning of the enterprise; essence of entrepreneurial risk and the main ways to reduce risk; main elements of the culture of entrepreneurship and corporate culture; list of information to be protected; essence and types of responsibility of entrepreneurs; methods and tools of financial analysis; main provisions of accounting in small enterprises; types of taxes; a

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system of indicators of the effectiveness of entrepreneurial activity; principles and methods of assessing the effectiveness of entrepreneurial activity; ways to improve and control the effectiveness of entrepreneurial activity.

Be able to: characterize the types of entrepreneurial activity and the business environment; operate in practice with economic categories; develop a business plan; prepare a package of documents for opening a business; draw up documents for opening a bank account; determine the organizational and legal form of the enterprise; develop a strategy and tactics of the enterprise; comply with professional ethics, ethical codes of the company, generally accepted rules of business;

Psychology

CODE - HUM122

CREDIT - 2 (1/0/0)

PRE-REQUISIT – NO

PURPOSE AND OBJECTIVES OF THE COURSE

The purpose of the discipline is the formation of psychological knowledge, skills and competencies necessary in professional activity; development of students' psychological thinking and systematization of their knowledge based on the study of general psychological laws.

Objectives of mastering the discipline:

- 1) mastering basic psychological concepts, theories and approaches to the study of personality and society;
- 2) the formation of ideas about the basic principles of the functioning of socio-psychological phenomena, psychological patterns of age and cultural socialization of a person, factors of his learning and cognitive development;
- 3) instilling the skills of using the knowledge gained in the process of mastering psychology in professional activity.
- 4) to develop the skills and abilities of analytical and research thinking, creative development of the content of psychological sources of foreign and domestic authors and methods of obtaining psychological information;
- 5) the formation of critical thinking skills and the ability to apply it in practice.

BRIEF DESCRIPTION OF THE COURSE

The discipline "Psychology" examines the patterns of the emergence, development and functioning of mental processes, states, personality traits involved in this or that activity, the patterns of development and functioning of the psyche as a special form of life. The study of this discipline is aimed at the formation of psychological culture, worldview, self-awareness, psychological thinking of the individual for social and professional interaction.

KNOWLEDGE, ABILITY, SKILLS TO COMPLETE THE COURSE

As a result of studying the discipline, the student must:

know:

- characterization of psychology as a science, its methods, tasks and history of development;
- the essence and structure of the emergence and development of the psyche and mental phenomena, taking into account the age and social characteristics of manifestation;

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- general psychological patterns of development of psychological phenomena;
- knowledge of the psychological laws of communication and interaction of people;

- the dynamics of development and structure of personality and human activity;

be able to:

- understand and explain the need for psychological and socio-psychological knowledge in professional activities;

- to analyze the main categories of psychology, interpersonal relationships in a group, the characteristics of the activities of various individuals;

- to apply psychological knowledge as a means of self-knowledge and self-development;

- to design effective methods of work in various spheres of social communication based on the content of psychological theories and ideas;

own:

- skills of argumentation, focused on achieving high results of educational and professional activities.

- the ability to work in a team, correctly defend one's point of view, propose new solutions, find compromises;

- skills of systemic thinking and holistic perception of psychological reality;

- the ability to analyze and form judgments about the psychological problems of a person in the modern conditions of the development of society.

Philosophy

КОД – HUM124

CREDIT - 5 (1/0/2)

PREREQUISITES - The Modern History of Kazakhstan

COURSE GOALS AND OBJECTIVES

The aim of the course is to develop cognitive, operational, communicative, self-forming competencies for solving problems:

- contribute to the development of adequate world-views in the modern world;
- To form creative and critical thinking among students;
- distinguish between the relationship between spiritual and material values, their role in human life, society and civilization;
- to help define one's attitude to life and to find harmony with the world around them.

SUMMARY OF THE COURSE

"Philosophy" is the formation of a holistic worldview, which developed in the context of the socio-historical and cultural development of mankind. Familiarity with the basic paradigms of the methodology of teaching philosophy and education in classical and post classical traditions of philosophy. Theoretical sources of this course are the concepts of Western, Russian, Kazakh yin history and philosophy theory.

KNOWLEDGE, SKILLS, SKILLS AT THE END OF THE COURSE

- Knowing the basic terms, the main concepts and problems of philosophy;
- Knowing the basic philosophical ways to solve ideological issues in the context of culture;
- the ability to analyze the history of philosophical thought development;
- the ability to identify alternative ways of setting and solving world-views issues in the history of human development;
- the ability to identify basic theoretical approaches in the relationship between man and society;
- The ability to master the technique of doing independent work;
- The skills of finding material to organize
- The skills to freely debate and make rational decisions;
- ethical principles in professional activities.

Life safety

CODE – CHE451

CREDIT 2 (1/0/0)

PREREQUISITES: NO

PURPOSE AND OBJECTIVES OF THE COURSE

The purpose of the discipline: to study the impact of anthropogenic hazards and risks in the conditions of new realities that disrupt the normal functioning of people, causing accidents, leading to emergencies and catastrophes, including environmental ones. To instill the skills to identify these dangers and master the prevention measures or the principles of protection against them.

SHORT COURSE DESCRIPTION

Life safety is concerned with the identification of hazards and risks that affect human health and life. Life safety gives an idea of the inseparable unity of effective professional activity with the requirements for human safety and security. Life safety includes the study of the basic principles of ensuring the safety of human interaction with his environment; rational and safe conditions of his activity; the consequences of human exposure to traumatic, harmful and damaging factors; means and methods of improving safety, environmental friendliness and sustainability of technical means and technological processes.

KNOWLEDGE, SKILLS, SKILLS AT THE END OF THE COURSE

Familiarization of students with the control of parameters and the level of negative impacts on their compliance with regulatory requirements; effective use of protective equipment against negative impacts; development of measures to improve the safety and environmental friendliness of production activities; planning and implementation of measures to protect production personnel and the public.

Heat and mass transfer equipment of the enterprise

CODE-ERG521

CREDIT – 5 (2/0/1)

PREREQUISITES-Physics I, II course

GOALS AND OBJECTIVES

Purpose of the course: the purpose of studying the discipline "heat and mass Transfer equipment of enterprises" is to train specialists in the application of thermodynamics and heat transfer methods for analyzing the processes of heat and mass transfer equipment of thermal power plants and other industrial enterprises.

BRIEF DESCRIPTION OF THE COURSE

"Calculation and design of heat and mass transfer equipment" examines the processes of heat and mass transfer in heat power equipment and installations. These include boiler installations, waste heat boilers, and heat exchangers of various pressures.

KNOWLEDGE, SKILLS AT THE END OF THE COURSE

Master knowledge in the field of heat and mass transfer, which is based on the course "Theoretical foundations of heat engineering".

STUDENTS SHOULD HAVE AN IDEA THAT:

Principles of operation schemes of combined-cycle gas installations, in particular waste heat boilers, gas-gas, gas-water and other types of heat exchangers;

Know the basic laws and concepts of heat and mass transfer; thermophysical characteristics of bodies and media; equations of interrelations of system parameters.

Be able to use the basic provisions and laws of heat engineering to analyze heat exchange processes; use tables and diagrams, calculate the efficiency of the cycle based on heat exchange processes.

Industrial electronics

CODE-ERG509

CREDIT – 5 (2/1/0)

PREREQUISITES-Physics II

COURSE GOALS AND OBJECTIVES

Familiarizing students with the basic information about industrial electronics, their application and developing students ' skills to work with them.

BRIEF DESCRIPTION OF THE COURSE

As a result of mastering the discipline "Industrial electronics", students will

know:

- the basic element base of electronics;
- the principle of operation of the main electronic devices;
- characteristics of electronic devices;
- device of electronic converters;

Be able to:

- read electronic circuits;
- perform basic calculations of electronic devices;
- collect circuits of electronic converters;

possess:

- methods for calculating the most common electronic devices;
- skills in working with electronic converters.

Physical education IV

CODE – KFK104

CREDIT - 2 (0/0/2)

PREREQUISITE - Basic concepts of motor activity (speed, endurance, coordination, strength, flexibility, etc.), knowledge in the field of valeology, anatomy, knowledge of sections: 1. Be careful! Coronavirus; 2. Strengthen the immune system; 3. Nutrition and health; 4. Body types in men and women; 5. What is heart rate; 6. CPK SU

Goals and objectives of the course

The purpose of physical education of students of Satbayev University is the formation of personality and the ability to use a variety of means of physical culture and sports to preserve and strengthen health, psychophysical training and self-preparation for future professional activity.

Course Description: Course objectives: in order to achieve this goal, it is planned to solve the following educational, educational, developmental and health-improving tasks:

Understanding the social role of physical culture in personal development and preparation for future professional activity;

Knowledge of the scientific, biological and practical foundations of physical culture, and a healthy lifestyle;

Formation of a motivational and value attitude to physical culture, attitudes towards a healthy lifestyle, physical self-improvement and self-education, the need for regular physical exercise and sports;

Mastering a system of practical skills and abilities that ensure the preservation and strengthening of health, mental well-being, the development and improvement of psychophysical abilities, personality qualities and properties, self-determination in physical culture;

Provision of general and professionally applied physical fitness, which determines the psychophysical readiness of the student for the future profession;

Gaining experience in the creative use of physical culture and sports activities to achieve life and professional goals.

Familiarization with the rules of judging by sports

Brief description of the course

The course is intended for 2nd year students of all specialties

As part of the course, the student will master the forms and methods of forming a healthy lifestyle within the framework of the vocational education system. GET ACQUAINTED WITH THE NATURAL-SCIENTIFIC FOUNDATIONS OF PHYSICAL EDUCATION, MASTER MODERN HEALTH TECHNOLOGIES.

Master the basic methods of independent physical education and sports. And also as part of the course, the student will master the rules of judging in all sports.

The final stage of the course is the CONTROL STANDARDS (Presidential tests). Who evaluate their physical fitness.

After completing the course, the student must understand the role of physical culture and a healthy lifestyle; know the basics of physical culture and a healthy lifestyle; possess a system of practical skills and abilities that ensure the preservation and strengthening of health, development and improvement of psychomotor abilities and qualities.

The student must be able to:

- independently use modern wellness technologies;
- assess your health status to determine physical activity
- to use knowledge, methods and means of professionally applied physical training.

At the end of the course, the student should know:

- fundamentals of a healthy lifestyle (HLS);
- CONCEPTS OF THE SOCIO-BIOLOGICAL FOUNDATIONS OF PHYSICAL CULTURE;
- rules for building and rationing the load during independent studies; - rules and methodology for composing complexes of hygienic gymnastics and general developmental exercises;
- RULES OF REFEREEING IN THE STUDIED SPORTS.

Laboratory workshop on modern industrial technologies in electric power industry I

КОД – ERG 504

CREDIT - 5 (0/3/0)

PREREQUISITES – NO

COURSE GOALS AND OBJECTIVES

The goal of teaching discipline is to gain students basic knowledge in the development and design of automation and management software systems.

To examine the tasks solved by the industrial controller in the automated process management systems.

To study the architecture and composition of model series of industrial controllers;

Acquire practical skills in using industrial controllers in the implementation of typical technological controls and controls;

SUMMARY OF THE COURSE

To form a solid foundation of knowledge, a high mathematical culture and practical skills, sufficient for successful production activities and allow him to master new necessary knowledge and achievements in the field of programming and engineering tasks.

KNOWLEDGE, SKILLS, SKILLS AT THE END OF THE COURSE

Learn the methodology of automated software development of automation and management systems.

Learn how to use state-of-the-art software development and design tools, as well as design and regulatory documentation, to acquire skills in building quality automation and management software systems;

Provide theoretical training in software development and design of tools and automation and management systems.

Engineering Thermodynamics

CODE-ERG153

CREDIT – 5 (2/0/1)

PREREQUISITES-Physics I, II course

GOALS AND OBJECTIVES

Purpose of the course: the purpose of studying the discipline "Technical thermodynamics" is to train specialists in the application of thermodynamic methods for process analysis in order to ensure reliable and efficient operation of heat and power and heat-mechanical equipment.

BRIEF DESCRIPTION OF THE COURSE

The course "Technical thermodynamics" examines the processes associated with the thermal processes of heat power plants and is part of the basic cycle of higher professional education disciplines in the specialty 5B071700 - "heat power".

KNOWLEDGE, SKILLS, SKILLS AT the end of the COURSE

Master thermodynamic methods for analyzing the stability of the state of thermodynamic systems, study the thermodynamic properties of substances, master the methods of analysis and optimization of cycles, get an idea of methods for converting thermal Power Engineering into electrical and mechanical Power Engineering.

As a result of studying this discipline, students should:

have an idea of: the

Principles of operation of heat and cooling machines, schemes of thermal power plants, gas turbine plants and steam power plants;

Know the basic laws and concepts of thermodynamics; thermophysical characteristics of bodies and media; equations of interrelation of system parameters.

Be able to use the basic principles and laws of thermodynamics for process analysis; use tables and diagrams in the analysis of processes and cycles to acquire practical skills in calculating heat and working in thermodynamic cycles, expiration, compression and efficiency of cycles.

Power and electrotechnical equipment

CODE-ERG529

CREDIT – 5 (2/0/1)

PREREQUISITES – no

PURPOSE AND PURPOSE OF THE COURSE

The discipline is the basis for studying specialized disciplines of higher professional education-bachelor's degree. The purpose of studying the discipline "Power and electrical equipment" is to acquire students ' knowledge on the basics and trends of development of electrical engineering and electrical equipment.

BRIEF DESCRIPTION OF THE COURSE

Students acquire knowledge on the basics and trends in the development of electro-mechanics and electrical equipment. Clearly understand the concept of providing consumers with Electric Power Engineering, understand the structure of Electromechanical systems and electrical equipment, the relationship between its various links, get an idea of the composition of Electric Power Engineering consumers in various sectors of the national economy. Questions on the generalized Electromechanical Converter are considered. Device and principles of construction of Electromechanical systems. Laws of electromechanics. Electrical insulation and cable equipment.

KNOWLEDGE, SKILLS AT THE END OF THE COURSE

In the course of studying the discipline, students should know:

- understand the practical problems of electrical engineering and electrical engineering;
- shows their connection with special disciplines, processes and technologies in the electric power industry and industries.

Electric machines

CODE-ERG527

CREDIT – 5 (2/1/0)

PREREQUISITES – no

PURPOSE AND PURPOSE OF THE COURSE

develop students ' knowledge and skills in the design and operation of electrical machines and transformers used in industry.

BRIEF DESCRIPTION OF THE COURSE

- the specialist must gain knowledge of the basics of the theory of electric machines and transformers, the principles of their operation, design features, quantitative relationships that characterize the processes that occur during the operation of these machines.

- the specialist must acquire the ability to determine their purpose and operational properties based on the characteristics of electric machines, and correctly and effectively use electric machines and transformers in their work.

- the specialist must acquire skills in the production of installation of electrical circuits for connecting electrical machines and transformers with the implementation of safety regulations, perform calculations of electrical, magnetic systems and characteristics of electrical machines.

KNOWLEDGE, SKILLS AT THE END OF THE COURSE

- operating principle and design of various types of electrical machines and transformers;

- physical phenomena occurring in electrical machines and transformers under various operating modes and their mathematical description;

- main characteristics of electrical machines and transformers.

- analyze and describe the physical processes occurring in electric machines;

- use of standards in the field of technical documentation, use of standard terminology.

- selection of electrical machines according to their functionality, to provide the consumer with the necessary accuracy and reliability;

- selection and calculation of electric machines operating in the system,

- mastering theoretical and practical knowledge of the processes of Electromechanical Power Engineering conversion, the design of electric machines, their properties, characteristics, and operating rules.

Electrical apparatus

CODE – ERG532

CREDIT - 5 (2/1/0)

PREREQUISITE - Electrotechnical material science

THE PURPOSE AND TASK OF THE COURSE

- training a highly qualified specialist who is able to perform the main tasks related to reliable and economical supply of Electric Power Engineering to consumers.

SUMMARY OF THE COURSE

Classification of electric devices and the requirements for them. Electrodynamic forces in electrical devices. Heating electrical appliances. Electrical contacts. Electromagnets. The basics of the theory of burning and extinguishing the electric arc. Insulation of electrical devices. Contactors and magnetic launchers, tyrosir launchers. Controllers, commando-aparats and reostats. Automatic switches and fuses. Electromagnetic relays and voltages. Heat relay, time relay, polarized, index relays. Magnetic amplifiers. Semiconductor electrical vehicles. Automatic high voltage switches. Disconnectors, finishers and short-circuiters. Reactors, dischargers. Measuring power and voltage transformers.

KNOWLEDGE, SKILLS, SKILLS AT THE END OF THE COURSE

Students will know:

- Mastering consumers' Electric Power Engineering requirements;

Students will be able to:

- the ability to develop consumer Electric Power Engineering systems that meet reliable and safe operation.

Electric power networks and systems

CODE-ERG178

CREDIT – 5 (1/1/1)

PREREQUISITES-Electrical apparatus

PURPOSE AND PURPOSE OF THE COURSE

- acquisition of knowledge on trends in the development of the electric power industry, principles and methods of transmission and distribution of Electric Power Engineering.
- getting an idea and studying the parameters of replacement circuits for electric grid elements;
- familiarization with the structures of overhead and cable lines;
- determination of power and Power Engineering loss in elements of electric networks;
- master modern methods for calculating the steady-state modes of electric networks on a PC, and also consider issues related to the quality of electric Power Engineering and its security.

BRIEF DESCRIPTION OF THE COURSE

Basic definition. Electrical and power systems, electrical networks. Elements and structures of electric networks Characteristics and parameters of electric network elements. Practical methods for calculating the steady-state modes of electric networks. Determination of power and Power Engineering losses in elements of electric networks. Calculation of a two-way power supply network with different supply voltages, power quality And its provision. Setting the voltage regulation in electrical networks. Ways to change the voltage regulation.

KNOWLEDGE, SKILLS AT THE END OF THE COURSE

In the process of studying the discipline, students must understand the concept of providing consumers with Electric Power Engineering, the equivalent circuits of basic network elements, the basic techniques and ratios used to determine the parameters of the mode and the range of regulation of voltage. The discipline focuses the knowledge gained in Power Engineering, theoretical basics of electrical engineering to practical problems of electric power industry, shows their relationship with related disciplines, forms of trained specialists of the main knowledge in the field of transmission and distribution of Electric Power Engineering.

Electrical part of power stations

CODE-ERG525

CREDIT – 5 (1/1/1)

PREREQUISITES-Electrical apparatus

PURPOSE AND PURPOSE OF THE COURSE

Organization of the electric power industry based on the most efficient directions, such as concentration of Electric Power Engineering production by creating large power plants connected to each other and to consumers by an extensive network of power lines, rationalization of the fuel and Power Engineering balance by involving hydroelectric resources, the cheapest and least scarce fuels, especially local ones, as well as optimization of the allocation of productive forces and Power Engineering economy. This will allow you to expand your horizons and deepen the special knowledge of the student.

BRIEF DESCRIPTION OF THE COURSE

Consideration of the design of electrical devices, characteristics and modes of equipment, electrical circuits, methods for limiting short-circuit currents, etc. Calculation and selection of basic data on parameters and characteristics of electric machines, power transformers, electrical devices and conductors, as well as materials for the development of main circuits, circuits for own needs and structures of power plants and substations.

KNOWLEDGE, SKILLS AT THE END OF THE COURSE

Formation of high practical skills in the future specialist that are sufficient for successful production activities, allowing them to independently master new necessary knowledge about electric power systems, features of technological processes of various types of power plants and substations.

Transition processes in energy systems

CODE-ERG127

CREDIT – 5 (2/0/1)

PREREQUISITES-Theoretical foundations of electrical engineering

PURPOSE AND PURPOSE OF THE COURSE

Students acquire knowledge of the basics of the theory of transients that occur in power systems. For this course, it is essential, first of all, that the processes occurring in interconnected elements of electrical systems are studied as a whole.

BRIEF DESCRIPTION OF THE COURSE

Basic information about electromagnetic transients. Basic definition. Causes of a short circuit. General instructions for performing short-circuit current calculations. The main assumptions made when calculating a short circuit. General information about Electromechanical transients in electrical systems and processes. Types of transients. Basic considerations on the analysis of electrical system modes. General assessment of the stability of electrical systems. Static stability of the regulated electrical system. The D-partition method. Static stability with ARV of proportional action and strong action. Self-starting of electric motors in power supply systems of industrial enterprises. Frequency and power changes in power systems. Measures to improve the stability and transients of electrical systems of APV.

KNOWLEDGE, SKILLS AT THE END OF THE COURSE

In the course of studying the discipline, students should understand the principles of transformation of power system circuits, the impact of transients on the stability of the power system, understanding the processes and methods of analysis that are used in the practice of designing and operating electrical systems. The study of transients is based on the knowledge gained in previous General education courses - the theoretical foundations of electrical engineering, electrical machines, and a number of special courses.

Theoretical Foundations of Fuel Combustion and Furnace Plants

CODE-ERG533

CREDIT – 5 (2/0/1)

PREREQUISITES-heat and mass Transfer equipment of enterprises

COURSE GOALS AND OBJECTIVES

Course objective: The purpose of studying the discipline "Fundamentals of the theory of fuel combustion and combustion devices" is to train specialists with knowledge of complex combustion processes, including both chemical and physical processes. Familiarization with the processes of fuel combustion in large power plants.

DESCRIPTION OF THE COURSE

"Fundamentals of the theory of fuel combustion and combustion devices" examines the combustion processes of liquid, solid and gaseous fuels, as well as the accompanying conditions for optimal combustion. Devices that provide combustion of various types of fuels are considered.

KNOWLEDGE, SKILLS AT THE END OF THE COURSE

Master knowledge in the field of burning various fuels, ensuring optimal Gorenje, various devices in the form of burners, furnaces.

STUDENTS SHOULD HAVE AN IDEA THAT:

The Principles of operation of fuel-burning devices, their main design features. Features of combustion of fuels of various aggregate state. Gorenje Gorenje chemical processes, conditions of optimal combustion..... Torch, a combustion zone, oxidizing agents.

Automated electric drive

CODE-ERG500

CREDIT – 5 (1/1/1)

PREREQUISITES-Electric cars

COURSE GOALS AND OBJECTIVES

Study of the General physical properties of an electric drive as an object of automatic control, its Power Engineering characteristics and the basics of choosing the power of power elements, Electromechanical Power Engineering transformations in an electric drive, methods for solving the equation of motion of electric drives of industrial mechanisms.

BRIEF DESCRIPTION OF THE COURSE

The discipline "Automated electric drive" is a basic subject where students get a General idea of modern electric drive. The main subject of the course: electric drive Mechanics, DC and AC electric Drives. Adjustable electric drive. Transients in the electric drive. Power Engineering characteristics of the electric drive. Design of electric drives for typical industrial mechanisms.

KNOWLEDGE, SKILLS AT THE END OF THE COURSE

Students will gain knowledge of the physical laws of the basic features of interaction of elements of system of regulation of coordinates of electric drive, transient design and load diagrams of electric drive, choice of power of motors and inverters, Power Engineering parameters of the drive.

Students will acquire skills in calculating and choosing ways to control modern electric drives that ensure resource and Power Engineering saving.

Blowers and Heat Engines

CODE-ERG507

CREDIT – 5 (2/0/1)

PREREQUISITES-Theoretical foundations of heat engineering

COURSE GOALS AND OBJECTIVES

Course goal: the main objectives of the discipline are to familiarize with the theoretical foundations and principles of operation of superchargers and heat engines (TD), their design, characteristic modes and technical and economic indicators of their operation. Students should acquire the knowledge and skills necessary for free orientation in the practice of operation and design of hydraulic and power generating systems containing superchargers, etc.

BRIEF DESCRIPTION OF THE COURSE

The course "Superchargers and heat engines" examines pumps, compressors, the principle of their operation, as well as the operation of heat engines, which include gas and steam turbines. During the course, students are introduced to the principles of their work and methods of their calculation.

KNOWLEDGE, SKILLS AT THE END OF THE COURSE

As a result of studying the discipline, students should have an idea of:

- the operating conditions of the main elements of superchargers and heat engines;
 - on the design principles of superchargers and heat engines;
 - about the technology of manufacturing machine parts;
 - on the control structure of superchargers and heat engines.
- know:
- the essence of the theory of blade machines (fans, superchargers, compressors, turbines);
 - structural design of superchargers, steam and gas turbines;
 - thermal and strength processes in the flow parts and parts of shovel machines and the basics of their calculation; be
- able to:
- calculate and select superchargers and heat engines depending on their purpose;
 - evaluate the efficiency and reliability of superchargers and heat engines;
 - perform thermal and strength calculations of superchargers and heat engines.
- possess:
- methods of verification and design calculations of superchargers;
 - ways to upgrade existing equipment;
 - the method of selecting superchargers for the network, parallel and sequential operation.

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Laboratory workshop on modern industrial technologies in the electric power industry II

CODE-ERG555

CREDIT – 5 (0/3/0)

PREREQUISITES-Laboratory workshop on modern industrial technologies in the electric power industry I

COURSE GOALS AND OBJECTIVES

The purpose of studying the discipline is to develop professional skills for bachelors and undergraduates in a laboratory workshop on modern industrial technologies in the electric power industry, methods for modeling calculation and analysis of transients in electric drives of General industrial mechanisms.

BRIEF DESCRIPTION OF THE COURSE

The discipline "Laboratory workshop on modern industrial technologies in the electric power industry" is one of the main fundamental disciplines that form professional skills in solving problems of bachelors and masters in production, considering the basic principles and methods that are part of Electromechanical systems.

KNOWLEDGE, SKILLS AT THE END OF THE COURSE

Bachelors and undergraduates acquire the necessary stock of fundamental knowledge on modeling of electric drive systems; stages of installation and adjustment; system approach to installation and adjustment of electric machines;

Bachelors, and undergraduates acquire knowledge of the principles of installation variants for the construction of closed systems of variable frequency drives, count and model the system is asynchronous variable frequency drives, perform full range of tasks associated with the selection of hardware and software, and use software package for simulation and analysis of modern power supply systems of General mechanisms.

Power supply to enterprises

CODE-ERG530

CREDIT – 5 (2/1/0)

PREREQUISITES – Power and electrical equipment

PURPOSE AND PURPOSE OF THE COURSE

The purpose of discipline is to train a specialist capable of performing the full range of tasks related to the design of individual elements of the system shop Electric Power Engineering and the whole range of issues craft supply, using modern computer technology and introducing new technology in designing.

Objectives of the discipline-study of modern methods for calculating electrical loads at power supply stages with a voltage of up to 1 kV, reactive power compensation with a voltage of up to 1 kV.

BRIEF DESCRIPTION OF THE COURSE

Study of calculation methods, design analysis of shop power supply systems, development of skills for independent solution of engineering problems and practical application of theoretical knowledge, study of the principles of designing power supply systems at the stages of electric loads of industrial enterprises with a voltage of up to 1 kV.

KNOWLEDGE, SKILLS AT THE END OF THE COURSE

As a result of studying the discipline, the student should have an idea:

- about the basic principles of building schemes for internal power supply;
- about internal power supply schemes;
- reactive power compensation in networks up to 1 kV.

Know:

- basic requirements applicable to shop floor power supply systems;
- power supply schemes for shop substations;
- classification of power supply networks;
- methods of laying cables, wires and current lines with a voltage of up to 1 kV

on the territory of the workshop;

- conditions for selecting electrical equipment with a voltage of up to 1000 V;

Be able to:

- design the shop's power supply system;
- calculate short-circuit currents and select equipment in the network with a voltage of up to 1000 V
- draw up diagrams of in-house power supply.

Basics of electrical safety

CODE-ERG124

CREDIT – 5 (1/1/1)

PREREQUISITES – power supply for enterprises

PURPOSE AND PURPOSE OF THE COURSE

Students receive knowledge about the legislation in the field of safety and the causes of electrical injuries in industrial enterprises, knowledge of the main protective measures and means of electrical safety in General-purpose electrical installations and basic requirements for electrical personnel, as well as first aid measures when personnel receive an electric injury.

BRIEF DESCRIPTION OF THE COURSE

Organization of TB and responsibility for violation of TB. Electrical injuries, classification, types and act of investigation of electrical injuries, ways to reduce electrical injuries. Effects of electric current on the human body and the degree of danger. Parameters of the electrical circuit, the effect of voltage, current, frequency, time of action, resistance of the human body and the current loop on the severity of the outcome of electric injuries. The state Committee for standardization on electrical safety. Danger of networks with grounded and isolated neutral. Risk of ground fault. Protective measures, the role of isolation. Application of low voltages, safety interlocks, protection during the transition of the highest voltage to the lowest network. Protective shutdown and automatic capacity compensation. Electric protective equipment, assistance in case of electric shock.

KNOWLEDGE, SKILLS AT THE END OF THE COURSE

As a result of studying the discipline, students should be able to use individual means of protection against electric shock and check their serviceability, provide first aid to victims of electric current, check the compliance of electrical installations with electrical and industry rules in terms of electrical safety requirements, and draw up operational documents.

Main Machinery Operation of Heat Power Plant

CODE-ERG524

CREDIT – 5 (2/0/1)

PREREQUISITES-Superchargers and heat engines

COURSE GOALS AND OBJECTIVES

The discipline "Operation of TPP equipment" is part of the cycle of specialized disciplines and is a course of choice for bachelors of higher educational institutions studying in the specialty 5B071700 - "heat power Engineering".

The course "Operation of TPP equipment" 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 objectives of the course are the formation of knowledge in the field of operation of heat supply equipment; mastering the skills of evaluating the functional, quantitative and qualitative characteristics of heat supply devices.

KNOWLEDGE, SKILLS AT THE END OF THE COURSE

As a result of studying this discipline, students should: have an idea of:

- operating conditions of the main elements of steam boilers, steam and gas turbines during operation;
- the structure of management of work the main equipment of thermal power plants;
- basic data on reliability and reasons for its decline in the operation of TPP power equipment;
- know:
 - fundamentals of the theory of installation and operation of TPP equipment;
 - operating modes of boiler units, steam and gas turbines;
 - the procedure for starting and stopping boiler installations and processes that affect the rational management of start-up and stop modes;
 - fundamentals of organization and management that ensure trouble-free operation of the boiler plant and auxiliary equipment at a given performance with minimal losses;
 - fundamentals of the theory of heat transfer in turbomachines under transient modes of operation;
 - starting schemes of turbomachines;
 - technology for starting, stopping, and servicing turbomachines and their auxiliary equipment.
- be able to:

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- analyze the technical condition of the main equipment of thermal power plants;
to evaluate the efficiency and reliability of the main equipment of thermal power plants;
- operate heat engines and units;
acquire practical skills:
- acquire skills in drawing up technological processes for the repair and installation of heat and power equipment.

Modeling in power systems

CODE-ERG506

CREDIT – 5 (2/1/0)

PREREQUISITES – no

COURSE GOALS AND OBJECTIVES

Familiarization of students with the main elements of electric power systems (ESS) and their mathematical and virtual models, formation of students' skills in modeling electric power objects in the MATLAB software environment.

BRIEF DESCRIPTION OF THE COURSE

The course covers the following main topics: modeling of single-phase and three-phase power transformers, modeling of DC machines in generator and motor modes, modeling of asynchronous machines in generator and motor modes, modeling of synchronous machines in generator and motor modes, modeling of power lines, load modeling, modeling of switching devices.

KNOWLEDGE, SKILLS AT THE END OF THE COURSE

As a result of mastering the discipline "Modeling in Power Engineering systems", the student will:

know:

- methods of EES modeling;
- the principle of operation of the main elements of the EES;
- mathematical models of the main equipment of the power plant;
- methods for regulating the parameters of the EES mode;

be able to:

- work in the MATLAB software environment;
- calculate parameters of the main electrical equipment;
- collect the object model of the EPS;
- explore the modes of the EES;

possess:

- methods for regulating parameters of electrical equipment;
- skills of work with schemes of the EPS.

Lighting technology and lighting

CODE-ERG508

CREDIT – 3 (2/0/1)

PREREQUISITES – power supply for enterprises

PURPOSE AND PURPOSE OF THE COURSE

Training of a highly qualified specialist who is able to perform the main tasks related to reliable and economical supply of Electric Power Engineering to consumers with its standardized quality, reliability and economy.

BRIEF DESCRIPTION OF THE COURSE

Autonomous power supply systems - as an alternative source of electric Power Engineering. Diesel, wind, and solar power plants. Electric loads of enterprises and modern methods of calculating electric loads fed by Autonomous sources of electric Power Engineering. Reactive power compensation. Distribution of Electric Power Engineering at a voltage of up to 1 kV. Distribution of Electric Power Engineering at a voltage above 1 kV. Shop transformer, main step-down, distribution and conversion substations. The quality and parameters of Electric Power Engineering. Electric Power Engineering metering. Selection of electrical equipment. Selection of types of wiring, brands of wires and cables, selection of the optimal scheme of external and internal power supply, design of grounding.

KNOWLEDGE, SKILLS AT THE END OF THE COURSE

Mastering the requirements of consumers for power supply, the ability to develop power supply systems for consumers that meet reliable and safe operation, providing high-quality voltage for electric Power Engineering receivers.

Heat engines and gas turbines

CODE-ERG520

CREDIT – 5 (2/0/1)

PREREQUISITES-Superchargers and heat engines

COURSE GOALS AND OBJECTIVES

The discipline "Heat engines and GTU" aims to give students knowledge about heat engines, their design, operating principles, and systems for ensuring optimal modes. The main heat engines are steam turbines and internal combustion engines. Gas turbines are separately removed. Students should be familiar with the design and operating principles of GTU.

BRIEF DESCRIPTION OF THE COURSE

In the discipline "Heat machines and gas turbine engines" students study the theory of blade machines (fans, superchargers, compressors, turbines), the structural design of superchargers, steam and gas turbines, thermal and strength processes in the flow parts and parts of blade machines and the basics of their calculation. Students should acquire the knowledge and skills necessary for free orientation in the practice of operating superchargers in production.

KNOWLEDGE, SKILLS AT THE END OF THE COURSE

Master knowledge in the field of heat and mass transfer, technical thermodynamics, and various types of heat exchange.

STUDENTS SHOULD HAVE AN IDEA THAT:

As a result of studying the discipline, students should have an idea of:

- the operating conditions of the main elements of superchargers and heat engines;

- on the design principles of superchargers and heat engines;

- about the technology of manufacturing machine parts;

- on the control structure of superchargers and heat engines;

Know:

- the essence of the theory of shovel machines;

- structural design of superchargers, steam and gas turbines;

- thermal and strength processes in the flow parts and parts of shovel machines and the basis of their calculation;

Be able to:

- calculate and select superchargers and heat engines depending on their purpose;

- evaluate the efficiency and reliability of superchargers and heat engines;

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- perform thermal and strength calculations of superchargers and heat engines.

Possess:

- methods of verification and design calculations of superchargers;

- ways to upgrade existing equipment;

- the method of selecting superchargers for the network, parallel and sequential operation.

Calculation and design of power supply systems

CODE-ERG511

CREDIT – 5 (2/0/1)

PREREQUISITES - power supply of enterprises

COURSE GOALS AND OBJECTIVES

Training of a highly qualified specialist who is able to perform the main tasks related to reliable and economical supply of Electric Power Engineering to consumers with its standardized quality, reliability and economy.

BRIEF DESCRIPTION OF THE COURSE

Methods for calculating electrical loads, calculating reactive power compensation, drawing up diagrams of shop and in-plant networks, studying issues related to calculations of power supply to consumers with a specific load.

KNOWLEDGE, SKILLS AT THE END OF THE COURSE

- mastering the requirements of consumers for power supply;
- ability to develop power supply systems for consumers;
- satisfying reliable and safe operation, providing high-quality voltage for electric Power Engineering receivers.

Calculation and design of electric power networks and systems

CODE-ERG517

CREDIT – 5 (2/0/1)

PREREQUISITES – Electric power networks and systems

PURPOSE AND PURPOSE OF THE COURSE

Students acquire knowledge on trends in the development of electric power networks and systems, principles and methods of transmission and distribution of Electric Power Engineering. Students get an idea and study the parameters of replacement circuits for electrical network elements, determine power losses, voltage and Power Engineering losses in electrical network elements, calculate and select voltage, power flows, wire cross-sections and power of substation transformers, master methods for calculating steady-state modes of electrical networks, and also consider issues related to voltage regulation and reactive power compensation.

BRIEF DESCRIPTION OF THE COURSE

Basic definition. Selection of the rated network voltage. Selection of wire sections. Drawing up a power line replacement scheme for calculating the steady-state mode and determining its parameters. Selection of substation transformers. Parameters of transformers. Losses in transformers. Calculations and analysis of operation modes of closed and open electric networks. Technical and economic calculations in electric networks of power systems. Mechanical calculation of wires and cables. Choice of supports and spans.

KNOWLEDGE, SKILLS AT THE END OF THE COURSE

In the process of studying the discipline, students must understand the concept of providing consumers with Electric Power Engineering, the equivalent circuits of basic network elements, the basic techniques and ratios used to determine the parameters of the mode and the range of regulation of voltage. The discipline focuses the knowledge obtained in the electric power industry, electric power networks and systems, transients in power systems on practical problems of the electric power industry, shows their connection with related disciplines, and forms specialized knowledge in the field of transmission and distribution of Electric Power Engineering among trained specialists.

Calculation and Design of Heat Exchange Equipment

CODE-ERG516

CREDIT – 5 (2/0/1)

PREREQUISITES – Fundamentals of theory of combustion fuel and the combustion device

COURSE GOALS AND OBJECTIVES

Purpose of the course: the purpose of studying the discipline "Calculation and design of heat and mass transfer equipment" is to train specialists in the field of thermodynamics and heat transfer methods for analyzing the processes of heat and mass transfer equipment of thermal power plants and other industrial enterprises.

BRIEF DESCRIPTION OF THE COURSE

"Calculation and design of heat and mass transfer equipment" examines the processes of heat and mass transfer in heat power equipment and installations. These include boiler installations, waste heat boilers, and heat exchangers of various pressures.

KNOWLEDGE, SKILLS AT THE END OF THE COURSE

Master knowledge in the field of heat and mass transfer, which is based on the course "theoretical foundations of heat engineering".

Students should have an understanding of:

Principles of operation schemes of combined-cycle gas installations, in particular waste heat boilers, gas-gas, gas-water and other types of heat exchangers;

Know the basic laws and concepts of heat and mass transfer; thermophysical characteristics of bodies and media; equations of interrelations of system parameters.

Be able to use the basic provisions and laws of heat engineering to analyze heat exchange processes; use tables and diagrams, calculate the efficiency of the cycle based on heat exchange processes.

Calculation and projecting of systems of automated electrical drive

CODE-ERG510

CREDIT – 5 (2/0/1)

PREREQUISITES-Automated electric drive

PURPOSE AND PURPOSE OF THE COURSE

Acquisition of knowledge, skills and abilities in design, calculation, research and operation of an automated electric drive system for typical industrial installations and complexes of continuous and cyclic operation with various types of load on the engine shaft.

BRIEF DESCRIPTION OF THE COURSE

Automated electric drives of typical industrial installations and complexes (excavators, drilling rigs, electric locomotives, conveyors, fans, pumps, compressors and lifting units) are considered. The main issues of the electric drive and its operating conditions are described. For the considered working machine, the operating modes are given and the requirements for its electric drive are determined. Possible schemes of the electric drive and ways of its automation for realization of the requirements imposed to it are given. The method of calculation and selection of the main elements of the electric drive, as well as their typical schemes, is described.

KNOWLEDGE, SKILLS AT THE END OF THE COURSE

Students should have a clear understanding of the principles of operation and design capabilities of typical industrial mechanisms and installations; the main characteristics of electric drives of continuous and cyclic installations; methods for regulating the coordinates of the electric drive of specific installations, depending on their belonging to groups of mechanisms; Electromechanical and operational characteristics of DC and AC electric drive systems of various installations.

Industrial Energy Audit and Energy-Saving

CODE-ERG535

CREDIT – 3 (1/0/1)

PREREQUISITES – no

COURSE GOALS AND OBJECTIVES

to teach students the theory, methodology and practice of improving the efficiency of fuel and Power Engineering resources to train a new generation of specialists in the field of rational and efficient use of natural resources.

The program of the discipline provides for lectures and practical classes.

BRIEF DESCRIPTION OF THE COURSE

The discipline "Power Engineering Audit and Power Engineering saving at enterprises" is a profile discipline for the specialty 5B071700-heat power Engineering, 5B071800-electric power engineering in accordance with the working curriculum.

KNOWLEDGE, SKILLS AT THE END OF THE COURSE

- develop basic knowledge about renewable (alternative) Power Engineering sources, Power Engineering efficiency, Power Engineering saving in production and consumption;

- contribute to the formation of students ' understanding of sustainable development of the state through Power Engineering efficiency, Power Engineering conservation and the use of renewable Power Engineering sources;

- develop competencies for decision-making at all levels of use of fuel and Power Engineering resources;

- prepare a competitive personality who is ready to actively participate in the social, economic and political life of the country, and is able to make responsible decisions.

As a result of studying the discipline "Power Engineering Audit and Power Engineering saving at enterprises", students should know:

- options for using renewable Power Engineering, ensuring Power Engineering efficiency, Power Engineering saving and preventing climate change;

- legislation of the Republic of Kazakhstan on Power Engineering audit and Power Engineering saving at enterprises;

- new generation of equipment and technologies;
be able to:

- analyze measures to save fuel and Power Engineering resources, identifying benchmarks and prospects for Power Engineering supply, including the use of renewable Power Engineering, Power Engineering efficiency and Power Engineering conservation based on world achievements;

- effectively use fuel and Power Engineering resources and develop possible ways to improve the Power Engineering system;
- analyze the situation in various aspects of sustainable development: technological, environmental, economic;
- develop evaluation criteria for Power Engineering efficiency and Power Engineering saving in technological processes and consumption of fuel and Power Engineering resources;
- set specific tasks and priorities in environmental and Power Engineering-saving activities and use the knowledge gained to solve them.

Renewable energy

CODE-ERG534

CREDIT – 3 (1/0/1)

PREREQUISITES – Power and electrical equipment

COURSE GOALS AND OBJECTIVES

Are to teach students the theory, methodology and practice of using fuel and Power Engineering resources to train a new generation of specialists in the field of rational and efficient use of natural resources.

BRIEF DESCRIPTION OF THE COURSE

Study of the physical nature of the processes of converting renewable Power Engineering sources (RES) into electric Power Engineering and the implementation of the most economical and safe operating conditions for power plants based on RES.

KNOWLEDGE, SKILLS AT THE END OF THE COURSE

- to form basic knowledge about renewable (alternative) sources formation of the ability to generalize, analyze, perceive information, set goals and choose ways to achieve it.

Assistance in forming a graduate's readiness to:

- perform Power Engineering calculations;
- develop technical documentation and methodological materials.

Formation of graduates ' readiness to conduct technical and economic analysis, comprehensive justification of decisions taken and implemented in the field of operation of power plants based on RES; application of results in practice, striving for self-development, improving their skills and skills

- efficiently apply technological processes and methods of Electric Power Engineering production and transmission; master the methodology for calculating the design and optimal analysis of power supply systems, master knowledge and practical skills for reliable and safe operation of electrical equipment operating on the basis of renewable Power Engineering sources.

Graduation thesis (project) defense

CODE-ESA 103

CREDIT – 6

PREREQUISITES – no

COURSE GOALS AND OBJECTIVES

Diploma design (completion of a thesis) is the final stage of students' education at the University and has as its goal:

- systematization, consolidation and expansion of theoretical and practical knowledge in the field of development and design of heat and power systems, application of this knowledge in solving specific scientific, theoretical, economic and production problems that arise during the creation and operation of modern Power Engineering facilities;
- development of skills for independent work, development of research and experimentation techniques for solving problems and questions developed in the diploma project on various Power Engineering systems;
- finding out the students' readiness for independent work in the conditions of modern production, progress of science, technology and culture.

BRIEF DESCRIPTION

In the Capstone project student self-selected learning paths (thermal power or electrical power) designs a specific Power Engineering system with the definition of the structure of the tasks, their mathematical formulation, engineering analysis of selected Power Engineering systems, the choice of electric or thermal plant and equipments, performing the graphic part in the form of thermal or electrical schematics, and drafting of the explanatory note to the project.

In the research-based thesis, the student conducts research on the issues of modeling an Power Engineering object and developing control systems with the obligatory mathematical formulation of the problem, development or selection of algorithms for its solution, and experimental verification of the proposed solutions on a computer or object. The thesis can be theoretical or experimental. At the discretion of the head of the thesis, in the first case, it is allowed to reduce the calculation and graphic part with the replacement of some drawings with posters illustrating theoretical calculations; in the second case, part of the drawings can be replaced with graphs, diagrams, tables, etc., revealing the content of the experimental results obtained

KNOWLEDGE, SKILLS, and SKILLS at the END

Diploma project (work) is a final work, based on the protection of which the State attestation Commission decides whether to assign a bachelor's degree in the field of "electrical Engineering and Power Engineering" to a student.

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