

**С. СЕЙФУЛЛИН атындағы
ҚАЗАҚ АГРОТЕХНИКАЛЫҚ
УНИВЕРСИТЕТІ**



**S.SEIFULLIN KAZAKH
AGROTECHNICAL
UNIVERSITY**

**CATALOG of
elective
DISCIPLINES**



**S.SEIFULLIN
KAZAKH AGROTECHNICAL
UNIVERSITY**

**Catalog of elective disciplines
by speciality
6M071700 – Heat Energy**

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DEAR MASTERS!

At credit system of education compulsory element of educational and methodical complex of specialty is a catalog of elective disciplines (CED), which is a systematic annotated list of disciplines included in the component of choice. This catalog of elective disciplines is composed in order to create for you the possibility of independent, efficient, flexible and comprehensive definition of learning paths. CED is your assistant in designing a study plan of a student. Proposed CED contains a list of disciplines, which will fully master the professional knowledge, certain state standards of education (SOSE). The catalog of elective disciplines you used in the preparation of the individual curriculum of a master, developed personally under the direction of the supervisor, your prospects for growth, labor market needs and production. Catalog of disciplines combined in two cycles: the cycle of basic disciplines (BD) and the cycle of profile disciplines (PD). Cycle of basic disciplines aimed at developing a student fundamental knowledge in the relevant specialty. Cycle of major disciplines defines the list of special knowledge, skills and competences in relation to a particular area of professional activity. In accordance with the objectives set by the President of the Republic of Kazakhstan to 2020, all Kazakhstan people must learn Kazakh, Russian and English. The intensive pace and level of development of science and technology in the world require fluency in foreign languages for better and proper achievement of the necessary theoretical and practical knowledge and skills.

To form own educational program, graduate student should master all disciplines of base component (established SOSE) in accordance with the model curricula, as well as choose to study in the proposed catalog of discipline selection component. The choice of undergraduate of elective disciplines must be carried out in accordance with the logic of the relationship of academic disciplines and consistency. You must remember that how well thought-out and coherent educational trajectory of a master depends on the level of his training as a future professional.

Wish you all the best on study and proper
choice of elective disciplines!

LIST OF BASE AND PROFILE DISCIPLINES

№	Name of the discipline	Number of credits	Page
1	2	3	4
BASE DISCIPLINES (BD) – 20 credits:			
<i>1.1 Selective component (SC) – 12 credits</i>			
1	Dynamics of Multiphase Media	3	
2	Hydromechanics		
3	Modes of operation and maintenance of thermal power plants		
4	Transients in the material layers	3	
5	Thermophysics walling		
6	Gas turbines for oil and gas transportation		
7	Prospects of creation ecologically of clean power mediums from unpreceded in natural sources	3	5
8	Cycles and installations of processes heating engineers		5
9	Logistics	3	
10	The system of organizing the delivery and storage of goods		
11	Materials science		

1	2	3	4
MAJOR DISCIPLINES (MD) - 22 credits:			
<i>2.1 Selective components (SC) – 20 credits</i>			
MAJOR DISCIPLINES			
12	Development of small-scale power boilers	4	6
13	Methods of extrim energysaving		7
18	Systematic approach in science and technology	3	
19	Inventive creativity in power		
20	Modern scientific problems of the theory of combustion and heat transfer intensification	3	

Catalog of elective disciplines

I Base disciplines (BD)

PSECH 6303 Prospects of creation of ecologically clean power mediums from unpreceded natural sources

Number of credits - 3

Course prerequisites: history and philosophy of science, psychology.

Postrequisites: theory and technique of heating experiment; special issues of water chemistry; Modern scientific problems of the combustion theory and heat transfer enhancement.

Purpose: The purpose of teaching is creation of a system of scientific and technical knowledge of the basics of creating clean energy from renewable natural sources.

Course content: As a result of studying the discipline undergraduates study the prospects of creating clean energy from non-renewable natural sources in order to validate and selection of high-performance thermal processes, facilities and energy. The basic methods of producing hydrogen and especially their use as in the conventional form, and in more modern forms (as a fuel cell). Advantages and disadvantages in their use as a conventional form and in the form of fuel cells. The modern methods of producing hydrogen from water by the conversion of hydrocarbon fuels, as well as synthesis gas (mixtures of hydrogen and carbon monoxide H₂ CO). The problems of transport, storage and combustion of hydrogen fuel in households, industry and transport.

Expected result: Upon completion of the study subjects, undergraduates will receive theoretical knowledge and the foundations for scientific, research and experimental skills on the improvement of technology and techniques used in the processes occurring in the various material layers.

CUTP 6303 Cycles and installations of processes heating engineers

Number of credits - 3

Course prerequisites: history and philosophy of science, psychology.

Postrequisites: theory and technique of heating experiment; special issues of water chemistry; Modern scientific problems of the theory of combustion and heat transfer enhancement.

The aim: The purpose of teaching is creation of a system of scientific and technical knowledge bases using thermal cycles, power systems, chillers, heat pumps, systems for direct conversion of thermal energy into electrical energy.

Course content: Cycles of thermal power plants: gas; steam; Direct conversion of heat into electricity. Methods to compare the thermal efficiency of reversible cycles. Rankine cycle analysis taking into account the loss of irreversibility. Cycle with reheat. The regenerative cycle. Binary cycles. Heating cycle. Cycles of heat pumps. Cycle internal combustion engines. As a result of studying the discipline undergraduates learn the basic cycles and installation of thermal processes in order to validate and selection of highly efficient thermal processes, facilities and energy. Will be analyzed by the Carnot cycle, Rankine, Mayer, thermal cycles, power systems, chillers, heat pumps, systems for direct conversion of thermal energy into electrical energy; just outlines issues related to the general thermodynamic principles produce heat.

Expected result: Upon completion of the study subjects, undergraduates will receive theoretical knowledge and the foundations for scientific, research and experimental skills on the improvement of technology and techniques used in different thermodynamic cycles.



S. Seifullin Kazakh Agrotechnical University

Catalog of elective disciplines

Profile disciplines (PD)

RKME 5301 Development of small-scale power boilers

Number of credits – 4

Prerequisites: Transients in layers of material, methods of limiting energy conservation theory and technique of heating experiment.

Postrequisites: Modern scientific problems of the theory of combustion and heat transfer enhancement, student's research work of a student, including the implementation of the master's thesis
Objective: Formation of knowledge about the current state of small power boiler systems, methods, and perspectives of development of small power boilers.

Contents: The discipline that studies the current state and the level of alarm status boiler low power. General principles of classification and accidents of small capacity boilers. Regulatory, technical and legal framework for the boilers of low power system of Kazakhstan. Overview of market attractiveness of small power boilers. Prospects for the development of recovery boilers, gas-water, steam-water heat generators and other types of small capacity boilers. Methods of calculation,

adjustment and design of boiler installations of low power with high efficiency and low emissions. Development Methods of specifications, the foundations of standardization and certification of small power boilers in Kazakhstan.

Expected result: Skills for adjustment of boiler systems, low energy, including ways to improve the effectiveness, efficiency and sustainability of small power boilers

MPE 5301 Methods of extrim energysaving

Number of credits - 4

Prerequisites: history and philosophy of science, psychology, theory and technique of heating experiment.

Postrequisites: Knowledge acquired in the study course used in the study of all majors and implementation of the master's thesis.

Purpose: The purpose of teaching - creation of a system of scientific and technical knowledge bases use the laws of heat engineering and new ways and new technological means to implement extremely low cost primary fuel and energy resources in heat technologies.

Content: exploring new areas, new techniques and new technological means to implement extremely low cost primary fuel and energy resources in heat technologies. The method limit of energy saving is an important lever for improving energy efficiency and reducing harmful effects on the environment. Considers the quality analysis of energy consumption and the environmental situation in the technology, the selection of non-waste and clean technology, highly efficient equipment and energy-saving thermal circuit realizes the technology and equipment.

Expected result: (in power and heat technologies) new waste-free technological schemes, efficient energy technology unit (ETA) and energy saving thermal circuit realizes this non-waste technology and ETA.

Head of the department
Dean of faculty



Baubekov K.T.
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