

AL-FARABI KAZAKH NATIONAL UNIVERSITY

**EDUCATIONAL PROGRAM IN ENGLISH
AVIATION ENGINEERING AND TECHNOLOGIES**

Specialty 5B071400 - Aviation engineering and technologies

Almaty, 2018

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Educational program Aviation engineering and technologies in English

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**PASSPORT
OF EDUCATIONAL PROGRAM IN ENGLISH
«AVIATION ENGINEERING AND TECHNOLOGIES»**

PASSPORT OF THE EDUCATIONAL PROGRAM

1. Application area

The present educational program on the specialty "Aviation engineering and technologies" in English is developed on the basis of the Model curriculum of specialty 5B071400-Aviation engineering and technologies (from August 23, 2012 with changes from May 13, 2016) in accordance with international documents in higher education, the recommendations of the ECTS Users' Guide, "Tuning Educational Structures in Europe" and establish the requirements for the content of education through the results of training, the volume of the training load and the level and training of bachelors.

The educational program is developed taking into account the comparison of the laboriousness of the training load in accordance with the requirements of the Bologna Declaration. As well as taking into account the requirements of the EASA PART-66 standard (British model), Model training programs for aviation personnel involved in ensuring flight safety (order of the State Aviation Committee of the Ministry of Transport and Communications of the Republic of Kazakhstan dated September 28, 2013 No. 764 registered in the Ministry No. 8785).

2. Normative references

1. The Law of the Kazakhstan Republic "On Education" (No. 319-III from July 27, 2007 in the edition of the Law of the Republic of Kazakhstan from 24.10.11 No. 487-IV, as amended and supplemented as of July 4, 2013);

2. The state general compulsory standard of higher education, approved by the Decree of the Government of the Republic of Kazakhstan from August 23, 2012 No. 1080, as amended from May 13, 2016 No. 292;

3. Typical curriculum on specialty 5B071400-Aviation engineering and technologies approved by the Order of the Minister of Education and Science of the Republic of Kazakhstan from July 5, 2016;

4. The Rules for the organization of the educational process on the credit technology of education, approved by the Order of the Minister of Education and Science of the Republic of Kazakhstan dated April 20, 2011 No. 152;

5. The National Qualifications Framework, approved by the Protocol of the Republican tripartite commission on social partnership and regulation of social and labor relations from March 16, 2016;

6. Model curricula of the cycle of general education disciplines for organizations of higher and (or) postgraduate education, approved by Order No. 603 of the Minister of Education and Science of the Republic of Kazakhstan dated October 31, 2018;

7. Guidance on the use of the European Credit Transfer and Accumulation System (ECTS), developed as part of the Bologna process and officially published by the European Commission in 2009;

8. Professional standard «Aircraft Maintenance» item 28, order of the Deputy Chairman of the Board of the National chamber of entrepreneurs of the Republic of Kazakhstan «Atameken» №239, dated September 6, 2018.

3. Basic terms and abbreviations

In this document, the following basic terms and definitions are used in accordance with the Law of the Republic of Kazakhstan “On Education”, the State General Compulsory Educational Standard (SGCES) of the Republic of Kazakhstan “Higher Education. Undergraduate. Basic Regulations” No. 292 dated 05.13.2016 and SGCES of RK 5.05.001-2005 “Coding System of Academic Disciplines of Higher and Postgraduate Education”, international documents in the field of education, European Credit Transfer System:

education – a continuous process of upbringing and education, carried out for the purposes of moral, intellectual, cultural, physical development and the formation of professional competence;

bachelor's program – higher education, educational programs of which are aimed at training personnel with the award of a bachelor's degree in the relevant specialty;

bachelor – the degree awarded to persons who have mastered the educational programs of higher education;

educational program (EP) – a single complex of basic characteristics of education, including the goals, results and content of education, the organization of the educational process, the approaches and methods for their implementation, the criteria for assessing the learning outcomes;

student-centered learning – an approach to learning, characterized by innovative teaching methods, with the aim of facilitating learning through communication of the teacher and the student;

competences – the ability of students to the practical application of acquired in the process of learning knowledge, abilities and skills in professional activities;

professional competences – knowledge, abilities and skills necessary for the effective implementation of professional activities;

descriptors – a description of the level and amount of knowledge, abilities, skills and competencies acquired by the students upon completion of the educational program of the appropriate level of higher and postgraduate education; descriptors are based on the learning outcomes, the formed competencies, as well as the total number of credits;

learning outcomes – the confirmed by the assessment amount of knowledge, abilities and skills, acquired and demonstrated by students after mastering of the educational program, and the formed values and attitudes;

credit technology of education – training based on the selection and self-planning by the students of the sequence of studying disciplines with the accumulation of academic credits;

academic credit – a unified unit of measurement of the volume of scientific and (or) educational work (load) of the student and (or) teacher;

standard curriculum (SC) – a training document developed on the basis of the

qualifier of specialties of higher and postgraduate education of the Republic of Kazakhstan and SGCES, regulating the structure and volume of the educational program by the cycles of disciplines, indicating the list of the credits minimum amount for the disciplines of obligatory component and all types of practices, the final certification, approved by the authorized body in the field of education;

obligatory component (OC) – a list of academic disciplines and the corresponding minimum amounts of credits established by the standard curriculum and studied by the students on a mandatory basis under the educational program;

elective disciplines – the academic disciplines that are a elective component within the framework of the established credits and introduced by the educational organizations, reflecting the individual training of the student, taking into account the specifics of social and economic development and the needs of a particular region, the developed scientific schools of the higher educational institution;

curriculum – a document regulating the list, consistency, volume (labor intensity) of academic subjects, academic disciplines and (or) modules, professional practice, other types of educational activities of students of the appropriate level of education and forms of control;

module – a course system in which each course corresponds to an equal number of credits or a multiple of it;

prerequisites – disciplines containing the knowledge, abilities and skills necessary to master the discipline under study;

postrequisites – disciplines for the study of which requires knowledge, abilities and skills acquired at the end of the study of this discipline;

working curriculum (WC) – a training document developed by an educational organization independently on the basis of a standard curriculum of a specialty and individual curricula of students;

intermediate certification of the students – a procedure conducted to assess the quality of students mastering the content of the part or all volume of one academic subject, one academic discipline and (or) module, as well as the professional modules within one qualification after completing their study;

final attestation of the students – a procedure carried out to determine the degree of their mastering the volume of subjects, the educational disciplines and (or) modules stipulated by the state general compulsory standard of the corresponding level of education;

assessment methods – a full range of written, oral and practical tests/exams, projects, presentations, presentations and portfolios, which are used to assess student progress and confirm the achievement of learning outcomes for the educational component (unit/module);

assessment criteria – a description of what a student should be able to do and at what level in order to demonstrate the achievement of the learning outcome;

academic mobility – moving of the students or research teachers to study or conduct research for a specific academic period (semester or academic year) to another organization of higher and (or) postgraduate education (domestically or abroad) with mandatory recalculation of mastered curricula, disciplines in the form of academic credits in their own organization of higher and (or) postgraduate education or for

continuing their studies in another organization of higher and (or) postgraduate education;

coding system – a complex of methods and coding rules for classification groups and objects of classification of a given set;

European Credit Transfer and Accumulation System (ECTS) – a student-centered system for the accumulation and transfer of credit based on the principle of transparency in the processes of study, teaching and evaluation.

In addition to these, the following abbreviations are applied:

GED – general educational disciplines;

BD – basic disciplines;

PD – profile disciplines;

OC – obligatory component;

EC – elective component;

EEEEA – external evaluation of educational achievements;

SSS – self-study of students;

SSST – self-study of students under the teacher guidance;

REMC – Republican educational methodical Council.

4. Basic regulations

4.1 The educational program on the specialty "Aviation engineering and technologies" was developed in accordance with the State General Compulsory Educational System of the Republic of Kazakhstan, the National Qualifications Framework and is coordinated with the Dublin descriptors and the European Qualifications Framework. The educational program is focused on the learning outcomes.

4.2 Priority guidelines for the development of the educational program in the specialty "Aviation engineering and technologies" were:

- programs within the framework of the President's Messages, including the messages "The Third Modernization of Kazakhstan: Global Competitiveness", "Digital Kazakhstan" voiced in the text;

- interdisciplinary programs;
- training programs in English language;
- joint educational programs with the foreign partner universities;
- professional programs by order of the enterprises-employers;
- programs, using distance learning technologies, including additional education programs.

4.3 Educational activity at the university is carried out by the credit technology of education on the basis of the student-centered approach, in which the learning outcomes and competences play the main role and become the main result of the educational process for the student. To achieve this goal, the innovative teaching methods should be applied, for example:

- *work in the small groups (team)* - a joint activity of the students in a group under the leadership of a leader, aimed at a common task solving by creatively

combining the results of individual work of the team members with the division of powers and responsibilities;

– *project technology* - individual or collective activities at the selection, distribution and systematization of material on a particular topic, as a result of which a project is drawn up;

– *case study analysis* - analysis of the real problem situations that took place in the relevant area of professional activity, and the search for options for the best solutions;

– *role-playing and business games* - role-playing imitation by the students of the real professional activities with the performance of the specialist functions at the various workplaces;

– *advanced independent work* - study of new material by the students before studying it in the classroom;

and others.

4.4 The educational program is intended to provide the high quality of professional education in aviation engineering and technologies in accordance with the highest academic standards in the world educational space.

The program has theoretical and practical components. Terms of study: 4 years. Forms of training: full-time. During the period of study, the student learns 153 credits, including theoretical education - 130 credits, professional practice - 12 credits, physical culture - 8 credits and final examination - 3 credits.

The awarded degree for the full mastery of the educational program: Bachelor of engineering and technologies on specialty "5B071400-Aviation engineering and technologies".

5. Code and name of the specialty

The code of specialty 5B071400-Aviation engineering and technologies in accordance with the Classifier of specialties of higher and postgraduate education of the Republic of Kazakhstan, this educational program belongs to the section technical sciences.

In the National Classifier of the Republic of Kazakhstan (NC RK 01-2017 Classification of Occupations), specialists Engineers in aviation technology have the code 2144-4 «Engineers in aviation technology», which is part of the group 2144 mechanical Engineers, professionals in the field of technology, excluding electrical engineers; code 2172 «Pilots of aircraft and professionals related occupations», which is part of the group 217 professionals in the field of air and sea transport management.

6. Level of qualification according to the International Standard of Classification of Education

This educational program corresponds to the level of International Standard Classification of Education 6 (ISCED), which do not require the preliminary completion of other programs and are classify as first-degree programs. The direction of training is bachelor's degree. Duration of training - 4 years.

According to the International Standard Classification of Education (ISCED 2013), this educational program applies to mechanical engineers, included in group 5 «Engineering, manufacturing and construction industries», 52 «Engineering and engineering»; 8 «Services», 84 «Transport: flight crews, air traffic controllers».

7. Objectives of the educational program

The educational program is focuses on the training of highly qualified specialists in the field of aviation engineering and technologies, who possess certain knowledge and competencies that are in demand on the labor market.

The objectives of the educational program are:

- Formation of a person capable of self-improvement and professional growth with diverse humanitarian, technical and natural science knowledge and interests.

- Formation of the ability to critically rethink the accumulated experience, change, if necessary, the profile of their professional activities, awareness of the social significance of their future profession, possessing a high motivation to perform professional activities.

- Formation of the ability to technical maintenance of aircraft systems and engines.

- Formation of the ability to analyze the operation of aircraft systems, the perception of information, setting goals and choosing ways to achieve it.

- Cooperation to the formation of readiness among graduates: to start an internship at the workplace of a specialist in the technical operation of aircraft systems in airlines and aircraft repair plants; make suggestions for improving the quality of maintenance; use the necessary information to perform their duties.

- Formation of graduates' readiness to conduct a technical and economic analysis of the technical maintenance and repair of aircraft systems, the application of the results in practice, the desire for self-development, improvement of their skills and mastery.

- Cooperation in the formation of graduates' readiness for the economical and safe maintenance of the systems of aircraft and engines.

8. Field of professional activity of a specialty

The sphere of professional activity of bachelor on speciality 5B071400 – "Aviation technique and technologies" is:

- the field of science and technology, which includes a set of technologies, tools, methods and methods of production activities aimed at ensuring the operation of aviation equipment and technologies.

- the field of aviation transport system related to the technical operation of air transport, through the maintenance and repair of aircraft systems and engines.

- organizational and management activities: development of methodological and regulatory documents, technical documentation, examination of technical documentation, as well as proposals and measures for the technical operation of aviation equipment and technologies; etc.

- research activities: participation in research, development of projects and

programs related to the testing and operation of aviation equipment and technologies.

The objects of professional activity of the bachelor of aviation technology and technology are the processes, methods and means of flight and technical operation of aircraft, engines, on-Board and ground systems, including avionics and electrical equipment, as well as automation and control systems.

9. Directions of professional activity

Areas of professional activity specialty 5B071400 - "Aviation engineering and technology": Operation, repair and maintenance of aircraft, air traffic service, maintenance of technical systems of aviation security, maintenance, repair and Assembly of units of electrical equipment, checking the performance of products and systems of aviation equipment, etc.

Graduates on the specialty 5B071400-Aviation engineering and technologies can perform the following types of professional activities:

- operational and technical;
- production and management;
- experimental research;
- production and technology.

The bachelor's program is formed by the organization depending on the types of educational activity and the requirements for the results of the mastering of an educational program oriented to scientific-research and pedagogical types of professional activity.

In addition to the diploma of higher education in the specialty 5B071400 – "Aviation engineering and technologies", student gets the certificate confirming the exams for one or more programmes of initial training in the form of modules according to the Order №750 WORK of the Republic of Kazakhstan dated 26.09.2013, which give the right to receive a certificate of a specialist in the aircraft in the CGA MIR of the Republic of Kazakhstan of the desired category A, B1.

10. Competence of a specialist

Bachelor of Natural Science on specialty 5B071400-Aviation engineering and technologies should have general-cultural (GC) and professional (PC) competencies:

Competence Code	Competence Description
GC-1	knowledge of the main stages of the recent history of the progressive development of Kazakhstan's statehood in the context of the global and Eurasian historical process
GC-2	the ability to freely interpret and creatively use scientific, historical and philosophical knowledge to generalize the success factors of the Kazakhstan development model on the way to the country that has taken place - the Republic of Kazakhstan

GC-3	competent use of linguistic and linguocultural knowledge for solving communication problems in the multilingual and multicultural society of the Republic of Kazakhstan and in the international arena
GC-4	knowledge of social and ethical values based on social norms and tolerance to different cultural and confessional traditions
GC-5	knowledge of the basic laws of the functioning and development of nature and society, the ability to adequately navigate in various social-economic, political and emergency situations
GC-6	ability to perceive, analyze, summarize information, goal setting and choose ways to achieve them
GC-7	willingness to cooperate with colleagues, work in a team
GC-8	the ability to apply legal norms and theories in specific practical situations, discern errors and omissions in the logic of reasoning
GC-9	the ability to assimilate the basic provisions of economic science in the context of the current state and trends in the development of the world economy
PC-1	knowledge of the principles of construction, features of the work, characteristics and parameters of the circuits of aviation electronics
PC-2	knowledge of the general laws of mechanical movement and interaction of material bodies, the laws and methods of theoretical mechanics.
PC-3	knowledge of the principles of analysis and interpretation of data from Kazakhstan and foreign statistics on the processes and nature of failures and malfunctions.
PC-4	ability to use the basic methods of calculating aerodynamic characteristics, depending on operational factors.
PC-5	knowledge of the operation of power supply systems for aviation equipment.
PC-6	the ability to formulate classifications and review aerodynamic screw theories, as well as to decide on the use of propellers for the intended purpose and to summarize the basic safety requirements.
PC-7	ability to formulate a classification, properties and indicators of the quality of aviation fuel, lubricants and special liquids, the system of their rational use.
PC-8	knowledge in the field of fluid mechanics and gas, hydraulic machines and other devices for processing, feeding and moving gaseous liquids.
PC-9	the ability to recognize and classify structural and raw materials according to appearance, origin, properties, as well as to classify methods for obtaining composite materials.
PC-10	the ability to analyze and evaluate production technologies at the

	stages of aircraft design and assembly to ensure their reliability and safety, to possess methods of compliance control of the developed technical documentation with regulatory documents.
PC-11	ability to briefly describe each part of the Chicago Convention, define the role of the International Civil Aviation Organization, compare JAA and EASA by structure and function, determine the relationship between Part -145, Part -66 Part -147 and Part-M and apply the main provisions Part -66 in practical activities, the ability to make management decisions to limit working time and the prohibition of work in the event of exposure to harmful, and even dangerous for life and health factors on a person at workplaces resulting from a violation Nia regulations repairs and gross violations of safety regulations.
PC-12	the ability to study the state and prospects of development of automated control systems for the processes of operation of aircraft, to formulate an assessment and forecasting the performance indicators of the processes of operating aircraft.
PC-13	the ability to use the specification in the process of reading assembly drawings, diagrams
PC-14	the ability to freely interpret and understand the principles of construction, features of work, characteristics and parameters of digital integrated circuits of basic logic elements.
PC-15	the ability to perform maintenance and repair of aircraft in accordance with the requirements of the ETS, to ensure the safe performance of maintenance and repair, control and standard operations in accordance with the maintenance and repair manual and other relevant instructions and tasks.
PC-16	the ability to establish the cause and make informed decisions on the elimination and prevention of failures and malfunctions of the airframe design and its functional systems, the ability to distinguish the structural elements of aircraft engines, to outline the processes occurring in the engine; incidents and incidents, a description of the programs for monitoring the reliability of aircraft and the quality of maintenance, with enyat formulas for calculation of reliability metrics for a certain form of the compound.

11. Learning outcomes focused on the Dublin descriptors

By completion of this educational program is expected that students will be able to:

Cognitive competence:

A1. know the general laws of the development of nature and society, own a culture of thinking; to be guided in ideals and values of a democratic society;

A2. Know linguistic and cultural linguistics, information and communication technologies in professional activities;

A3. Know the basic laws of aerodynamics, flight dynamics and basic methods for calculating aerodynamic characteristics depending on operating factors, design of propellers and parts, basic physicochemical and operational properties of fuels and lubricants and special liquids (LF), as well as the basics of their production technology classification and labeling.

Functional competencies:

B1. possess a physical and mathematical culture, computer literacy;

B2. To be able to organize the metrological support of technological processes of aircraft maintenance and repair, to recognize and classify structural and raw materials according to their appearance, origin, properties, as well as certification processes for aircraft and air personnel;

B3. To be able to organize routine inspections and maintenance in order to maintain the airworthiness of aircraft and ensure flight safety;

B4. To be able to make applications for the necessary technical equipment and spare parts, prepare technical documentation for the repair and develop instructions for the operation of technical equipment and aviation equipment;

B5. To be able to perform professional primary skills, including metalworking, manufacturing and repairing simple parts, assembling components to ensure the health, efficiency and readiness of aircraft for their intended use and with the lowest operating costs;

System Competencies:

C1. able to put into practice knowledge to calculate the reliability characteristics and determine the requirements for these characteristics in the process of design, manufacturing and operation, to demonstrate knowledge of the fundamentals of aviation technology, aircraft equipment, fundamentals of aircraft engineering and aircraft design;

C2. able to provide power supply of power plants, systems of energy supply of avionics and radio-electronic equipment, use power plants in various operating modes, in the event of an emergency situation and failures; to make decisions in the event of a non-standard situation in any elements of the power supply system; interpret the principles of functioning and mathematical models of biological control systems;

C3. capable of operation and maintenance of aircraft, to verify the technical condition and residual life of aircraft and equipment;

Social (communicative) competence:

D1. have an idea of the basic teachings in the field of natural and socio-economic sciences, analyze socially significant problems and processes, be able to use the methods of these sciences in various types of professional activity, have sufficient theoretical training to analyze the socio-economic situation of countries and regions; to realize their professional, social, economic role in society.

12. Accordance of expected learning outcomes to learning methods and assessment in forming competencies

Expected results (competence) for each EP module <i>(in accordance with the</i>
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Guidelines for the description of learning outcomes).

Socio-humanitarian module 6 credits GC-1 GC-2	Upon successful completion of this module, students should be able to: 1. demonstrate the knowledge and understanding of the main stages of the new history of the progressive development of the statehood of Kazakhstan in the context of the world and Eurasian historical process; 2. freely interpret and creatively use the scientific, historical and philosophical knowledge to summarize the success factors of the Kazakhstan development model on the way to the established state - the Republic of Kazakhstan; 3. perceive, analyze and summarize information, set a goal and choose ways to achieve it; 4. understand the need for the formation of new competencies; determine the direction of further personal and professional development, self-education and self-development.
Tool module 15 credits GC-3	Upon successful completion of this module, students should be able to: 1. competently use linguistic and linguistic-cultural knowledge to solve communication problems in a multilingual and multi-cultural society of the Republic of Kazakhstan and in the international arena; 2. use information and communication technologies in their professional activities; 3. search for information necessary for the effective performance of professional tasks.
Cultural communicative module 7 credits GC-4 GC-5	Upon successful completion of this module, students should be able to: 1. demonstrate knowledge of the basic laws of the functioning and development of nature and society, the ability to adequately navigate in various socio-economic, political and emergency situations, knowledge of socio-ethical values based on social and legal norms and tolerance to various cultural and confessional traditions; 2. demonstrate knowledge and understanding of sociology and psychology; 3. perceive, analyze and summarize information, set a goal and choose ways to achieve it; collect and interpret information; 4. be aware of the need to form new competencies; determine the direction of further personal and professional development, self-education and self-development; 5. use in life practical skills and abilities ensuring the preservation and strengthening of health, development and improvement of psychophysical abilities and qualities.
Professional	Upon successful completion of this module, students should

<p>Kazakh and foreign languages</p> <p>4 credits</p> <p>GC-5</p>	<p>be able to:</p> <ol style="list-style-type: none"> 1. competently use of linguistic knowledge to solve communication professional problems; 2. perceive, analyze and summarize information, set a goal and choose ways to achieve it; 3. realize the need to form new competencies; determine the direction of further personal and professional development, self-education and self-development; 4. study of scientific Kazakh / Russian / foreign languages; 5. apply scientific terminology by specialty. 6. write scientific articles and active participating in scientific discussions in Kazakh / Russian / foreign languages.
<p>Physics and mathematics module</p> <p>12 credits</p> <p>GC-7</p> <p>GC-8</p>	<p>Upon successful completion of this module, students should be able to:</p> <ol style="list-style-type: none"> 1. formulate the main sections of mathematics, physics; have the basic necessary knowledge for the study of professional disciplines; 2. perceive, analyze and summarize information, set a goal and choose ways to achieve it; 3. present the scientific picture of the world, adequate to the modern level of knowledge, on the basis of knowledge of the basic provisions, laws and methods of the natural sciences and mathematics; 4. to reveal the natural-science essence of the problems arising in the course of professional activity, to involve the corresponding physico-mathematical apparatus for their solution.
<p>Theoretical basis of Aviation techniques</p> <p>4 credits</p> <p>PC-10</p> <p>PC-11</p>	<p>Upon successful completion of this module, students should be able to:</p> <ol style="list-style-type: none"> 1. demonstrate knowledge and understanding of civil aviation development as state branch, main parts of aircraft and helicopters, aerodynamic fundamentals, flight safety foundation, airports and airfields of civil aviation; 2. determine the main data of aircraft, helicopters and aviation engines, to make calculation for determining aviation equipment characteristics; 3. systematize civil aviation terminology, have skills on creating and implementation of event for providing flight safety, 4. get information on Airplane structure and Aviation Engines, aerodynamic fundamentals and exploitation of Engines, flight safety foundation, airports and airfields of Civil Aviation
<p>Fundamentals of Electronics, Mechanics and Statistics</p>	<p>Upon successful completion of this module, students should be able to:</p> <ol style="list-style-type: none"> 1. analyze the main provisions of the sections: statics, kinematics, dynamics of the theoretical mechanics of the

<p>8 credits</p> <p>PC-1 PC-2 PC-3</p>	<p>material point, the mechanical system and an absolutely solid body;</p> <p>2. schematize mechanical phenomena, presenting concrete tasks in an abstract form; use of mathematical and physical methods in solving engineering problems;</p> <p>3. solve problems associated with the movement of material bodies;</p> <p>4. carry out a comprehensive analysis and interpretation of data in solving practical problems on the basis of the constructed physical and mathematical models and experiments;</p> <p>5. build mathematical models of mechanical and physical processes, to apply mathematical methods in solving problems during the operation of the aircraft, as well as to analyze the results of field tests;</p> <p>6. analyze the main types of <i>детехническое мероприятие</i> devices and circuits used in electronics;</p> <p>7. describe the principle of operation and features of rectifiers, inverters and other electrical energy converters used in the electrified equipment and flight-navigation complex of aircraft.</p>
<p>Aerodynamics , devices, equipment and systems of aircraft</p> <p>9 credits</p> <p>PC-10</p>	<p>Upon successful completion of this module, students to be able to:</p> <p>1. apply practical aerodynamic methods to calculate the aerodynamic parameters of an aircraft, use mathematical modeling methods to calculate the mechanical characteristics of an aircraft under the influence of aerodynamic loads;</p> <p>2. demonstrate methods of calculating the aircraft flight dynamics of its stability and controllability;</p> <p>3. verify the results obtained on the stands.;</p> <p>4. calculation of the screw and its control system;</p> <p>5. apply the methods of calculating the flight dynamics of the aircraft of its stability and controllability and the aircraft's avionics system in practice.</p>
<p>Materials and production of aviation Equipment</p> <p>13 credits</p> <p>PC-9 PC-12</p>	<p>Upon successful completion of this module, students to be able to:</p> <p>1. take into account modern development trends, materials, technologies of their production and aviation equipment in their professional activities;</p> <p>2. carry out measurements and instrumental control during the operation of aircraft, to analyze the results and estimate the errors;</p> <p>3. to classify with structural materials, including composite materials to differ their characteristics;</p> <p>4. develop and use the necessary structural materials to ensure the strength, vitality, reliability under the influence of the</p>

	<p>environment and implement its usage in aviation construction;</p> <p>5. interpret the main characteristics of construction materials, including composite materials, to know the recommended reference materials and restrictive assortments for construction materials standardized from articles;</p> <p>6. To make technical operation and service of means of reception, storage, pumping, refueling, refueling and delivery of PVC of liquids, oils and special liquids.</p> <p>7. Identify and eliminate malfunctions of technological equipment of technical means fuel supply of aircraft and ground equipment.</p>
<p>International relations and aviation legislation</p> <p>5 credits</p> <p>PC-10</p> <p>PC-15</p>	<p>Upon successful completion of this module, students to be able to:</p> <ol style="list-style-type: none"> 1. use the basic requirements governing the use of AC. 2. apply in the work of normative legal acts regulating the procedure for designing and designing aircraft; 3. be guided by state and industry standards; 4. analyze the national interests and strategic priorities of the socio-economic development of the Republic of Kazakhstan in the context of globalization; 5. analyze the system of laws and regulations, regulating public relations connected with the use of airspace of Kazakhstan Republic and aviation activity; 6. To analyze the features of economic processes of air transport enterprises. Cost of production in HECTARES. Production resources of enterprises and efficiency of their use, financial results of transport enterprises. Commercial activities of airlines. Strategic and innovative management of transport enterprises; 7. To analyze national interests and strategic priorities of socio-economic development of the Republic of Kazakhstan in the context of globalization; 8. To analyze the system of legal acts regulating public relations related to the use of the airspace of the Republic of Kazakhstan and aviation activities. 9. To apply legal acts. 10. use the requirements of regulations governing the technology and organization of the aircraft. 11. apply in practice the requirements of documents relating to the work performed. 12. be guided by state and industry standards.
<p>System security and quality management</p>	<p>Upon successful completion of this module, students to be able to:</p> <ol style="list-style-type: none"> 1. argue the international and national regulatory framework for the provision of SS in the Civil Aviation of the Republic of

<p>10 credits</p> <p>PC-13 PC-15</p>	<p>Kazakhstan;</p> <ol style="list-style-type: none"> 2. formulate the basics of ensuring the safety of flights on civil aircraft of the Republic of Kazakhstan, the rules and procedure for the preparation of the analysis on SS; 3. provide and prepare for flight the aircraft; 4. provide airport services for flight preparation; 5. use the rules and procedure for loading the aircraft for the safe transportation of passengers, cargo, mail; 6. monitor the compliance of parameters and the level of undesirable effects to regulatory requirements; 7. effective use of protective equipment; 8. develop measures to improve occupational safety; plan and use measures to improve the sustainability of facilities; 9. to develop measures for the protection of production personnel and the public in emergency situations and, if necessary, participation in rescue and other urgent work; 10. apply the general methodological principles for constructing a quality system for manufacturing and servicing ATs, taking into account the requirements of ISO 9001: 2001; 11. use the practical aspects of the implementation of the process approach to the quality management of AT; 12. to evaluate the production and domestic activities of a person taking into account the minimization of the negative impact on the elements of the environment, including professional activities.
<p>Computer technology</p> <p>4 credits</p> <p>PC-14</p>	<p>Upon successful completion of this module, students to be able to:</p> <ol style="list-style-type: none"> 1. Work with spreadsheets, consolidates data, builds charts; works with databases; applies methods and information security tools; can design and create simple websites; use control automation methods 2. To present technical solutions by means of engineering and computer graphics; creates graphic objects in the AutoCAD system on different layers, uses the means to ensure the accuracy of the construction of graphic objects, and is able to load typical elements of drawings; 3. Imit computer networks in different simulation programs, configure and test network functions in popular operating systems (Windows, Linux, MacOS) using a graphical interface. 4. design electronic components, incl. on the basis of microprocessor elements, to read and understand simple diagrams of typical electronic equipment on a digital integrated element base; select the necessary elements according to the reference information in accordance with the working conditions of the elements in the scheme, apply theoretical knowledge to

	<p>solve problems related to the construction of digital and microprocessor systems and devices; apply the knowledge gained from this course in practice in the construction, development and operation of integrated circuits of aviation equipment.</p> <p>5. show the principles of construction, features of work, characteristics and parameters of digital integrated circuits of basic logic elements, their classification and labeling, their conventional graphic symbols on circuit diagrams, operation of functional units and semiconductor computer storage devices, composition and designation of microprocessor systems and methods programming.</p>
<p>Airplane structure and reliability of aviation techniques</p> <p>5 credits</p> <p>PC-15</p>	<p>Upon successful completion of this module, students to be able to:</p> <ol style="list-style-type: none"> 1. demonstrate knowledge on structure and principle of aircraft operation and their functional systems; 2. read and understand the technical documentation; 3. determine the cause and take reasoned decision for elimination and failure warning and analysis system of airplane structure; 4. demonstrate the knowledge on the basics of aircraft technology production, aircraft equipment, the fundamentals of aircraft operation, the fundamentals of aircraft design and engines. 5. Apply knowledge in practice to calculate reliability characteristics and determine the requirements for these characteristics in the design, manufacture and operation.
<p>Technical maintenance, repair and operation of aircraft</p> <p>12 credits</p> <p>PC-15</p>	<p>Upon successful completion of this module, students to be able to:</p> <ol style="list-style-type: none"> 1. use the methods of determining the center of gravity, the take-off and landing characteristics of different aircraft; 2. analyze the main technologies of maintenance, repair and restoration of worn aircraft parts and electrical equipment; 3. use maps for calculating aircraft characteristics, load sheet and other tables and charts presented in the RLE, section “calculating aircraft characteristics”; 4. use the basic technology of maintenance, repair and restoration of worn parts of the aircraft and electrical equipment; 5. investigate documentation for maintenance and preservation of airworthiness in order to ensure flight safety at the stages of its technical operation; 6. adequate use of ground -based instrumentation, in-service nondestructive examination usage of equipment.
<p>Airframe and</p>	<p>Upon successful completion of this module, students should</p>

<p>powerplant and engine handling</p> <p>12 credits</p> <p>PC-16</p>	<p>be able to:</p> <ol style="list-style-type: none"> 1. provide energy-propulsion of power plants, systems of power supplying of avionics and radio electronic equipments; 2. calculate the energetic resources of the aircraft; 3. use power plants in various modes of operation, in case of emergency situations and failures; 4. make a decision on the occurrence of non-standard situations in any elements of the power supply system; to interpret the principles of functioning and mathematical models of biological control systems; 5. the main methods of calculation and research of automatic control devices used in aircraft; principles of automation of control processes in the aircraft; 6. use resource enhancement of engines and determine their condition methods; recognition and environmental effect for main engine data; 7. evaluate Augmented Controls for steadiness and control performance quality. 8. adjust gas-turbine engine (GTE) error from standard technical documentation (STD)
<p>Radio electronic, instrumentation and electrical equipment of aircraft</p> <p>15 credits</p> <p>PC-2 PC-13</p>	<p>Upon successful completion of this module, students should be able to:</p> <ol style="list-style-type: none"> 1. to be able to wiring the electrical circuit of the product, to make measurements of electrical parameters, install and dismantle aviation equipment using tools and accessories; 2. be able to establish the main types of feeder lines and elements of the feeder path; 3. be able to interpret the propagation of radio waves in free space and the earth's atmosphere; 4. be able to describe the main parts of aircraft engines, the basics of aerodynamics; 5. apply knowledge of aviation electrical equipment.
<p>Technical maintenance systems of avionics in exhaust airplanes</p> <p>12 credits</p> <p>GC-6</p>	<p>Upon successful completion of this module, students should be able to:</p> <ol style="list-style-type: none"> 1. be able to use test equipment; 2. develop design and technological documentation; 3. identify the faulty nodes of the logic unit, sensors and actuators; 4. to determine the electric power parameters of electric machines and apparatus, electrical devices and systems; 5. select technological equipment for the repair and operation of electrical machines and apparatus, electrical systems, determine the best options for its use; 6. apply and knowledge of the basics of radar; 7. explore the stages of radar surveillance;

	8. Apply knowledge of the basics of the theory of radio navigation.
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Matrix of formation of competencies by modules of the educational program

Module Name	Learning outcomes											
	1	2	3	4	5	6	7	8	9	10	11	12
Socio-humanitarian module	A1											D1
Instrumental module		A2										D1
Cultural and communicative module	A1											D1
Professional Kazakh and foreign language		A2										D1
Physical and mathematical module				B1								
Theoretical basis of aviation techniques								B5				
Fundamentals of Electronics, Mechanics and Statistics				B1								
Aerodynamics, device, devices and systems of aircraft			A3									
Materials and production of aviation Equipment			A3		B2							
International relations and aviation legislation	A1											D1
Security Systems and Quality Management					B2	B3				C2		
Computer technology		A2										
Airplane structure and reliability of aviation Techniques									C1			
Maintenance, repair and operation of aircraft						B3	B4			C2	C3	
Airframe and powerplant and engine handling									C1	C2		
Radioelectronic, instrumentation and electrical equipment of aircrafts			A3	B1								
Technical maintenance systems of avionics in exhaust airplanes						B3	B4			C2	C3	

13. Curriculum of «5B071400-Aviation engineering and technologies» specialty

Code	Names of disciplines/other educational activities	Credits	Semesters							
			I	II	III	IV	V	VI	VII	VIII
			lec+ practice+ lab							
GENERAL EDUCATION DISCIPLINES (GED)		28								
OBLIGATORY COMPONENT (OC)		21								
Module 1	Social and humanitarian module	6								
SIK1101	Modern history of Kazakhstan (State Examination)	3	2+1+0							
Fil 2102	Philosophy	3				2+1+0				
Module 2	Instrumental module	15								
IYa 1103	Foreign language	6	0+3+0	0+3+0						
K(R)Ya 1104	Kazakh (Russian) language	6	0+3+0	0+3+0						
IKT 1105	Information and communication technologies (in English)	3		2+0+1						
Total of obligatory component		21	9	9	0	3	0	0	0	0
ELECTIVE COMPONENT (EC)		7								
Module 3	Finance and law module	7								
	Legal bases of corruption control	2								
	Basics of Transport Systems Security	2								
	Psychology of interpersonal communication	3								
Module 3(1)	Cultural and communicative module	7								
	Culture of speech and language communication	2					1+1+0			
	The human factor and psychology	3	2+1+0							
	Political Science and Sociology	2			1+1+0					
Total of elective component		7	3	0	2	0	2	0	0	0
CORE DISCIPLINES(CD)		69								
OBLIGATORY COMPONENT (OC)		20								
Module 4	Professional kazakh and foreign language	4								
PK(R)Ya2201	Professional kazakh (russian) language	2			0+2+0					
POIYa2202	The professional focused foreign language	2				0+2+0				

Code	Names of disciplines/other educational activities	Credits	Semesters							
			I	II	III	IV	V	VI	VII	VIII
			lec+ practice+ lab							
Module 5	Physical and mathematical module	12								
VM 1203	Higher Mathematics 1	3	2+1+0							
VM 1204	Higher Mathematics 2	3		2+1+0						
Fiz 1205	Physics 1	3	2+1+0							
Fiz 1206	Physics 2	3		2+1+0						
Module 6	Theoretical basis of aviation techniques	4								
TOAT 2207	Theoretical basis of aviation techniques 1	2			1+1+0					
TOAT 2208	Theoretical basis of aviation techniques 2	2				1+1+0				
	Total of obligatory component	20	6	6	4	4	0	0	0	0
ELECTIVE COMPONENT (EC)		49								
Main disciplines of the educational program										
Module 7	Fundamentals of Electronics, Mechanics and Statistics	8								
OE 2201	Fundamentals of Electronics	2			1+1+0					
TM 2202	Theoretical Mechanics	3			2+1+0					
St 2203	Statistics	3				2+1+0				
Module 8	Aerodynamics, device, devices and systems of aircraft	9								
ADP 2204	Aerodynamics and flight dynamics	3			2+1+0					
SAVS 2305	Aircraft avionics system	3					2+1+0			
VSU 2306	Screw and its control systems	3						2+1+0		
Module 9	Materials and production of aviation equipment	13								
HTVS 2307	Chemistry and ground supply of aircraft	2						1+1+0		
JGSBS 2208	Liquid gas systems of aircraft	3				2+1+0				
TM 2209	Technical mechanics	3				2+1+0				
Mat 2210	Materials Science	3			2+1+0					
TPAT 2211	Technology of aircraft production	2			1+1+0					
Module 10	International relations and aviation legislation	5								
AZ 1212	Aviation legislation	2		1+1+0						
MEO 3213	International economic relations	3					2+1+0			

Code	Names of disciplines/other educational activities	Credits	Semesters							
			I	II	III	IV	V	VI	VII	VIII
			lec+ practice+ lab							
Module 11	System security and quality management	10								
OTE 3214	Labor protection and ecology	2						1+1+0		
SUK 3215	Standardization and quality management	3						2+1+0		
SBP 3216	Flight safety system	3					2+1+0			
UTPA 4217	Management of technological processes in the airline	2							1+1+0	
Module 12	Computer technology	4								
TChKG 1218	Technical drawing and computer graphics	2		1+1+0						
ChESP 2219	Digital electronic systems and devices	2				1+1+0				
	Total of elective component	49	0	4	14	10	9	10	2	0
MAJOR DISCIPLINES (MD)		32								
OBLIGATORY COMPONENT (OC)		5								
Module 13	Construction and reliability of aviation equipment	5								
KLA 3301	Construction of aircraft	3					2+1+0			
HAT 4302	Reliability of aviation equipment	2							1+1+0	
	Total of obligatory component	5	0	0	0	0	3	0	2	0
ELECTIVE COMPONENT (EC)		27								
Module 14	Maintenance, repair and operation of aircraft	12								
PTO 3303	Maintenance Practice	3						2+1+0		
OOTOV5 4304	Organization and maintenance of aircraft maintenance	2							1+1+0	
TEVS 4305	Technical operation of aircraft	3							2+1+0	
RAT 4306	Repair of aviation equipment	4							2+2+0	
Module 14 (1)	Technical maintenance systems of avionics in exhaust airplanes	12								
Rn 3303(1)	Radio navigation	3						2+1+0		
Rs 4304 (1)	Radiocontact	2							1+1+0	
TOR 4305 (1)	Theoretical bases of radar detection	3							2+1+0	
	Technical maintenance and repair of aviation systems and avionics	4							2+2+0	
Module 15	Power plants and controls	15								
AUGD 3307	Automation and control of gas turbine engines	2						1+1+0		

Code	Names of disciplines/other educational activities	Credits	Semesters							
			I	II	III	IV	V	VI	VII	VIII
			lec+ practice+ lab							
SUAD 4308	Aviation engine control systems	3							2+1+0	
PAK 4309	Strength of aircraft construction	3							2+1+0	
KAD 3310	Aircraft engine design	4					2+2+0			
SVS 3311	Aircraft systems	3						2+1+0		
Module 15 (1)	Radioelectronic, instrumentation and electrical equipment of aircrafts	15								
Ed 3307 (1)	Electrodynamics, AFU and RRV	2						1+1+0		
PReO 4308(1)	Instrumentation and radio-electronic equipment	3							2+1+0	
Ael 4309 (1)	Aviation Electrical Equipment	3							2+1+0	
SU 3310 (1)	Silent installations	4					2+2+0			
PNSK 3311(1)	Pilotage-navigation systems and complexes	3						2+1+0		
	Total of elective component	27	0	0	0	0	4	8	15	0
	Total of theoretical studies	129	18	19	19	18	18	18	19	0
ADDITIONAL TYPES OF TRAINING(ATT)		23								
OBLIGATORY COMPONENT (OC)										
	Physical Training Module	8								
FK	Physical Training	8	0+0+2	0+0+2	0+0+2	0+0+2				
	Professional practice module	12								
UP	Educational Internship	2		2 (1 week)						
PrP	Practice Training	10				1 (2,5 week)		1 (2,5 week)		3 (7,5 week)
	Total on additional types of training	20	2	4	2	3	0	1	0	8
FINAL ATTESTATION		3								
GES	State exam in the specialty	1								1 (2 week)
NZDR	Writing and Presentation of Diploma Work (Project)	2								2 (4 week)
TOTAL		153	21	22	20	21	18	21	19	11

CONTENT OF EDUCATIONAL MODULES OF DISCIPLINES

In this section are used the following abbreviations:

ACS – automatic control system;
AD – aircraft engine;
ADF – Automatic Direction Finder;
AFU – antenna-feeder devices;
AGTSU – Automatic control systems (regulation) of aviation gas turbine power plants;
AiKT – Aviation and Space Technology;
ANV – acts of unlawful interference;
AP – an accident;
API – accident and incident;
AT– aircraft technology;
ATC – Air Traffic Control;
ATS – air traffic service;
BC – life safety;
BP – flight safety;
BT – air transport;
DME – Distance Measuring Equipment;
DR – thesis;
EASA – European Aviation Safety Agency;
EC – electronic computer;
EMM – economic and mathematical model;
ETD – operational and technical documentation;
EU – European Union;
FADEC – Full Authority Digital Engine Control System;
GIK – gyroscopic induction compass;
GTD – gas turbine engine;
HF – High Frequency;
IATA – International Air Transport Association;
IAS – engineering and aviation service;
ICAO – International Civil Aviation Organization;
JAA – Joint Aviation Authorities Training Organization;
KLA – the design of aircraft;
KPA – test equipment;
KS – combustion chamber;
KV – short wave;
LA – aircraft;
MEP – powerful electromagnetic field;
Microwave – ultra high frequencies;
MK – control method;
MRO – maintenance and repair;
NTD – regulatory and technical documentation;
OPS – operational;
PIC – anti-icing system;

PNS – flight and navigation systems;
PPS – fire system;
PS – grease;
PVC – anti-crystallization liquid;
RA – Radio Altimeter;
Radar – radar station;
REO – radio electronic equipment;
RLE – flight operation manual;
RNU – radio navigation device;
RRV – radio propagation;
RS – radio communication.
TC – solid lubricant;
TCAS – Traffic collision avoidance system;
TDRD – dual turbojet engine;
TE – turbojet engine;
TEIR – technical maintenance and repair;
THEN – maintenance;
TOAT – theoretical foundations of aviation technology;
TVD – turboprop engine;
VHF – ultrashort waves;
VHF – Very High Frequency;
VIC – visual measuring control;
VNA – input guide vanes;
WXR – Weather avoidance radar;
SA – nozzle;
SAR – automatic control system;
SARD – automatic engine control system;
SL – special liquids;
SP – slipway;
SVS – air signal system;

GENERAL EDUCATIONAL DISCIPLINES (GED) – 28 credits

OBLIGATORY COMPONENT (OC) – 21 credits

Social and humanitarian module – 6 credits

Upon successful completion of this module, students should be able to:

1. demonstrate the knowledge and understanding of the main stages of the new history of the progressive development of the statehood of Kazakhstan in the context of the world and Eurasian historical process;
2. freely interpret and creatively use the scientific, historical and philosophical knowledge to summarize the success factors of the Kazakhstan development model on the way to the established state - the Republic of Kazakhstan;
3. perceive, analyze and summarize information, set a goal and choose ways to achieve it;
4. understand the need for the formation of new competencies; determine the direction of further personal and professional development, self-education and self-development.

As a result of studying the module, student able to:

- A1. know the general laws of the development of nature and society, own a culture of thinking; to be guided in ideals and values of a democratic society;
- D1. have an idea of the basic teachings in the field of natural and socio-economic sciences, analyze socially significant problems and processes, be able to use the methods of these sciences in various types of professional activity, have sufficient theoretical training to analyze the socio-economic situation of countries and regions; to realize their professional, social, economic role in society.

SIK1101 Modern history of Kazakhstan - 3 credits

Prerequisites: no.

Postrequisites: no.

As a result of studying the discipline, the student is able to:

- systematize the conceptual foundations of the study of modern history of Kazakhstan;
- to compare the ideas of continuity and continuity of historical and cultural development, the deep roots of the spiritual heritage of Kazakhstan;
- to reveal the significance of the formation of historical consciousness and ideological principles in accordance with national priorities;
- to classify historical sources reflecting the features of the modern history of Kazakhstan;
- to identify the historical patterns of the development of society, paying attention to the study of historical originality;

- master the techniques of historical description and analysis of the causes and consequences of the events of the modern history of Kazakhstan;

Predict possible solutions to contemporary problems based on an analysis of the historical past and reasoned information;

- argue the features and significance of the modern Kazakhstan model of development;

- to explain the importance of education of patriotism, in the spirit of democratic values of modern society on the example of the vital activity of historical personalities.

Studying topics:

1. Conceptual framework for the study of national history.
2. Prerequisites for the formation of independence in Kazakhstan: national liberation uprisings and the formation of the idea of a national state.
3. The process of polarization of political forces.
4. Civil and political confrontation.
5. Implementation of the Soviet model of nation-building.
6. Contradictions and consequences of Soviet reforms in Kazakhstan in the second half of the twentieth century.
7. The policy of "restructuring" of Kazakhstan.
8. Formation of the state structure of the Republic of Kazakhstan.
9. Kazakhstan model of economic development.
10. Social modernization - the basis of the welfare of society.
11. Ethno-demographic processes and the strengthening of interethnic harmony.
12. Socio-political development prospects and spiritual modernization.
13. The policy of forming a new historical consciousness and worldview of the people of the Great Steppe.
14. Kazakhstan is a state recognized by the modern world.
15. N.A. Nazarbayev - a person in history. Formation of a united nation of the future.

Fil 2102 Philosophy - 3 credits

Prerequisites: Modern history of Kazakhstan.

Postrequisites: no.

As a result of studying the discipline, the student is able to:

- describe the main content of ontology and metaphysics in the context of the historical development of philosophy;
- explain the specifics of the philosophical understanding of reality;
- justify the worldview as a product of philosophical reflection and study of the natural and social world;
- Classify the methods of scientific and philosophical knowledge of the world;
- Interpret the content and specific features of the mythological, religious and scientific worldview;

- to substantiate the role and importance of key ideological concepts as values of the social and personal being of a person in the modern world;
- analyze the philosophical aspect of media texts, socio-cultural and personal situations to substantiate and make ethical decisions;
- to formulate and correctly argue their own moral position in relation to the actual problems of modern global society;
- conduct research that is relevant to identify the philosophical content of problems in the professional field and present the results for discussion.

Studying topics:

1. The emergence and development of philosophy. The subject and method of philosophy.
2. Historical types of philosophy.
3. Basic philosophical understanding of the world.
4. The problem of being. Ontology and metaphysics.
5. Consciousness and language.
6. Cognition and creativity.
7. Scientific and extra-scientific knowledge. Science and technology.
8. Philosophy of man and value world.
9. Human. Life and death. Meaning of life.
10. Ethics. The philosophy of values.
11. Freedom.
12. Aesthetics. Perception and creation of beauty.
13. Society and culture.
14. Philosophy of history.
15. «Magilik Yel» and «Ruhani zangyru» - the philosophy of the new Kazakhstan.

Instrumental Module – 15 credits

Upon successful completion of this module, students should be able to:

1. competently use linguistic and linguistic-cultural knowledge to solve communication problems in a multilingual and multi-cultural society of the Republic of Kazakhstan and in the international arena;
2. use information and communication technologies in their professional activities;
3. search for information necessary for the effective performance of professional tasks.

As a result of studying the module, student able to:

- A2. Know linguistic and cultural linguistics, information and communication technologies in professional activities;
- D1. have an idea of the basic teachings in the field of natural and socio-economic sciences, analyze socially significant problems and processes, be able to use the methods of these sciences in various types of professional activity, have

sufficient theoretical training to analyze the socio-economic situation of countries and regions; to realize their professional, social, economic role in society.

IYa 1103 Foreign language – 6 credits

Prerequisites: no.

Postrequisites: Professionally-oriented Foreign Language.

As a result of studying the discipline, the student is able to:

- reproduce orthoepic, spelling, stylistic norms of Russian / Kazakh / foreign languages;

- use the features of professional oral and written scientific speech;

- apply the technology of interpretation and analysis of the texts of scientific literature in the specialty;

Have an idea of the role and importance of information and information technology in the development of modern society and the economy of knowledge in the English language;

- practice the main methods, methods and means of obtaining, storing, processing information;

- have computer skills as an information management tool;

- to build work with information in the global computer networks and corporate computer systems in English;

- Competently use linguistic and cultural linguistic knowledge for communication in a multilingual and multicultural society of the Republic of Kazakhstan and in the international arena.

Studying topics:

1. The content of the educational program level A1.

2. The content of the educational program level A2.

3. The content of the educational program level B1.

4. The content of the educational program level B2 + LSP.

5. The content of the educational program of level C1.

6. The content of the educational program of the level - CALP – cognitive academic proficiency in the language.

K(R)Ya1104 Kazakh (Russian) Language – 6 credits

Prerequisites: no.

Postrequisites: Professional Kazakh (Russian) language.

As a result of studying the discipline, the student is able to:

- to make the right choice and use of language and speech means on the basis of knowledge of a sufficient amount of vocabulary, system of grammatical knowledge, pragmatic means of expressing intentions;

- transfer the factual content of texts, formulate their conceptual information, describe output knowledge (pragmatic focus) of the entire text, as well as of its individual structural elements;

- interpret the information of the text, explain in the volume of certification requirements the style and genre specificity of the texts of the socio-cultural, socio-political, official business and professional areas of communication;

- request and report information in accordance with the situation of communication, evaluate actions and actions of participants, use information as a tool to influence an interlocutor in situations of knowledge and communication in accordance with certification requirements;

- to build programs of speech behavior in situations of personal, social and professional communication in accordance with the norms of language, culture, the specifics of the sphere of communication, certification requirements;

- to discuss ethical, cultural, socially significant problems in the discussions, to express their point of view, to defend it reasonably, to critically evaluate the opinion of interlocutors;

- participate in communication in various situations of different areas of communication in order to realize their own intentions and needs (everyday, educational, social, cultural), declaring about them ethically correctly, meaningfully complete, lexico-grammatically and pragmatically adequate to the situation;

- compile household, socio-cultural, and official business texts in accordance with generally accepted standards and functional orientation, using adequate lexical-grammatical and pragmatic material of a certain certification level, which is adequate for the purpose set.

Studying topics:

1. The content of the educational program level A1.

2. The content of the educational program level A2.

3. The content of the educational program level B1.

4. The content of the educational program level B2 + LSP.

5. The content of the educational program of level C1.

6. The content of the educational program of the level - CALP – cognitive academic proficiency in the language.

IKT1105 Information and Communication Technologies - 3 credits

Prerequisites: no.

Postrequisites: Digital electronic systems and devices

As a result of studying the discipline, the student is able to:

- explain the purpose, content and development trends of information and communication technologies, justify the choice of the most appropriate technology to solve specific problems;

- explain the methods of collecting, storing and processing information, how to implement information and communication processes;

- describe the architecture of computer systems and networks, the purpose and functions of the main components;

- use information Internet resources, cloud and mobile services for searching, storing, processing and distributing information;

- use software and hardware of computer systems and networks for collecting, transmitting, processing and storing data;
- analyze and justify the choice of methods and means of protecting information;
- using digital technologies to develop data analysis and data management tools for various activities;
- to carry out project activities in the specialty with the use of modern information and communication technologies.

Studying topics:

1. Introduction. The concept of information and communication systems. Informatization of society. Applications of information and communication technology.
2. Units of measurement information. Digital logic level of a computer. Logic, Boolean algebra, truth tables. Logic gates, circuits.
3. Numeral systems. Historical examples of numeral systems: positional and non-positional. Arithmetic operations for different numeral systems.
4. Organization of computer systems. Memory structure. Hardware: input, processing, and output devices. Physical components of a computer system.
5. Directions for further development of ICT. Quantum computers. Artificial intelligence.
6. Operating system as main part of the system software. Non-standard architecture computers, adaptation of the operating system kernel and software.
7. Introduction to the operating system UNIX / Linux. The history of UNIX (UNIX, Linux, GNU, BSD, Minix).
8. Installing OS (Linux OS, MS Windows OS). Virtual machine. Dual boot (Linux and Windows). Live USB, CD, DVD. Creation of backups of system.
9. Applications of Linux. Linux distributions. Desktop environment (KDE, GNOME, etc.).
10. Software. System software. Application software (customized). Utility software. Architecture of software. Testing of software. License, patent software.
11. Web-applications development technology. Client programming languages. Server-side programming languages.
12. Telecommunications and networks. Principles of construction and classification of computer networks.
13. Database systems and business intelligence. Electronic and mobile commerce. Systems development.
14. Algorithms (types, properties, methods of presentation). Sorting algorithms. The analysis of search algorithms.
15. Knowledge management and Specialized information systems. The personal and social impact of computers.

ELECTIVE COMPONENT – 7 credits

Cultural and communication module – 7 credits

Upon successful completion of this module, students should be able to:

1. demonstrate knowledge of the basic laws of the functioning and development of nature and society, the ability to adequately navigate in various socio-economic, political and emergency situations, knowledge of socio-ethical values based on social and legal norms and tolerance to various cultural and confessional traditions;
2. demonstrate knowledge and understanding of sociology and psychology;
3. perceive, analyze and summarize information, set a goal and choose ways to achieve it; collect and interpret information;
4. be aware of the need to form new competencies; determine the direction of further personal and professional development, self-education and self-development;
5. use in life practical skills and abilities ensuring the preservation and strengthening of health, development and improvement of psychophysical abilities and qualities.

As a result of studying the module, student able to:

A1. know the general laws of the development of nature and society, own a culture of thinking; to be guided in ideals and values of a democratic society;

D1. have an idea of the basic teachings in the field of natural and socio-economic sciences, analyze socially significant problems and processes, be able to use the methods of these sciences in various types of professional activity, have sufficient theoretical training to analyze the socio-economic situation of countries and regions; to realize their professional, social, economic role in society.

Kul2106 Culturology – 2 credits

Prerequisites: Modern history of Kazakhstan, Political Science and Sociology Sociology.

Postrequisites: no

As a result of studying the discipline, the student is able to:

- describe the morphology and anatomy of culture as a system of parameters and forms in contexts: nature, man, society;
- explain the origin and essence of signs, values, archetypes, symbols as a system of cultural code through correlation with the type of material culture, a certain way of being;
- streamline information about the cultural heritage of the inhabitants of Kazakhstan and determine the channels of their influence on the development of the culture of the Kazakh people;
- to classify the cultural capital of the Turks, to streamline 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 humanity and the Kazakh people;

- reasonably and reasonably provide information about the various stages of 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;

- give an objective assessment of the national cultural heritage from the standpoint of maintaining the status of the Kazakh culture, the Kazakh language and their role in shaping the cultural and national identity;

- assess the state of modern Kazakh culture, identify and substantiate the prospects for its development and the direction of modernization; to build programs of professional activities with regard to cultural specificities;

- to objectively evaluate the cultural policy of Kazakhstan and, on its basis, build inter-ethnic and intercultural communications taking into account cultural specifics, enter into a discussion on cultural issues, and reasonably defend one's opinion.

Studying topics:

1. The morphology of culture. The concept and essence of culture.
2. Semiotics culture.
3. The language of culture.
4. Anatomy of culture.
5. Space and forms of culture.
6. Cultural heritage of the inhabitants of Kazakhstan.
7. Culture of nomads of Kazakhstan.
8. Cultural heritage of the Turks of Kazakhstan.
9. Medieval culture of Central Asia.
10. Cultural heritage of the Kazakh people.
11. The formation of the Kazakh culture.
12. Kazakh culture at the turn of the XVIII - the end of the nineteenth centuries.
13. Kazakh culture of the twentieth century.
14. Kazakh culture in the context of modern world processes.
15. Cultural policy of Kazakhstan.

ChFP2107 The human factor and psychology – 3 credits

Prerequisites: Modern history of Kazakhstan

Postrequisites: Flight safety system.

As a result of studying the discipline, the student is able to:

- understand the role and place of psychological knowledge in the system of human sciences;

- describe the concepts of personality and interpersonal communication in the context of the formation and modernization of the national consciousness;

- analyze the value-semantic structure of the individual and highlight the main priorities for the purpose of self-determination and personal growth in the framework of the modernization of consciousness;

- use psychological knowledge for career planning and building a professional path;
- assess their own psychological qualities, resources and capabilities;
- justify the value and place of interpersonal communication as a factor in the development of a harmonious personality;
- develop your own strategies for effective interpersonal communication, use the skills of stress management and time management, self-presentation skills to improve personal and professional effectiveness;
- apply different strategies for resolving conflict situations in personal and professional interaction.

Studying topics:

1. Psychology of personality and its role in the system of human sciences.
2. Motivational-need sphere of personality.
3. Emotions and emotional intelligence.
4. Volitional processes and the psychology of self-regulation.
5. Temperament and character.
6. Values, interests, norms as the spiritual basis of personality.
7. Psychology of the meaning of life and professional self-determination.
8. Psychology of career growth.
9. Psychology of communication.
10. Perceptual side of communication.
11. Interactive side of communication.
12. The communicative side of communication.
13. The concept and structure of the socio-psychological conflict.
14. Models of individual behavior in conflict.
15. Techniques and techniques for effective communication.

PS2106 Political Science and Sociology – 2 credits

Prerequisites: no

Postrequisites: no.

As a result of studying the discipline, the student is able to:

- to determine the objects of the study of sociology (society, social organizations, social groups, individuals, etc.) to explain the social reality;
- explain key sociological ideas and theories and describe the social structure and stratification of society, distinguish and analyze the degree of social inequality;
- to reveal the mechanism of formation of public opinion and consciousness in society;
- analyze the characteristics of social institutions in the modernization of Kazakhstani society;
- describe the features of the organization and functioning of political institutions (institutions of representation and coordination of interests);
- demonstrate an understanding of the mechanisms and principles of the functioning of political power, political institutions, domestic, foreign, world politics and international relations;

- demonstrate an understanding of the nature and laws of the functioning and development of politics, its role in various spheres of society;
- justify the relationship of political systems and political regimes.

Studying topics:

1. Sociology in understanding the social world.
2. Social structure and stratification.
3. Mass media, technology and society.
4. Sociology of ethnicity and nation.
5. Religion, culture and society.
6. Family and modernity.
7. Deviation, crime and social control.
8. Economy, globalization and labor.
9. Social change: the latest sociological debate.
10. Politics in the structure of public life.
11. The rule of law and civil society.
12. The specificity of political parties, party systems and socio-political movements and organizations.
13. World politics and modern international relations.
14. Sovereign Kazakhstan in the system of international relations.
15. The third modernization in the Republic of Kazakhstan.

BASIC DISCIPLINES (BD) - 69 credits

OBLIGATORY COMPONENT (OC) – 20 credits

Professional kazakh and foreign language Module - 4 credits

Upon successful completion of this module, students should be able to:

1. competently use of linguistic knowledge to solve professional problems;
2. perceive, analyze and summarize information, set a goal and choose ways to achieve it;
3. realize the need to form new competencies; determine the direction of further personal and professional development, self-education and self-development;
4. study of scientific Kazakh / Russian / foreign languages;
5. apply scientific terminology by specialty.
6. write scientific articles and active participating in scientific discussions in Kazakh / Russian / foreign languages.

As a result of studying the module, student able to:

A2. Know linguistic and cultural linguistics, information and communication technologies in professional activities;

D1. have an idea of the basic teachings in the field of natural and socio-economic sciences, analyze socially significant problems and processes, be able to use the methods of these sciences in various types of professional activity, have sufficient theoretical training to analyze the socio-economic situation of countries and regions; to realize their professional, social, economic role in society.

PK(R)Ya2201 Professional Kazakh (Russian) Language - 2 credits

Prerequisites: Kazakh (Russian) Language.

Postrequisites: no.

As a result of studying the discipline, the student will be able to:

- know the orthoepic, orthographic, stylistic norms of the Russian / Kazakh language;
- understand the features of professional oral scientific speech;
- determine the features of professional written scientific speech;
- justify the strategy and tactics of speech communication in the field of professional interaction;
- be able to speak with an oral message;
- to build oral and written statements in different communicative situations;
- understand and analyze the structural and semantic organization of a scientific text;
- perform various operations with the text: describe, summarize information;
- master the technology of interpretation and analysis of the texts of scientific literature in the specialty.

Studying topics:

1. Language and its main functions. Language and speech
2. Types and forms of speech
3. Text. Text Signs
4. Text. Types of communication in the text. Chain connection Chain Transfer Methods
5. Functional-semantic types of speech. Description as a functional-semantic type of speech
6. Functional-semantic types of speech. Narration as a functional-semantic type of speech
7. Functional-semantic types of text. Reasoning as a functional-semantic type of text
8. General characteristics of functional styles of literary language
9. Conversation style and its language features
10. Official business style and language attributes
11. The journalistic style and its language features
12. Artistic and literary style and its language features
13. Scientific style and its language features
14. Structural and semantic articulation of the text. Theme of the scientific text
15. The communicative task of the scientific text

POIYa2202 The professional focused Foreign Language - 2 credits

Prerequisites: Foreign Language

Postrequisites: no.

As a result of studying the discipline, the student will be able to:

- master the functional features of oral and written professional-oriented texts;
- possess strategies of communicative behavior in situations of international professional communication;
- understand oral (monologue, dialogical) speech within professional topics;
- participate in the discussion of topics related to the specialty;
- independently prepare and make oral reports on professional topics, including using multimedia technologies;
- extract the necessary information from sources in a foreign language created in different sign systems (text, table, graph, diagram, audiovisual series, etc.) in typical situations of professional and business communication.

Studying topics:

1. Revising tenses, direct and indirect speech, prepositions: above, below, over, under.
2. Past tenses: simple, continuous, perfect.
3. Future forms: going to, present continuous, will/shall.

4. present perfect and past simple;
5. Participle I, participle II, perfect participle;
6. comparatives and superlatives;
7. Writing a progress test №1;
8. Read and retell the text;
9. Must, have to, should (obligation);
10. Must, may, might, can't (deduction);
11. Infinitive and its forms;
12. First conditional and future time clauses + when, until, etc;
13. First conditional;
14. Second conditional;
15. Basic grammar, special terminology from the textbook.

Physical and mathematical module – 12 credits

Upon successful completion of this module, students should be able to:

1. formulate the main sections of mathematics, physics; have the basic necessary knowledge for the study of professional disciplines;
2. perceive, analyze and summarize information, set a goal and choose ways to achieve it;
3. present the scientific picture of the world, adequate to the modern level of knowledge, on the basis of knowledge of the basic provisions, laws and methods of the natural sciences and mathematics;
4. to reveal the natural-science essence of the problems arising in the course of professional activity, to involve the corresponding physico-mathematical apparatus for their solution..

As a result of studying the module, student able to:

- B 1. possess a physical and mathematical culture, computer literacy.

VM 1203 Higher Mathematics 1 – 3 credits

Prerequisite: no.

Postrequisite: Higher Mathematics 2.

As a result of studying the discipline, the student will be able to:

- to achieve a good understanding of the basic concepts and be able to apply these concepts to different mathematical situations;
- to know the basic fundamental concepts of linear algebra: the basis of linear algebra and the method of coordinates; all forms and equations of geometric objects of the first and second order, the basic definitions, theorems, rules, methods and formulas of linear algebra;
- to approve and prove the main theorems related to the above concepts;
- provide written explanations of key concepts ideas from the course;

- clearly present and explain solutions to problems both in writing and orally;
- apply mathematical reasoning and mathematical analysis to solve theoretical and applied problems.

Studying topics:

1. Sets. Numerical sets. Operations on sets. Venn diagram. Cardinality.
2. Permutations and combinations. Standard permutation record. The structure of the permutation cycle. The sign of the permutation.
3. «Matrixes. Classification of matrices. Elementary matrix operations»
4. Determinants of the second and third orders. Determinants of n-th order. Minors and cofactor of elements of the matrix. Properties of the determinant. Expansion of the determinant by column or row elements. Determinants of special matrices.
5. The rank of a matrix. Linear combination. Linear independence. Basis. Linear space. Dimension. Computation of the inverse matrix. Elementary transformations.
6. Linear equation system. The criterion of compatibility of a system of linear equations (theorem of Kronecker-Capelli). Square matrix. Classes of equivalent matrices.
7. Finding solutions to a system of linear equations by the inverse matrix method. Solution space
8. Vector and basic definitions. Linear operations on vectors.
9. Scalar and vector product of two vectors and their properties.
10. Mixed product. Properties of the mixed product.
11. Linear dependence of vectors. Cartesian coordinate system. Change of coordinates when replacing the basis.
12. Linear vector space. Dimension and basis of linear space. Linearly independent vectors.
13. Bilinear and quadratic forms. Polyline images. Bilinear form. The law of change of matrix of bilinear forms. Symmetric and skew-symmetric forms. Quadratic form.
14. Coordinate transformation when moving to a new basis. Transition matrix. Theorem on the existence of a fundamental system of solutions.
15. Linear transformations (operators). Coordinate representation of linear transformations. Sum of linear transformations.

VM 1204 Higher Mathematics 2 – 3 credits

Prerequisite: Higher Mathematics 1.

Postrequisite: Statistics.

As a result of studying the discipline, the student will be able to:

- know the basic concepts, definitions and formulas;
- learn the basic methods of solving problems.

Studying topics:

1. Differential calculus of functions of many variables. Definition of limit of a function. Continuity of the function of several variables. Partial derivative.
2. Total increment and total differential, its application in approximate calculations. Differentiability of the function of several variables. The derivative of a complex function.
3. Directional derivative. Gradient. The equation of the tangent plane on the surface. The equation of the normal. Extremum of the function of two variables.
4. Multiple integrals.
5. Curvilinear and surface integrals. Formulas Of Green, Stokes, Ostrogradsky.
6. Numerical series. Signs of convergence of sign-positive series: d'alembert, Cauchy, integral sign, signs of comparison.
7. Alternating rows. Leibniz's Theorem. Absolute and conditional convergence of the alternating series.
8. Functional series, their special case-power series. Uniform convergence of the series. Abel's Theorem. Termed differentiation and integration of the functional range. Fourier series.
9. Differential equations of first order: separable variables, homogeneous
10. First order differential equations: linear, in full differentials. Finding the integrating factor.
11. Higher order differential equations. Lowering the order of the differential equation.
12. Linear homogeneous differential equation. Differential equations of the second and higher orders with constant coefficients. Cauchy problem.
13. Inhomogeneous linear differential equations with standard right-hand side. Method of selection of decisions. Inhomogeneous linear differential equations. A method of variation of arbitrary constants.
14. Classical definition of probability. Basic theorems of probability theory. Repetition of tests. The Formula Of Bernoulli. Moivre-Laplace Theorems. Poisson's Theorem. Discrete random variables.
15. General and sample population. Empirical distribution functions. Distribution characteristics: arithmetic mean, mode and median. Empirical moments and their calculation.

Fiz 1205 Physics 1 – 3 credits

Prerequisites: no.

Postrequisites: Physics 2.

As a result of training the student is able to:

- demonstrate the ability to use fundamental laws, theories of classical and modern physics, as well as methods of physical research as the basis of the system of professional activity;

- generalize skills of solving typical problems of the discipline from different areas of physics as the basis of the ability to solve professional problems;

- make decisions to choose methods of decision, both in analytical form and with the use of computer technology.

- use the acquired knowledge and skills to solve practical problems of everyday life, to ensure the safety of their own lives, environmental management and environmental protection.

- independently conduct experimental physics research, processing of results and to assess orders of magnitude of physical quantities.

Studying topics:

1. Elements of kinematics, Dynamics of a material point and systems of points, non-Inertial reference systems

2. Work and energy. The motion of a rigid body

3. Movement of liquids and gases. Mechanical vibrations and waves

4. Molecular-kinetic theory, Statistical and thermodynamic methods for studying molecular systems

5. The first and second law of thermodynamics

6. Electric field. Conductors and dielectrics in an electric field.

7. Constant electric current. Current strength and density. EMF. Electric current in gases. Types of discharges in gases in the atmosphere. Aurora.

8. Magnetic field. Ampere's Law. Law Of Bio-Savar-Laplace. Faraday's law of electromagnetic induction.

9. Magnetism of matter, the earth's Magnetic field, the mechanism of its occurrence, Alternating current.

10. Electric oscillations, Electromagnetic field, the main provisions of Maxwell's theory.

11. The interaction of light with matter, Wave and quantum concepts of the nature of light. Huygens principle

12. Interference and diffraction of light. Coherence of waves. Diffraction pattern, grating. Light polarization.

13. Photons and their properties. Atomic structure. Physics of atomic nucleus and elementary particles

14. Solid state physics. Crystal structure of solids. Amorphous bodies

15. Structure and development of the Universe. Our star system is a Galaxy. Other galaxy. The Infinity Of The Universe.

Fiz 1206 Physics 2 – 3 credits

Prerequisite: Physics 1

Postrequisite: Theoretical mechanics

As a result of studying the discipline, the student will be able to:

- To know the basic physical phenomena and processes on which the principles of action of objects of professional activity, areas and possibilities of application of physical effects are based;

- Know the fundamental concepts, laws and theories of classical and modern physics, the limits of applicability of the basic physical models;
- Apply basic physical quantities and constants, their definitions and units;
- Use methods for solving physical problems important for technical applications;
- Use technologies for working with different types of information.

Studying topics:

1. Kinematics and dynamics of translational motion
2. Dynamics of rotational motion
3. Work. Energy. Mechanics of continua
4. Oscillation
5. Waves
6. Molecular kinetic theory
7. Phenomenological thermodynamics
8. Electric field
9. Constant electric current
10. Magnetostatics
11. Electromagnetic induction. Electromagnetic oscillations and waves
12. Interference
13. Diffraction
14. Quantum optics
15. Atomic physics and quantum mechanics. Nuclear physics and elementary particles.

Module Theoretical basis of aviation techniques – 4 credits

Upon successful completion of this module, students should be able to:

1. demonstrate knowledge and understanding of civil aviation development as state branch, main parts of aircraft and helicopters, aerodynamic fundamentals, flight safety foundation, airports and airfields of civil aviation;
2. determine the main data of aircraft, helicopters and aviation engines, to make calculation for determining aviation equipment characteristics;
3. Systematize civil aviation terminology, skills on creating and implementation of event for providing flight safety;
4. get information on Airplane structure and Aviation Engines, aerodynamic fundamentals and exploitation of Engines, flight safety foundation, airports and airfields of Civil Aviation

As a result of studying the module, student able to:

- B5. To be able to perform professional primary skills, including locksmith operations, manufacturing and repairing simple parts, assembling components to ensure the health, efficiency and readiness of aircraft for their intended use and with the lowest operating costs.

TOAT 2207 Theoretical basis of aviation techniques 1 – 2 credits

Prerequisites: Higher mathematics 1-2, Physics 1-2, Fundamentals of life safety.

Postrequisites: Theoretical basis of aviation techniques 2.

As a result of studying the discipline a student:

1. demonstrate knowledge of the elements of the aircraft structure.
2. understand the basics of aerodynamics and operation of the aircraft.
3. perform simple calculations to determine the parameters of aircraft;
4. to analyze the principle of operation of functional systems;
5. use the terminology adopted in civil aviation, skills in the development and implementation of organizational and technical measures to ensure flight safety.

Studying topics:

1. Civil aviation as a branch of the state economy. Classification of aircraft.
2. Basic information about the aerodynamics of the AIRCRAFT.
3. Basic information about civil aviation aircraft (HA), aircraft schemes.
4. Centering characteristics of the aircraft.
5. Elements of aircraft design. Fuselage, wing, tail.
6. Mechanization of the wing.
7. Design of aircraft landing gear.
8. The work of the system of cleaning and landing gear.
9. Hydraulic system, its purpose and principle of operation.
10. Hydraulic units.
11. Operation of control systems
12. The fuel system of the aircraft.
13. Air conditioning and automatic pressure control system
14. Anti-icing system of the aircraft.
15. Fire-fighting system of the aircraft.

TOAT 2208 Theoretical basis of aviation techniques 2 – 2 credits

Prerequisites: Higher mathematics 1-2, Physics 1-2, Theoretical foundations of aviation technology -1.

Postrequisites: No

As a result of studying the discipline a student:

1. demonstrate acquired knowledge (of the systems and major components of the helicopter, the design and principle of operation of the engines);
2. demonstrate an understanding of the overall structure of the aviation transport system and its parts (airport, airfield, ATS, IAS, etc.);
3. cooperate new knowledge with basic knowledge, interpret its content;
4. analyze the educational situation and suggest the direction of its solution;
6. synthesize, interpret and evaluate the results of the discipline, modules, content of the intermediate exam;
7. to analyze the dynamics of solving scientific problems of the course

8. analyze the learning outcomes of the course, summarize them with scientific essays, presentations, reviews, etc.;
9. to constructive, educational and social interaction in the group;
10. formulate the problem, offer to consider it, and justify its importance;
11. to accept criticism and to criticize;
12. work in team;
13. discuss the importance of aviation in the transport system;
14. identify areas for further personal and professional development

Studying topics:

1. The design of the helicopter and its systems.
2. Helicopter rotor.
3. Basic information about aircraft engines.
4. The design of aircraft engines.
5. Structural elements of TRD.
6. The design of the piston engine.
7. Design of functional systems at.
8. Organization of technical operation of aircraft.
9. Serviceability and access to the aircraft flight.
10. Operational and technical documentation.
11. The guidelines of IAS
12. Basics of safety.
13. Organization of aircraft preparation for flights.
14. Airports and airfields.
15. Equipment Parking.

ELECTIVE COMPONENTS – 49 CREDITS

Main disciplines of the educational program

Fundamentals of Electronics, Mechanics and Statistics module – 8 credits

Upon successful completion of this module, students should be able to:

1. analyze the main provisions of the sections: statics, kinematics, dynamics of the theoretical mechanics of the material point, the mechanical system and an absolutely solid body;
2. schematize mechanical phenomena, presenting concrete tasks in an abstract form; use of mathematical and physical methods in solving engineering problems;
3. solve problems associated with the movement of material bodies;
4. carry out a comprehensive analysis and interpretation of data in solving practical problems on the basis of the constructed physical and mathematical models and experiments;

5. build mathematical models of mechanical and physical processes, to apply mathematical methods in solving problems during the operation of the aircraft, as well as to analyze the results of field tests;
6. analyze the main types of devices and circuits used in electronics;
7. describe the principle of operation and features of rectifiers, inverters and other electrical energy converters used in the electrified equipment and flight-navigation complex of aircraft.

As a result of studying the module, student able to:

B 1. possess a physical and mathematical culture, computer literacy.

OE 2201 Fundamentals of Electronics – 2 credits

Prerequisites: Physics 1-2.

Postrequisites: Digital electronic systems and devices, Aircraft avionics system.

As a result of studying the discipline, the student will be able to:

1. Have general information about the element base of the circuitry (resistors, capacitors, diodes, transistors, microcircuits, elements of optoelectronics).
2. To determine the parameters of semiconductor devices and system engineering elements.
3. Identify semiconductor devices and circuitry elements.
4. Apply basic information about electro vacuum and semiconductor devices, rectifiers, oscillatory systems, antennas; amplifiers, electrical signal generators.
5. Compare digital-analog and analog-digital converters.
6. Disassemble the principle of propagation of signals in communication lines.
7. Distinguish between logical elements and logical design in chip bases.

Studying topics:

1. Notation diodes. The characteristics and properties of diodes
2. Diodes connected in series and in parallel
3. Main characteristics and use of silicon diodes triode (thyristors)
4. Key characteristics and use of light-emitting diodes, photoconductive diodes, varistors
5. Functional check diodes.
6. Main characteristics and use of rectifying diodes
7. Legend transistors
8. The description and location of the components.
9. Characteristics and properties transistors.
10. Description and operation of logic circuits and linear
11. Operational amplifier.
12. Description and use of printed circuit boards.

13. Understanding of the following terms: a system of open and closed-loop servo feedback analog converter system.

14. The principles of operation and the use of the following components / features synchronous systems converters, differential, control and torque.

15. The principles of operation and the use of the following components / transformers, inductive and capacitor converters.

TM 2202 Theoretical Mechanics –3 credits

Prerequisite: Physics 1-2, higher mathematics 1-2.

Postrequisites: Technical Mechanics

As a result of learning the discipline, the student is able:

1. To form knowledge of the general laws of mechanical movement and interaction of material bodies, laws and methods of theoretical mechanics.

2. Apply knowledge of mechanics sections: statics, kinematics and dynamics.

3. Use the basic laws of mechanical movement and interaction of material bodies.

4. Get an idea of the statics of a solid, center of gravity, kinematics, the dynamics of a point, the dynamics of a solid body system, the d'Alembert principle and the Lagrange equation.

Studying topics:

1. Introduction. Introduction to statics. Connections and their reactions.

2. The system of converging forces. The theory of moments of forces and pairs of forces.

3. Flat arbitrary system of forces. Spatial arbitrary system of forces. Independent work. General conditions of equilibrium of the spatial system of forces.

4. Center of parallel forces. The center of gravity. Friction.

5. Introduction to kinematics. Kinematics point. Independent work. Determining the speed and acceleration of a point in the coordinate and natural ways of specifying the motion.

6. Kinematics of a solid body. Progressive movement of the body. Rotational motion of a solid body.

7. Plane-parallel motion of a rigid body. Difficult point motion. Independent work. Determination of absolute point acceleration in complex motion.

8. Introduction to the dynamics. The dynamics of the material point.

9. Fluctuations of the material point. Moment of inertia of a solid. Independent work. The moments of inertia of the system and the solid with respect to the plane, axis and pole.

10. Introduction to the dynamics of the mechanical system. General theorems of dynamics.

11. Theorem on the change in the amount of motion of the system. The theorem on the change of the angular momentum of the system. Independent work. Application of the moment theorem to the motion of a liquid (gas).

12. Elementary work of force, various ways to define it. The theorem on the change in the kinetic energy of a point and a system.

13. Principle of d'Alembert. Applications of general dynamics theorems to the dynamics of a rigid body. Independent work. Elementary theory of the gyroscope.

14. The laws of conservation of energy. Elements of analytical mechanics.

15. D'Alembert principle for a point and a system of material points. The principle of possible displacements and the general equation of dynamics. Independent work. The general equation of dynamics.

St 2203 Statistics – 3 credits

Prerequisite: higher mathematics 1-2.

Postrequisites: Technical Mechanics

As a result of learning the discipline, the student is able:

1. Demonstrate the following results: basic concepts, categories and statistical tools;

2. Apply basic construction methods.

3. To calculate and analyze a modern system of indicators characterizing the failures and malfunctions of aircraft.

4. To determine the main features of the organization and functioning of Kazakhstan and foreign state statistics bodies.

5. Calculate statistics indicators on the basis of standard methods and current operational documentation;

6. Analyze and interpret data from Kazakhstan and foreign statistics on the processes and nature of failures and malfunctions.

7. Identify trends in statistical indicators.

Studying topics:

1. The subject and method of statistics.

2. Statistical observation.

3. Summary and grouping of data.

4. Absolute and relative values.

5. Average values and indicators of variation.

6. Selective observation.

7. Dynamics rows, Indices.

8. Correlation and regression analysis.

9. Statistics of population and labor resources.

10. Indicators of the use of labor resources in terms of number, working time, labor productivity.

11. Statistics of national wealth.

12. Statistics of equipment and materials.

13. The system of national accounts.

14. Statistics of living standards of the population.

15. Product statistics.

Module Aerodynamics, device, devices and systems of aircraft – 9 credits

Upon successful completion of this module, students should be able to:

1. apply practical aerodynamic methods to calculate the aerodynamic parameters of an aircraft, use mathematical modeling methods to calculate the mechanical characteristics of an aircraft under the influence of aerodynamic loads;
2. demonstrate methods of calculating the aircraft flight dynamics of its stability and controllability;
3. verify the results obtained on the stands.;
4. calculation of the screw and its control system;
5. apply the methods of calculating the flight dynamics of the aircraft of its stability and controllability and the aircraft's avionics system in practice.

As a result of studying the module, student able to:

A3. Know the basic laws of aerodynamics, flight dynamics and basic methods for calculating aerodynamic characteristics depending on operational factors, design of propellers and parts, basic physicochemical and operational properties of combustive-lubricating materials and special fluids classification and labeling.

ADP 2204 Aerodynamics and flight dynamics - 3 credits

Prerequisites: Physics 1-2.

Postrequisites: The design of aircraft, propeller and its control systems.

As a result of studying the discipline, the student will be able to:

- to use the basic methods for calculating aerodynamic characteristics depending on operational factors.
- to establish the causes of failures and make informed decisions to eliminate and prevent failures and malfunctions in the design of the airframe and the functional systems of the aircraft.
- to determine the basic parameters of air.
- to the definition of the basic physical properties of air.
- to the explanation of the basic equations of aerodynamics.
- to the analysis of aircraft dynamics.

Studying topics:

1. Basic parameters and physical properties of air.
2. Basic equations of Aeromechanics
3. Boundary layer
4. Aerodynamic force.
5. Aerodynamic moments
6. Aerodynamic characteristics of the profile
7. Geometric characteristics of the wing
8. Aerodynamic characteristics of the aircraft.

9. Supersonic gas flow.
10. Horizontal flight of the aircraft.
11. Climb. The planning of the aircraft
12. The plane took off. Plane landing.
13. The twists and turns of the aircraft.
14. Controllability of the aircraft. Stability of the aircraft.
15. Aerodynamic compensation of rudders and ailerons.

SAVS 2305 Aircraft avionics system - 3 credits

Prerequisites: Electronics basics.

Postrequisites: Reliability of aviation technology.

As a result of studying the discipline, the student is able to:

1. to the analysis of the work of aviation electrical systems.
2. to the analysis of the possible causes of failures and malfunctions of aviation electrical equipment.
3. to the knowledge of the work of power supply systems of aviation equipment.
4. to the description of the basic principles of the work of aircraft generators.
5. to explain the principle of operation of the power supply network of the aircraft;
6. to the evaluation of the work of electrical aircraft.

Studying topics:

1. Analysis of the current state of the aircraft electrical equipment.
2. Aircraft DC generators and their voltage regulation
3. Parallel operation and protection of DC generators.
4. Aviation electric machines of alternating current and regulation of their voltage.
5. Drives of the generator of alternating current of stable frequency.
6. Stable frequency AC power supply systems
7. Aircraft converters.
8. Aircraft electrical network.
9. Chemical sources of electrical energy.
10. The power supply of the aircraft Fokker-50.
11. The power unit of the Tu-154B, M
12. The power supply system of the Airbus A320-200
13. The power supply system of airliner Boeing-757-200
14. Aircraft engine start system
15. The system of feathering.

VSU 2306 Screw and its control systems - 3 credits

Prerequisites: Aerodynamics and flight dynamics.

Postrequisites: Aircraft repair.

As a result of studying the discipline, the student is able to:

1. to justify the design of propellers and parts of their equipment, as well as to form the purpose and application of the propeller using the vortex screw theory N.E. Zhukovsky;

2. to the formulation of classifications and a review of screw aerodynamic theories, aerodynamic testing of screw models and flight dynamics.

3. to the formulation of general questions on the principle of operation of the propeller, as well as an explanation of the causes of the manufacturing technology and materials used in the propeller;

4. to decide on the use of the propeller for the intended purpose and generalization of the basic safety requirements.

5. to the orientation in terminology in the study of special issues relating to propellers, including aerodynamics, and flight dynamics;

Studying topics:

1. General information about screws

2. Design of propellers and parts of their equipment

3. Screw equipment parts designs

4. Description of the design of some screws.

5. The aerodynamics of the rotor.

6. The theory of the isolated blade element.

7. Vortex theory of screw N. E. Zhukovsky

8. Aerodynamic tests of models of screws.

9. The use characteristics of the tested propellers

10. Design of the propeller blade.

11. Static picture of forces and moments acting on the screw

12. Dynamic picture of forces and moments acting on the screw.

13. The regulation screw.

14. The noise of the screw

15. A brief description of the production of blades and screw bushings.

Module Materials and production of aviation equipment - 13 credits

Upon successful completion of this module, students should be able to:

1. take into account modern development trends, materials, technologies of their production and aviation equipment in their professional activities;

2. carry out measurements and instrumental control during the operation of aircraft, to analyze the results and estimate the errors;

3. to classify with structural materials, including composite materials to differ their characteristics;

4. develop and use the necessary structural materials to ensure the strength, vitality, reliability under the influence of the environment and implement its usage in aviation construction;

5. interpret the main characteristics of construction materials, including composite materials, to know the recommended reference materials and restrictive assortments for construction materials standardized from articles;

As a result of studying the module, student able to:

A3. Know the basic laws of aerodynamics, flight dynamics and basic methods for calculating aerodynamic characteristics depending on operational factors, design of propellers and parts, basic physicochemical and operational properties of combustive-lubricating materials and special fluids classification and labeling

B 2. To be able to organize the metrological support of technological processes of aircraft maintenance and repair, to recognize and classify structural and raw materials according to their appearance, origin, properties, as well as certification processes for aircraft and air personnel.

HTVS 2307 Chemistry and ground supply of aircraft – 2 credits

Prerequisites: Theoretical foundations of aviation technology

Postrequisites: Aircraft engine design

As a result of studying the discipline, the student is able to:

– to study the basic physicochemical and operational properties of fuels and lubricants and special liquids (LF), as well as the basics of the technology for their preparation, classification and labeling;

– to the formulation of the classification, properties and indicators of the quality of aviation fuel, lubricants and special liquids, the system of their rational use.

– to the analysis of general issues of classification of nomenclatures: the range and scope of fuel, oils and special fluids;

– to summarize the basic requirements for safety, industrial hygiene, fire and explosive safety at fuel and lubricants facilities and refueling aircraft.

– free to navigate the terminology in the study of specific issues related to fuel, including Chemistry.

Studying topics:

1. General characteristics of fuel
2. Primary processing of jet fuel.
3. Basic physico-chemical properties of fuels
4. Production of aviation fuels.
5. Aviation and automobile gasolines.
6. Diesel fuels.
7. Fuel for gas turbine and rocket engines
8. Aviation lubricants and oils.
9. Plastic (PS) and solid (TS) lubricants
10. Scopes, features of operation and the basic requirements for gear oils.

11. Transmission, technical and instrument oils.
12. Requirements for greases for various operating conditions of AT.
13. Working fluids for hydraulic systems and depreciation racks of the aircraft.
14. Solvents, washes, detergents
15. Safety measures during the work, storage and transportation of fuels and lubricants.

JGSBS 2208 Liquid gas systems of aircraft – 3 credits

Prerequisites: Theoretical foundations of aviation technology

Postrequisites: The design of aircraft

As a result of studying the discipline, the student is able to:

– to study the basics of knowledge in the field of fluid mechanics and gas, hydraulic machines and other devices for processing, feeding and moving gaseous liquids necessary for further study of special disciplines and practical activities in the specialty.

– mastering the theoretical foundations of fluid and gas mechanics, know the basic design formulas and methods for applying them to solving engineering engineering problems, be able to independently build a design diagram and find the right solution to the problem.

– to operational troubleshooting, improving operational efficiency and quality of service of fluid systems, consciously assimilating the requirements of the governing documents, as well as the formation of prerequisites for the further improvement of hydromechanisms.

– to the formation of students' methods of applying the basic laws of equilibrium and the movement of liquids and gases to solve practical problems in the design, construction and operation of life support systems for high-rise and long-span buildings and structures.

– to master the methodology and develop the skills of applying the theory to solving specific problems and, therefore, master the method of hydraulic calculations of various systems and structures;

Studying topics:

1. Hydraulics and its application on aircraft.
2. Hydrodynamics. The main characteristics of a moving fluid.
3. Hydrodynamic similarity.
4. Loss of friction pressure.
5. The outflow of liquid and gases through the holes.
6. Unsteady fluid flow.
7. Classification of pipelines.
8. Pump classification and hydromotors.
9. Volumetric pumps, structures, design and operation.

10. Schematic diagrams of power boosters, coefficients transmission, speed gain and feedback.
11. Electro-hydraulic amplifiers and steering cars autopilot and corrective feedback on pressure, flow, load and speed.
12. Control equipment.
13. Pipelines, hoses, hydraulic joints, manifold, valves, pipeline connections.
14. Protection against destruction.
15. Filters, air and water separators, dehumidifiers, sumps, drainage devices.

TM 2209 Technical mechanics – 3 credits

Prerequisites: Theoretical mechanics, Technical drawing and computer graphics

Postrequisites: Durability of aircraft design, standardization and quality management

As a result of studying the discipline, the student is able to:

- describe the structure of mechanisms and the main types of mechanisms.
- to form knowledge about the dynamic balancing of rotors and determine the generalized reduced forces and masses.
- to assess the mechanical properties of materials.
- calculate the shafts taking into account the torsion and spatial bending.
- summarize the results on transmission mechanisms.
- describe the types of connections, fasteners and rivets of the aircraft.

Studying topics:

1. Structure. The main types of mechanisms
2. Balancing mechanisms. Movement mechanism under the influence of forces
3. Aircraft Materials - ferrous metals. Bases of calculations on strength and stiffness
4. Types stress state. Geometric characteristics of planar sections
5. The central tension (compression).The cut and crushing
6. Torsion. Springs. Direct transverse bending
7. Complex species strain. The calculations under varying stresses
8. Transmission. The geometry of involute gears
9. The calculation of cylindrical gear teeth bending. Calculation of the cylindrical gear by a contact stresses.
10. Bevel gears. Planetary gears.
11. Worm gears. Transmissions with flexible coupling.
12. Shafts and axis. The shaft coupling.
13. Bearings. Bearings
14. Fasteners.Screw threads. Bolts, studs and screws. Bolts, studs and screws.
15. Retaining device. Locking devices Rivets aircraft.Aircraft rivets

Mat 2210 Materials Science – 3 credits

Prerequisites: Physics chemistry

Postrequisites: The design of aircraft

As a result of studying the discipline, the student is able to:

- recognize and classify structural and raw materials according to appearance, origin, and properties.
- to determine the types of construction materials.
- choose materials for the design according to their purpose and operating conditions.
- conduct research and testing of materials;
- describe the laws of crystallization processes and the structure of the formation of metals and alloys, the basis of their heat treatment, methods of protecting metals from corrosion;
- classify ways to obtain composite materials.
- analyze the structure and properties of metals, methods of their research.

Studying topics:

1. The atomic crystal structure of metals. The mechanical properties of metals
2. Aircraft materials are non-ferrous metals. Black metals.
3. Aircraft materials - composite and non-metallic materials. Characteristics, properties and characteristics of conventional composite and non-metallic materials, except wood, used in the manufacture of aircraft
4. Wooden structures. Fabric cover
5. Foundations and causes of corrosion. Identification of defects / wear of composite and non-metallic materials
6. Screw thread. Bolts studs, screws
7. Aircraft Locking Devices. Aircraft Rivets
8. Basic information about alloys, state diagrams of double alloys. State diagram of iron-carbon alloys
9. Modern metal alloys. Metals and alloys with special properties
10. Ceramic materials. Composite materials
11. Sealants and adhesives. Sealants and adhesives
12. Materials for the glider of airplanes and helicopters. Heat-resistant materials for promising gas turbine engines
13. Pipes and connections. Springs
14. Bearings. Transmissions
15. Control Cables. Electrical cables and connectors

TPAT 2211 Technology of aircraft production – 2 credits

Prerequisites: Physics

Postrequisites: The design of aircraft

As a result of studying the discipline, the student is able to:

– give practical skills for the synthesis and analysis of the structures of promising aircraft taking into account their manufacturability.

– develop working technical documentation and ensure the execution of completed design works;

– to the treatment of regulatory and technical documentation. 4. know the methods of control over the compliance of the developed technical documentation with the standards, technical specifications and other regulatory documents (BCD-8).

– to create and maintain documentation necessary to support all stages of the life cycle of the design under development (BCD-9).

– to the organization of workplaces, their technical equipment and the placement of technological equipment on them (PT-1. 7). to use the standards and typical methods of monitoring and assessing the quality of manufactured products (PT-3).

Studying topics:

1. Technological processes for assembling AT
2. Technological processes
3. Process components
4. Manufacturability of design, interchangeability and methods of linking
5. Technological design
6. Assignment of joints and connectors
7. Technological requirements for design interchangeability
8. Application in the design of aircraft of various methods of connection and their manufacturability
9. Glider design assembly methods
10. Basic concepts of aircraft assembly technology
11. Basic schemes for linking shapes and sizes of parts and tooling.
12. Assembly devices
13. Requirements for stocks
14. Structure and elements of SP
15. Features installation and testing of functional systems and units

Module International relations and aviation legislation – 5 credits

Upon successful completion of this module, students to be able to:

1. use the basic requirements governing the use of AC.
2. apply in the work of normative legal acts regulating the procedure for designing and designing aircraft;
3. be guided by state and industry standards;
4. analyze the national interests and strategic priorities of the socio-economic development of the Republic of Kazakhstan in the context of globalization;
5. analyze the system of laws and regulations, regulating public relations connected with the use of airspace of Kazakhstan Republic and aviation activity;

6. use in practice on projects at all stages of work laws and regulations.

As a result of studying the module, student able to:

A1. know the general laws of the development of nature and society, own a culture of thinking; to be guided in ideals and values of a democratic society;

D1. have an idea of the basic teachings in the field of natural and socio-economic sciences, analyze socially significant problems and processes, be able to use the methods of these sciences in various types of professional activity, have sufficient theoretical training to analyze the socio-economic situation of countries and regions; to realize their professional, social, economic role in society.

AZ 1212 Aviation legislation – 2 credits

Prerequisites: Human factor and psychology

Postrequisites: Flight safety system. Health and safety

As a result of studying the discipline, the student is able to:

1. To a brief description of each part of the Chicago Convention, especially the final clauses.
2. Analyze the importance of IATA Operational Safety Audit (IOSA) and IATA Safety Audit for Ground Operations.
3. Define the role of the International Civil Aviation Organization.
4. Compare JAA and EASA in structure and function.
5. Identify the relationship between Part-145, Part-66, Part-147 and Part-M.
6. To apply the basic provisions of Part-66 in practice.

Studying topics:

1. Chicago Convention
2. IATA – international air transport Association
3. Role of the International civil aviation organization
4. The role of EASA; Role of the member States EASA
5. Relationship between Part-145, Part-66, Part-147 and Part-M
6. Part-66 a Guide to licensing staff THAT is entirely
7. Part -145 requirements for the organization of Maintenance (as approved by the organization THAT)
8. EU-OPS
9. Common understanding of Part 21 and EASA certification specifications such as CS-23, 25, 27, 29.
10. Documentation
11. A detailed understanding of the provisions in Part-21 concerning airworthiness.
12. Detailed understanding of Part-M.
13. Program THE ALL, verification THE and inspections.
14. Authorized body and operators of civil aircraft.
15. Flight support.

MEO 3213 International economic relations – 3 credits

Prerequisites: Political science and sociology

Postrequisites: Process control in the airline

As a result of studying the discipline, the student is able to:

1. to study basic knowledge in the field of activity of international economic organizations, to help students in understanding the diverse and complex processes of economic integration within these organizations, regulating their activities;

2. to the ability to work with media materials, to compile press reviews on given topics, to find, collect and primarily summarize factual material, making sound conclusions

3. to the ability to think systematically, the ability to generalize, analyze, perceive information, set goals and choose ways to achieve it, the ability to identify international political and diplomatic meanings of problems

4. the skills to use the basic provisions and methods of social, humanitarian and economic sciences in solving social and professional problems, the desire to find practical application of their scientifically-based conclusions, observations and experience obtained as a result of cognitive professional activities in the field of world politics and international relations.

5. to the knowledge and understanding of the logic of global processes and the development of the world political system of international relations in their historical, economic and legal conditionality

Studying topics:

1. Formation and structure of the international economy
2. Classical theories of international Economics.
3. The theory of the ratio of factors of production
4. General equilibrium in international trade.
5. The impact of international trade on income distribution.
6. Alternative theories of international trade.
7. Foreign trade policy and its instruments.
8. International capital flows and international lending.
9. International labour migration.
10. International technology transfer.
11. International economic integration.
12. International monetary and financial system
13. Exchange rate and its regulation.
14. International financial market.
15. Balance of payments.

Module System security and quality management – 10 credits

Upon successful completion of this module, students to be able to:

1. argue the international and national regulatory framework for the provision of SS in the Civil Aviation of the Republic of Kazakhstan;
2. formulate the basics of ensuring the safety of flights on civil aircraft of the Republic of Kazakhstan, the rules and procedure for the preparation of the analysis on SS;
3. provide and prepare for flight the aircraft;
4. provide airport services for flight preparation;
5. use the rules and procedure for loading the aircraft for the safe transportation of passengers, cargo, mail;
6. monitor the compliance of parameters and the level of undesirable effects to regulatory requirements;
7. effective use of protective equipment;
8. develop measures to improve occupational safety; plan and use measures to improve the sustainability of facilities;
9. to develop measures for the protection of production personnel and the public in emergency situations and, if necessary, participation in rescue and other urgent work;
10. apply the general methodological principles for constructing a quality system for manufacturing and servicing ATs, taking into account the requirements of ISO 9001: 2001;
11. use the practical aspects of the implementation of the process approach to the quality management of AT

As a result of studying the module, student able to:

- B2. To be able to organize the metrological support of technological processes of aircraft maintenance and repair, to recognize and classify structural and raw materials according to their appearance, origin, properties, as well as certification processes for aircraft and air personnel;
- B3. To be able to organize routine inspections and maintenance in order to maintain the airworthiness of aircraft and ensure flight safety;
- C2. able to provide power supply of power plants, systems of energy supply of avionics and radio-electronic equipment, use power plants in various operating modes, in the event of an emergency situation and failures; to make decisions in the event of a non-standard situation in any elements of the power supply system; interpret the principles of functioning and mathematical models of biological control systems.

OTE 3214 Labor protection and ecology - 2 credits

Prerequisites: Aviation legislation

Postrequisites: Aircraft repair

As a result of studying the discipline, the student is able to:

1. to train future specialists with the necessary theoretical knowledge and practical skills to protect the population, business facilities and the territory from the impact of the damaging factors of modern means of destruction, natural and

man-made emergencies; 2. to the analysis and evaluation of dangerous and harmful factors of the production process and equipment.

3. to the specificity and mechanism of the toxic effects of harmful substances, energy exposure, microwave radiation, ionizing radiation, noise, infrasound and ultrasound, and the combined action of harmful factors; 4. the ability to make management decisions on the limitation of working time and the prohibition of work in the event of the impact of harmful and even life-threatening factors on a person at workplaces resulting from violation of the repair work regulations and gross violations of safety instructions. 5. the ability to teach the conscious use of this equipment, the newly hired technical personnel of the department of labor protection.

Studying topics:

1. Legal and organizational issues of labor protection
2. Organization of work on labor protection at civil aviation enterprises
3. Occupational injuries and diseases
4. Sanitary and hygienic requirements in air enterprises
5. Harmful substance.
6. Ventilation and air conditioning.
7. Noise, infrasound and ultrasound, vibration
8. Industrial lighting
9. Ionizing radiation
10. Safety at operation of load-lifting cars, adaptations and means of in-plant transport.
11. Electrosecurity.
12. Safety in the operation of pressure vessels.
13. Safety in the performance of aviation and chemical works.
14. Basics of fire and explosion safety
15. Safety at work, storage and transportation of fuels and lubricants.

SUK 3215 Standardization and quality management - 3 credits

Prerequisites: Technical mechanics

Postrequisites: other

As a result of studying the discipline, the student is able to:

1. To apply the legislative base of standardization and certification.
2. Apply terms and definitions, concepts that characterize standardization, certification and quality management.
3. Formulate the categories of regulatory documents and the main provisions regarding their application.
4. Describe the main provisions on the application of standards. 5. To determine the effect of measurement deviations on quality indicators; check the conformity of product labeling to the certificate.

Studying topics:

1. Basis of standardization
2. Methods of standardization

3. The organizational structure of the state system of standardization.
4. Quality planning
5. Total quality management.
6. Quality as a control object
7. Evolution of quality management
8. Methodical bases of quality management
9. Quality management - as the main factor in establishing a competitive advantage in the context of globalization.
10. Economics of quality management
11. Quality management system and product certification
12. The quality management system in the Republic of Kazakhstan
13. International practice in the field of quality
14. Total quality management.
15. Quality control of products and awards in the field of quality.

SBP 3216 Flight safety system - 3 credits

Prerequisites: Aviation legislation

Postrequisites: Aircraft systems

As a result of studying the discipline, the student is able to:

1. to the assessment and classification of AA.
2. to the organization of work on the investigation of accidents.
3. to the preparation of the report on the work on the investigation of the accident;
4. to the definition of types of AA.
5. to comparing emergencies with the accident. 6. to the conclusion of the investigation.

Studying topics:

1. Introduction. Safety on air transport. ICAO standards and recommended Practices for aviation security.
2. Regulatory legal framework for aviation security of the Republic of Kazakhstan.
3. Aviation technology and flight safety
4. Engineering and aviation safety
5. Organization of supervision over provision of PSU
6. The classification of AP and I.
7. Accident and incident investigation
8. Emergency and rescue flight safety
9. Goals and objectives of the AP investigation.
10. Aviation security
11. Airport security. Establishment of a Commission, sub-Commission and working groups in the AP investigation.
12. Aircraft operator safety program.
13. Organization and system response with anv.

14. The work of the flight Subcommittee on the results of the investigation of the AP.

15. Development of measures based on the results of the AP investigation.

UTPA 4217 Management of technological processes in the airline - 2 credits

Prerequisites: Technology of aircraft production

Postrequisites: other

As a result of studying the discipline, the student is able to:

1. to study the state and prospects of development of automated process control systems for the operation of aircraft equipment (AT);

2. to the formulation of the assessment and prediction of performance indicators of the processes of operation of aircraft equipment (AT)

3. to assess and analyze the efficiency of the processes of operation of aircraft equipment (AT);

4. to a generalization about modern methods of system analysis and the theory of the efficiency of the processes of operation of aircraft equipment (AT).

5. to be free to navigate the terminology when studying special issues related to automated control systems of operation processes

Studying topics:

1. The object and tasks of the process control operation Act

2. The main tasks and organizational structure of the aviation engineering service of air transport.

3. Managed processes of Aict operation

4. Mathematical models of processes operating Act.

5. Methods of modeling and identification of systems and processes of Aict operation.

6. Methods of software control systems and processes of operation of Aict.

7. Methods of optimization of software control of systems and processes of operation of Aict

8. Methods of adaptive control of systems and processes of Aict operation

9. Designing programs of technical operation of ICT

10. Norms of technological design of AT technical operation software.

11. Technological design of AT technical operation software.

12. Types of information technologies for operating process control of AIRCRAFT

13. Regulatory framework for automation of control systems and processes of operation of Aict.

14. Regulatory requirements for quality management systems in Maintenance organizations

15. Methodological support of the performance management processes operating Act.

Module Computer technology – 4 credits

Upon successful completion of this module, students to be able to:

1. Work with spreadsheets, consolidates data, builds charts; works with databases; applies methods and information security tools; can design and create simple websites; use control automation methods

2. To present technical solutions by means of engineering and computer graphics; creates graphic objects in the AutoCAD system on different layers, uses the means to ensure the accuracy of the construction of graphic objects, and is able to load typical elements of drawings;

3. Imit computer networks in different simulation programs, configure and test network functions in popular operating systems (Windows, Linux, MacOS) using a graphical interface.

4. design electronic components, incl. on the basis of microprocessor elements, to read and understand simple diagrams of typical electronic equipment on a digital integrated element base; select the necessary elements according to the reference information in accordance with the working conditions of the elements in the scheme, apply theoretical knowledge to solve problems related to the construction of digital and microprocessor systems and devices; apply the knowledge gained from this course in practice in the construction, development and operation of integrated circuits of aviation equipment.

5. show the principles of construction, features of work, characteristics and parameters of digital integrated circuits of basic logic elements, their classification and labeling, their conventional graphic symbols on circuit diagrams, operation of functional units and semiconductor computer storage devices, composition and designation of microprocessor systems and methods programming.

6. use the knowledge in practice for prediction of reliability characteristic and determining requirements for its characteristic in disigning process and exploitation.

As a result of studying the module, student able to:

A2. Know linguistic and cultural linguistics, information and communication technologies in professional activities.

TChKG 1218 Technical drawing and computer graphics - 2 credits

Prerequisites: Higher mathematics 1-2.

Postrequisites: Technical mechanics.

As a result of studying the discipline, the student is able to:

– to make sketches for the processed parts with an indication of tolerances and landings.

– use the reference books and a collection of state standards.

– use the specification in the process of reading the assembly drawings, diagrams.

– to carry out calculations of the values of the limiting sizes and the tolerance according to the drawing data and to determine the suitability of the given actual sizes.

– apply the basics of drawing and geometry.

– analyze the requirements of a unified system of design documentation.

Studying topics:

1. Basics of technical graphics.
2. Studying drawing commands and editing drawings.
3. The study of the principles of constructing drawings on the plane.
4. Familiarity with the interface AutoCAD, KOMPAS-3D.
5. Standards of design drawings.
6. Transform drawing straight and plane.
7. Cutout polyhedra.
8. Body rotation with a cutout.
9. Execution of three images from two data.
10. Detailing.
11. Assembly drawing specification.
12. Construction of primitives using drawing and editing commands.
13. Creating blocks, arrays.
14. Creating drawings of parts using various automated system planes.
15. Creating models of parts using various automated systems in 3D.

ChESP 2219 Digital electronic systems and devices - 2 credits

Prerequisites: Basics of electronics.

Postrequisites: Aircraft avionics system.

As a result of studying the discipline, the student is able to:

– understand the principles of construction, features of work, characteristics and parameters of digital integrated circuits of basic logic elements.

– to master the classification and labeling of integrated circuits of basic logic elements, their conventional graphic symbols on the circuit diagrams.

– disassemble the operation of functional units and semiconductor computer storage devices, the composition and purpose of microprocessor systems and programming methods.

– design electronic components, including those based on microprocessor elements.

– to read and understand simple diagrams of typical electronic equipment on a digital integrated element base.

– apply theoretical knowledge to solve problems associated with the construction of digital and microprocessor systems and devices.

Studying topics:

1. Systems of electronic devices
2. Number systems
3. Data Conversion

4. database
5. Logic
6. The structure of the host computer
7. Fiber optics
8. The electrostatic sensitive devices.
9. Knowledge of risks and possible damage to the device components for antistatic protection and staff.
10. Control software.
11. Control software.
12. Electromagnetic Environment
13. The types of electronic / digital aircraft systems.
14. General organization of typical electronic / digital aircraft systems and associated test BITE (built-in check-in Test Equipment) such as: ACARS-ARINC.
15. The communication address and information system.

PROFILE DISCIPLINES – 32 credits

OBLIGATORY COMPONENT – 5 credits

Module Construction and reliability of aviation equipment - 5 credits

Upon successful completion of this module, students should be able to:

1. Demonstrate knowledge of the design and operation of the aircraft and their functional systems;
2. Read and understand technical documentation;
3. Establish causes and make informed decisions on the elimination and prevention of failures and malfunctions of the airframe and its functional systems;
4. Demonstrate knowledge of the fundamentals of aviation technology, aircraft equipment, the fundamentals of aircraft operation and aircraft design and engines.
5. To apply in practice the knowledge to calculate the reliability characteristics and determine the requirements for these characteristics in the process of design, manufacturing and operation.

As a result of studying the module, student able to:

C1. able to put into practice knowledge to calculate the reliability characteristics and determine the requirements for these characteristics in the process of design, manufacturing and operation, to demonstrate knowledge of the fundamentals of aviation technology, aircraft equipment, fundamentals of aircraft operation and aircraft design and engines.

KLA 3301 Construction of aircraft – 3 credits

Prerequisites: Theoretical foundations of aviation technology, Aerodynamics and flight dynamics

Postrequisites: Technical operation of aircraft and BP

As a result of studying the discipline, the student is able to:

- to establish the causes and make informed decisions on the elimination and prevention of failures and malfunctions of the airframe construction and its functional systems.
- to discuss the main directions of development of aircraft, on how to improve the flight performance of the aircraft.
- to the analysis of complex tasks for evaluating the performance capabilities of the aircraft and their systems as a whole and in each specific flight for a given level of flight safety and reasonable economic efficiency.
- to the application of reasonable proposals for constructive development and improvement of operational manufacturability, efficiency, rationality.
- to the application of the main regulatory guidance on maintenance.

Studying topics:

1. Introduction to the course "Aircraft design."
2. The loading conditions of the aircraft.
3. Airworthiness standards.
4. Design of the wing.
5. Design of the aircraft fuselage.
6. Design of the tail of the aircraft.
7. Design of the landing gear.
8. Design and operation of aircraft control systems.
9. Design and operation of the power plant of the aircraft.
10. Aircraft hydraulic system.
11. Altitude system of the aircraft.
12. Aircraft anti-icing system
13. Household equipment of the aircraft.
14. Emergency rescue equipment of the aircraft.
15. Fire-fighting equipment of the aircraft.

NAT 4302 Reliability of aviation equipment – 2 credits

Prerequisites: The production technology of aviation equipment stick, Aircraft avionics system, Aircraft systems, Statistics

Postrequisites: ect.

As a result of studying the discipline, the student is able to:

- Distinguish the concepts between of durability and reliability.
- Determine the essence of physical and circuit reliability.
- Use formulas to calculate reliability indicators for a particular type of compound.
- Analyze the wear of a given part and the processing of information obtained at the repair company.
- Categorize failures according to engineering analysis.
- Analyze the consequences that may result from these or other failures.
- Apply the principle of AT control and the quality of its preparation for flight

Studying topics:

1. Reliability of aviation technology. The role and place of discipline for the GA.
2. Indicators of reliability of AT
3. Physical and circuit reliability
4. The basic law of reliability
5. Methods of connecting elements in systems
6. Formulas for calculating the probability of failure and the probability of failure

7. Calculation of the reliability of complex multifunctional systems
8. Classification of processes in time. Failures.
9. The main causes of failure
10. The triad of reliability
11. Tasks and organization of aviation engineering support
12. Monitoring the state of AT and the quality of its preparation for flight.
13. Collection, processing and analysis of operational information on failures and malfunctions of AT
14. Basic definitions and the essence of diagnosis
15. Organization of diagnostics services in airlines and enterprises of civil aviation.

ELECTIVE COMPONENT – 27 credits

Module Maintenance, repair and operation of aircraft – 12 credits

Upon successful completion of this module, students to be able to:

1. use the methods of determining the center of gravity, the take-off and landing characteristics of different aircraft;
2. analyze the main technologies of maintenance, repair and restoration of worn aircraft parts and electrical equipment;
3. use maps for calculating aircraft characteristics, load sheet and other tables and charts presented in the RLE, section “calculating aircraft characteristics”;
4. use the basic technology of maintenance, repair and restoration of worn parts of the aircraft and electrical equipment;
5. investigate documentation for maintenance and preservation of airworthiness in order to ensure flight safety at the stages of its technical operation;
6. adequate use of ground -based instrumentation, in-service nondestructive examination usage of equipment.

As a result of studying the module, student able to:

B3. To be able to organize routine inspections and maintenance in order to maintain the airworthiness of aircraft and ensure flight safety;

B4. To be able to make applications for the necessary technical equipment and spare parts, prepare technical documentation for the repair and develop instructions for the operation of technical equipment and aviation equipment;

C2. able to provide power supply for power plants, power supply systems for avionics and electronic equipment, use power plants in various operating modes, in the event of an emergency and failures; to make decisions in the event of a non-standard situation in any elements of the power supply system; interpret the principles of functioning and mathematical models of biological control systems;

C3. capable of operation and maintenance of aircraft, to verify the technical condition and residual life of aircraft and equipment.

PTO 3303 Maintenance practices – 3 credits

Prerequisites: TOAT, Theoretical Foundations of aviation engineering

Postrequisites: Organization and maintenance of aircraft maintenance, Technical operation of aircraft

As a result of studying the discipline, the student is able to:

– Apply methods of analysis and evaluation of aircraft plane and aircraft engine as objects of operation.

– Assess the impact of operational - technical characteristics of the aircraft plane on the processes and modes of maintenance and repair.

– To organize and carry out maintenance and repair of aircraft in accordance with the requirements of the electrical equipment.

– To organize the complex preparation of aircraft for flight, ensuring the interaction of all services of the airline.

– Ensure safe maintenance, control and standard operations in accordance with the MRO manual and other relevant instructions and tasks.

– Carry out the procedure for selecting the aircraft maintenance and repair strategy.

Topics covered:

1. Security measures - aircraft and workshop. Practical methods of work in the workshop

2. Instruments. General Aviation Inspection Equipment

3. Key documents and rules for maintenance and repair of aircraft.

Engineering documentation, standards and drawings

4. Landings and clearances. Electrical cables and connectors

5. Riveting. Tubes and hoses

6. Springs. Bearings

7. Gear boxes. Cable control wiring

8. Sheet metal. Composite and non-metallic materials

9. Welding, brazing and low-melting solder and gluing. Weight and centering

10. Handling and storage of aircraft plane.

11. Methods for disassembly, inspection, repair and assembly (types of defects, elimination, general methods, etc.). Disassembly, inspection, repair and assembly methods (dismantling methods, troubleshooting methods)

12. Non-destructive control methods (Visual and measuring control, Optical, capillary). Non - destructive control methods (Acoustic CM)

13. Non-destructive control methods (Eddy Current CM and Thermal CM). Non-destructive control methods (Radiation CM)

14. Emergency situations (lightning strike, powerful electromagnetic field). Emergency situations (bungled landing, bumping)

15. Maintenance procedures.

OOTOV5 4304 Organization and maintenance of aircraft maintenance – 2 credits

Prerequisites: Practice maintenance.

Postrequisites: no.

As a result of studying the discipline, the student is able to:

- Analyze the management structure of the technical operation of aircraft.
- Evaluate the principle of distribution of functions, duties and responsibilities of management personnel.
- Prepare information about the explant personnel responsible for the technical operation of the aircraft and the quality system.
- Use existing, designated and turnaround resources, service life for aircraft and components;
- Calculate the actual operating time in hours, plantings and calendar dates from the beginning of operation and after the last repair;
- Apply methods of organizing the control of critical structural elements, assessing the causes of identified defects, analysis aviation accidents and incidents, a description of the programs for monitoring the reliability of aviation technology and the quality of maintenance.

Topics covered:

Topics covered:

1. Technical and technological processes in HA
2. Conditions of operation of the airframe
3. The maintenance maintenance of the airframe
4. Chassis maintenance technology
5. Operating conditions and typical failures of control systems.

Maintenance of aircraft control systems

6. Features of maintenance of helicopter control systems
 7. Operating conditions and disruption of hydro-gas systems. Control of technical condition of hydro-gas systems
 8. Technology of hydro-gas SYSTEMS
 9. Operating conditions of the aircraft altitude system
 10. Maintenance technology SARD
 11. Operating conditions and typical failures of fuel systems. Maintenance of fuel systems
 12. Operating conditions and model the failure of the oil system. Technology THAT of lubrication systems
 13. Operating conditions of power plants. Typical damages, diagnostics and control of technical condition of power plants
 14. General characteristics of the process of launching aircraft engines.
- Testing of aircraft engines
15. Filling of lubricants, specialty fluids and gas charging

TEVS 4305 Technical operation of aircraft – 3 credits

Prerequisites: Practice maintenance.

Postrequisites: no.

- To analyze the choice of the strategy of technical maintenance and repair of the aircraft и aircraft engines.
- Assess the operational manufacturability of various objects of operation.
- Apply knowledge of operational and periodic maintenance in practice.
- Synthesize requirements for fuels and lubricants.
- Apply operational documentation.
- Analyze the control of aircraft and control flight

Topics covered:

1. Introduction to the course of operation of aircraft and aircraft engines. Strategies for technical maintenance and repair of aircraft and aircraft engines
2. Operational manufacturability of aircraft. The organization of the process of maintenance of aircraft
3. Aviation technical centers are the main link in the engineering and aviation service. Operational technical documentation
4. Operational maintenance of civil aircraft.
5. Periodic maintenance of aircraft.
6. Special types of maintenance.
7. Maintenance of aviation equipment or condition.
8. Providing aircraft maintenance.
9. Rules for the care of aircraft special equipment. Aircraft refueling with fuels and lubricants
10. Starting and testing engines. Aircraft towing
11. General provisions and organization of control of technical condition. Control when servicing aircraft and specials. Types of examinations
12. Control flights and taxiing.
13. Maintenance of the airframe of the aircraft and its systems.
14. Maintenance of the chassis of the aircraft.
15. Maintenance of control systems of the aircraft and power plant. Maintenance of aircraft hydraulic systems

RAT 4306 Repair of aviation equipment – 4 credits

Prerequisites: Labor protection and ecology.

Postrequisites: no.

As a result of studying the discipline, the student is able to:

- Assess the technological processes of repair and restoration of the main parts of aviation technics.

- Provide operational - technical properties of aircraft plane and aircraft engines for compliance.
- To form the theoretical and technological bases for the repair of aircraft and aircraft engines.
- Master the practical skills for the repair of aircraft and aircraft engines;
- Determine the approach to repair technology, allowing to ensure the required level of availability and efficiency of AT during the service life or resource.
- Apply terminology and classification in the field of aviation technics repair.
- Classify the organization of aircraft repair production.

Topics covered:

1. General information about the repair.
2. Types and principles of repair aircraft
3. The reasons for the receipt of aircraft in the repair.
4. Aircraft repair systems
5. Classification of aircraft repair plants.
6. Features of aircraft repair production
7. Preparation of the aircraft for repair.
8. Detection, determination of technical condition
9. The main technological processes of the restoration of parts in the repair of aircraft.
10. Restoration by bench work and mechanical treatment.
11. Repair of aviation technology by riveting and welding.
12. Restoration of parts of aviation technology by soldering and gluing
13. Restoration of parts of aviation technology by coating deposition.
14. Restoration of a paint coat at repair
15. Assembly and testing of aircraft after repair.

Module Technical maintenance systems of avionics in exhaust airplanes – 12 credits

Upon successful completion of this module, students should be able to:

1. be able to use test equipment;
2. develop design and technological documentation;
3. identify the faulty nodes of the logic unit, sensors and actuators;
4. to determine the electric power parameters of electric machines and apparatus, electrical devices and systems;
5. select technological equipment for the repair and operation of electrical machines and apparatus, electrical systems, determine the best options for its use;
6. apply and knowledge of the basics of radar;
7. explore the stages of radar surveillance;
8. Apply knowledge of the basics of the theory of radio navigation.

As a result of studying the module, student able to:

B3. To be able to organize routine inspections and maintenance in order to maintain the airworthiness of aircraft and ensure flight safety;

B4. To be able to make applications for the necessary technical equipment and spare parts, prepare technical documentation for the repair and develop instructions for the operation of technical equipment and aviation equipment;

C2. able to provide power supply for power plants, power supply systems for avionics and electronic equipment, use power plants in various operating modes, in the event of an emergency and failures; to make decisions in the event of a non-standard situation in any elements of the power supply system; interpret the principles of functioning and mathematical models of biological control systems;

C3. capable of operation and maintenance of aircraft, to verify the technical condition and residual life of aircraft and equipment.

Rn 3303(1) Radio navigation – 3 credits

Prerequisites: Digital electronic systems and devices

Post-requisites: no.

As a result of studying the discipline the student is able to:

1. apply knowledge of the basics of the theory of radio navigation;
2. navigate in the methods of measurement of navigation parameters;
3. understand the principles of operation of radio navigation devices and systems;
4. perform calculations of the simplest navigation tasks;
5. to analyze the main directions and prospects of radio navigation development;
6. learn the navigation methods used to determine the location of the aircraft.

Subjects studied:

1. Introduction. Classification, basic information and requirements for REO.
2. Airplane's intercom and loud-speaking device. Audio.
3. VHF radio stations. Very high Frequency (VHF) communication.
4. HF radio stations. High Frequency (HF) communication.
5. Emergency radio stations and beacons. Emekdas locator transmitter.
6. Airplane tape recorders. Cockpit Voice Recorder.
7. The instrument SATS, ASDAR, SELCAL and ACARS.
8. Radionavigation system. Navigation.
9. Automatic radio compasses. Automatic Direction Finder (ADF).
10. Navigation and landing equipment.
11. Aircraft rangefinders. Distance Measuring Equipment (DME). Doppler gauges. Doppler navigation.
12. Radio engineering systems of long-range and global navigation.
13. Radio altimeter. Radio Altimeter (RA).
14. Weather navigation radar. Weather avoidance radar (WXR).

15. Airplane defendants. Air Traffic Control (ATC) transponder. On-Board collision warning systems. TCAS.

Rs 4304 (1) Radiocommunication – 2 credits

Prerequisites: radio navigation.

Postrequisites: no.

As a result of studying the discipline the student is able to:

- use instrumentation and control equipment;
- develop design and process documentation;
- identify faulty units of the logic unit, sensors and actuators;

The student must have skills (to own):

- methods of theoretical and experimental research;
- skills for setting up automatic control systems;
- methods for calculating electrical and electronic devices using application packages;
- skills to select measuring and testing equipment during the technical operation of an aircraft electrical equipment and automation equipment;
- rules for constructing schematic diagrams and drawings of electrical equipment and means of automation, schemes for microprocessor control systems for aircraft technical means, and skills for reading electrical circuits.

Subjects studied:

1. Radio facility
2. International classification of radio frequencies. Frequency allocation.
3. Baklan Radio Station.
4. Radio Station "Micron".
5. The drive radio station.
6. Automatic direction finder.
7. Radar
8. Weather navigation radar stations
9. RSP-6M2. Purpose and composition.
10. Control radar DRL-6M2. The landing radar PRL-6M2.
11. Communication. Conducting radio exchange.
12. The establishment and maintaining of radio communication.
13. The transfer of ATS. Test stations and test the connection.
14. Standard phraseology radio control points ATS with aircraft crews.
15. Automatic direction finder.

TOR 4305 (1) Theoretical basis of radar – 3 credits

Prerequisites: radio navigation.

Post-requisites: no.

As a result of studying the discipline the student is able to:

1. apply knowledge of the basics of radar.
2. to investigate the stages of radar surveillance.

3. investigate the principle of operation and the basic parameters of the pulse radar.
4. analyze the range of radar stations.
5. to master the methods of radar sensing space radio pulses of short duration.
6. to analyze the methods of radar sensing space coherent radio signals of long duration.

Subjects studied:

1. The subject of the course, basic definitions and concepts. The main means of navigation.
2. Navigation space and coordinate systems. Maps and map projections.
3. The surface and the line of position of aircraft.
4. Methods of radio navigation.
5. The main navigation elements of the flight. Radio navigation support of flights.
6. The main properties of radio waves used in radio navigation.
7. Radio engineering methods and means of aircraft navigation.
8. Methods of radiometry. Methods of radiogrammetry.
9. The Doppler measurement technique in the TRASH
10. General principles of construction of satellite radio navigation systems.
11. Prospects of development of radio navigation.
12. The purpose of the radar equipment. Stages of development of radar.
13. Principles of radar. The essence of radar, the coordinates determined by the radar.
14. Radar measurement methods. The main characteristics of the radar.
15. On-Board radar equipment.

TORAEA 4306 (1) Maintenance and repair of aircraft electrical systems and avionics - 4 credits

Prerequisites: The avionics system of the aircraft.

Post-requisites: no.

As a result of studying the discipline the student is able to:

- determine the electrical parameters of electrical machines and apparatus,
- electrical devices and systems;
- select technological equipment for repair and operation of electrical machines and devices, electrical systems, determine the best options for its use;
- organize and perform adjustment, adjustment and verification of electrical and electrical systems;
- analyze malfunctions of electrical systems;
- efficient use of materials and equipment;
- filling route-technical documentation on the operation and maintenance of industrial and electrical systems;
- evaluate the efficiency of electrical and electrical systems;

- carry out technical control during the operation of electrical and electrical systems;
- to carry out metrological inspection of products;
- carry out diagnostics of equipment and determination of its resources;
- predict failures and detect defects in electrical and electrical systems.

Module Power plants and controls – 15 credits

Upon successful completion of this module, students should be able to:

1. provide energy-propulsion of power plants, systems of power supplying of avionics and radio electronic equipments;
2. calculate the energetic resources of the aircraft;
3. use power plants in various modes of operation, in case of emergency situations and failures;
4. make a decision on the occurrence of non-standard situations in any elements of the power supply system; to interpret the principles of functioning and mathematical models of biological control systems;
5. the main methods of calculation and research of automatic control devices used in aircraft; principles of automation of control processes in the aircraft;
6. use resource enhancement of engines and determine their condition methods; recognition and environmental effect for main engine data;
7. evaluate Augmented Controls for steadiness and control performance quality.
8. adjust gas-turbine engine (GTE) error from standard technical documentation (STD)

As a result of studying the module, student able to:

- C1. able to put into practice knowledge to calculate the reliability characteristics and determine the requirements for these characteristics in the process of design, manufacturing and operation, to demonstrate knowledge of the fundamentals of the technology of aviation production, aircraft equipment, fundamentals of operation of aircraft and aircraft design and engines;
- C2. able to provide power supply of power plants, systems of energy supply of avionics and radio-electronic equipment, use power plants in various operating modes, in the event of an emergency situation and failures; to make decisions in the event of a non-standard situation in any elements of the power supply system; interpret the principles of functioning and mathematical models of biological control systems.

AUGD 3307 Automation and control of gas turbine engines – 2 credits

Prerequisites: The design of aircraft engines.

Postrequisites: no.

As a result of studying the discipline, the student is able to:

- Analyze the importance of using automation to simplify engine operation.
 - Describe the modes of operation of the engine.
 - Analyze the further development of automatic control system
 - To identify the dependence of fuel consumption in aviation double-circuit GTE on the number of revolutions.
 - Synthesize knowledge about the elements of automatic control system and their purpose.
 - Describe the main ways to improve the reliability of the FADEC system.
- Topics covered:
1. Systems of automatic control (regulation) of aviation gas turbine power plants
 2. Have a forgiven scheme of engine management and fuel supply.
 3. Aviation gas turbine engines management
 4. The evolution of development and the main tasks of automatic control system engine and fuel supply
 5. Control programs (regulation) of automatic control system engine and fuel supply.
 6. Hydro mechanical automatic control system engine and fuel supply
 7. Automatic systems for axial compressors
 8. Semi-electronic automatic control system engine and fuel supply
 9. Electronic automatic control system engine and fuel supply type «FADEC»
 10. Directions of development in the development of FADEC systems .
 11. "The aircraft / engine" interface.
 12. Reverse control systems.
 13. Starting system.
 14. Ignition system.
 15. Auxiliary power unit.

SUAD 4308 Aviation engine control systems – 3 credits

Prerequisites: Automation and control of gas turbine engines. The design of aircraft engines.

Postrequisites: no.

As a result of studying the discipline, the student is able to:

- To the construction of automatic control systems aircraft and aircraft engine.
- To list the composition of automatic control systems aircraft and aircraft engine.
- To the description of the work of aircraft engines.
- To repeat basic management system requirements aircraft engine.
- To explain the working of aircraft engines ranges.
- To explain the main factors affecting aircraft engine.

Topics covered:

1. Introduction to automatics at gas turbine engines control
2. Adjustable parameters and regulatory factors
3. Multichannel and single-channel automatic control system.
4. Closed and unlocked automatic distribution system.
5. Gas-turbine engines as an object of regulation.
6. Limiting the temperature of the gas in front of the turbine.
7. Shaft speed limitation.
8. Centrifugal regulator.
9. Characteristics of the compressor.
10. Compressor stability margin
11. Theory stage compressor gas-turbine engines.
12. The characteristics of the gas-turbine engines.
13. Static characteristics of the gas-turbine engines.
14. The characteristics of the gas-turbine engines.
15. Automation of the launch of aviation gas-turbine engines.

PAK 4309 Strength of aircraft construction – 3 credits

Prerequisites: Technical mechanics.

Postrequisites: no.

As a result of studying the discipline, the student is able to:

- Find organizational and managerial solutions in unusual situations and a willingness to take responsibility for them.
- Apply the basic laws of natural sciences in professional activities.
- Apply methods of mathematical analysis and modeling, theoretical and experimental research.
- To apply this knowledge in practice, including owning the scientific tools used in the field of aviation.
- To make measurements and instrumental control during the operation of aircraft, to carry out the processing of results and to estimate the errors.
- Solve the tasks of planning, organizing, information and hardware support of the production processes of aircraft maintenance and repair, using basic professional knowledge.

Topics covered:

1. Maneuvering loads acting on the aircraft. Destructive stress of structural elements.
2. Gutting loads acting on the aircraft.
3. Plotting forces and moments for the wing. Verification calculation of the cross section of the wing.
4. Flexural and torsional deformations of a straight wing. Flexural and torsional deformation of the swept wing
5. The design loads acting on the plumage. Calculation of feathering with three-hinged suspension steering.

6. The calculation of the whole rotary stabilizer. Calculation of rudders for strength and stiffness. Calculated cases of loading of motor units
7. Estimated cases of loading rotary wings. Calculation of the rotor blade for static strength
8. Estimated cases of loading the fuselage. Inertial loads acting on the fuselage.
9. Calculation of cross-sections of the fuselage. Calculation of the frames.
10. Calculation of deformations of the fuselage. Calculation of fuselages in the area of large cuts
11. The calculated cases of loading the chassis. Calculation of chassis beam type
12. Calculation of the chassis with the lever wheel suspension. Selection of wheels for landing gear.
13. Equations of free oscillations of the bearing surface. Free torsional vibrations of the wing
14. Free flexural-torsional oscillations of the wing.
15. Aerodynamics of the vibrating wing.

KAD 3310 Aircraft Engine Design – 4 credits

Prerequisites: Practice maintenance.

Postrequisites: no.

As a result of studying the discipline, the student is able to:

- To distinguish design elements of aircraft engines.
- Analyze the characteristics of aircraft engines.
- Describe the main technical parameters of the engines.
- Outline the processes that occur in the engine, such as the pump and stall.
- Assess the applicability of various types of blade attachment.
- Analyze and distinguish between structural differences of the types of the reverse of a jet engine.

Topics covered:

1. Introduction. Kinds of energy. Brighton Cycle
2. Constructive schemes of engines. Input devices. Compressors. Types, design and principle of operation
3. Stators of axial compressors. Combustion chambers, classification, principle of operation
4. Gas turbines. Axis turbine stators
5. Nozzle. Mounts blades CA.
6. Types of output nozzle. Reverse thrust
7. Supports rotors. Gearboxes of aviation power plants and aggregate drives
8. Fuel system. Air system
9. Start and ignition system. Starting and ignition system
10. Engine operation indication system. Power increase systems
11. Turbo engines. Fire protection system

12. Engine design
13. Start and ignition system. Engine indication system
14. The control of the technical condition of the engine and ground maintenance of the CCD.
15. Storage and preservation of the engine.

SVS 3311 Aircraft Systems – 3 credits

Prerequisites: PTO 3303 Practice maintenance.

Postrequisites: no.

As a result of studying the discipline, the student is able to:

- Description of aircraft design.
- To the analysis of the principle of operation of the aircraft and functional systems.
- To discuss current and future aircraft.
- To the description of the technical characteristics of the aircraft.
- To the analysis of the principles of operation of the aircraft systems.
- To the illustration of the main aircraft systems diagrams.

Topics covered:

1. The hydraulic system of the aircraft.
2. Aircraft altitude system.
3. Aircraft anti-icing system.
4. Fuel system.
5. Anti-fire systems.
6. Aircraft equipment.
7. Emergency and rescue equipment of the aircraft.
8. Fire-fighting equipment of the aircraft.
9. Aircraft anti-icing devices
10. Lubrication systems.
11. Air systems.
12. Starting and ignition system.
13. Onboard functional systems of aircraft.
14. Aircraft lighting and alarm systems.
15. Engine indication system.

Module Radioelectronic, instrumentation and electrical equipment of aircrafts – 15 credits

Upon successful completion of this module, students should be able to:

1. to be able to wiring the electrical circuit of the product, to make measurements of electrical parameters, install and dismantle aviation equipment using tools and accessories;

2. be able to establish the main types of feeder lines and elements of the feeder path;
3. be able to interpret the propagation of radio waves in free space and the earth's atmosphere;
4. be able to describe the main parts of aircraft engines, the basics of aerodynamics;
5. apply knowledge of aviation electrical equipment.

As a result of studying the module, student able to:

A3. Know the basic laws of aerodynamics, flight dynamics and basic methods for calculating aerodynamic characteristics depending on operating factors, design of propellers and parts, basic physicochemical and operational properties of fuels and lubricants and special liquids (LF), as well as the basics of their production technology classification and labeling.

B1. possess a physical and mathematical culture, computer literacy.

Ed 3307 (1) Electrodynamics, AFU and RRV – 3 credits

Prerequisites: Digital electronic systems and devices.

Post-requisites: Instrumental and electronic equipment.

As a result of studying the discipline the student is able to:

- to the establishment of the main types of feeder lines and elements of the feeder path;
- to discuss the propagation of radio waves in free space and the earth's atmosphere;
- analysis of the main types of antennas: vibrator, aperture, antenna arrays, etc.;
- the ability to carry out energy calculations of various communication lines, taking into account the conditions of propagation of radio waves, the parameters of antennas, the transmitter and the receiver;
- to discuss the effect of earth on the directivity characteristics of antennas;
- to the use of antennas and feeder lines, as well as to the ability to calculate their parameters and, if necessary, to coordinate them.
- be able to choose the right antenna and feeder line, calculate their parameters and, if necessary, coordinate them;
- be able to carry out the energy calculation of various communication lines, taking into account the conditions of propagation of radio waves, the parameters of the antennas, the transmitter and the receiver.

Topics covered:

1. Basics of electrodynamics. Prerequisites for the emergence of radio engineering.
2. Frequencies of electromagnetic oscillations used in radio engineering.
3. Waves: their characteristics and properties.
4. Doppler effect and its application in radio engineering. High frequency power transmission lines.

5. Transmission lines of finite length.
6. Input resistance of lines loaded on an unmatched load.
7. Passive devices based on transmission lines. Microwave oscillatory systems.
8. Parameters of transmitting and receiving antennas. Vibrator antennas.
9. Symmetrical vibrator (dipole).
10. Multi-antenna antennas. The influence of earth on the characteristics of the antenna.
11. Mirror and lens antennas.
12. Waveguide and horn radiators.
13. Varieties of aperture antennas. Methods to reduce lateral radiation of aperture antennas. Wave-slot antennas.
14. Antennas traveling wave, dielectric and spiral.
15. Features of antennas for various purposes and ranges.

PReO 4308 (1) Instrumentation and radio-electronic equipment – 3 credits

Prerequisites: Electrodynamics, AFU and RRV

Post-requisites: no

As a result of studying the discipline the student is able to:

- measure electrical parameters;
- perform installation and disassembly of aviation equipment using tools and devices;
- conduct inspection work to check the external condition and mounting components and electrical equipment, and devices;
- use CPS in the maintenance of aviation equipment;
- know the basic concepts and definitions of aviation and electronic equipment;
- know the physical nature of the failure of equipment AT;
- know the main directions and prospects of aviation and radio-electronic equipment during operation, maintenance and repair, issues of evaluating the technical and economic efficiency of providing aviation and radio-electronic equipment AT, the introduction of technical diagnostics systems, integrated systems of quality management of maintenance and repair of AT.
- be able to organize a system for collecting and processing statistical information on aviation and radio-electronic equipment, taking into account the operating conditions;
- be able to use the equipment reliability indicators to ensure the performance of the AT, improving the system of operation, maintenance and repair.
- to possess skills of work with reference books, principles of construction of electrical systems, devices and units, as well as skills for calculating their reliability.

Topics covered:

1. Classification of aviation instruments by purpose.

2. Static pressure system.
3. Total pressure system.
4. Power supply system aneroid-membrane devices.
5. Air signal systems (ASS).
6. Thermometers (thermoelectric thermometers).
7. Gyroscopic instruments.
8. Magnetic compass.
9. Gyroscopic induction compass.
10. Navigation calculators.
11. Flight control systems.
12. Ground proximity warning system.
13. Instruments control aircraft engines.
14. Fuel flow meter. Fuel gauge.
15. Flight mode registration system.

Ael 4309 (1) Aviation electrical equipment – 3 credits

Prerequisites: Electrodynamics, AFU and RRV

Post-requisites: no

As a result of studying the discipline the student is able to:

- apply knowledge of aviation electrical equipment.
- analyze the principle of operation of power supply systems and power consumers.
 - present knowledge of generators, chemical power sources, transmission systems and distribution of electricity.
 - analyze the operation of AC / DC converters and DC / AC converters.
 - to evaluate the work of the sun protection and power distribution systems.
 - analyze the principle of operation of the switching system and electromagnetic circuits and devices.
 - know the principle of building aviation electrical equipment, the purpose, the main tactical and technical characteristics, the principle of operation, interaction with other aircraft systems, means of indication and signaling;
 - know the built-in control system;
 - know the safety measures when working.
 - be able to apply the knowledge gained in this course in practice;
 - be able to use the operational and reference literature;
 - to be able to properly operate the aviation electrical equipment.

Topics covered:

1. Aviation electrical equipment. Electrical equipment classification.
2. Power supply and distribution system.
3. Primary sources of electricity. Alternators, dc generators.
4. Secondary sources of electricity.
5. Emergency power supplies.
6. Auxiliary power plant startup system.
7. Main engine starting system.

8. Hydraulic equipment aircraft systems.
9. Electrical equipment of the aircraft fuel system.
10. Electrical equipment of the aircraft fire-fighting system.
11. Electrical anti-icing system of the aircraft.
12. Electrical equipment of the air conditioning system.
13. Electrical equipment of the aircraft control system.
14. Lighting systems of aircraft. Ground / airfield power sources.
15. Methods for evaluating the results achieved: study of the design of individual components and parts of the aircraft engine, as well as the operation of the engine as a whole.

SU 3310 (1) Silent installations – 3 credits

Prerequisites: Theoretical mechanics.

Post-requisites: Electrodynamics, AFU and RRV.

As a result of studying the discipline the student is able to:

- to the description of the main parts of aircraft engines, the basics of aerodynamics;
- to the definition of the main technical data of aircraft engines;
- to make calculations to determine engine parameters;
- to the analysis of the constructive arrangement and operation of turbo-jets, turbopumps, turboshaft and vinoturbin engines;
- to explain the operation of the electronic engine control system and fuel measurement;
- to the explanation of engine operation indication systems.
- know the basic information about the development of civil aviation, as a branch of the state economy;
- know the main parts of aircraft engines, the basics of aerodynamics;
- to be able to identify and distinguish the main technical data of aircraft engines;
- able to make the simplest calculations to determine the parameters of engines;
- possess the skills to develop and implement organizational and technical measures to ensure safety of flights.

Topics covered:

1. Fundamentals of theories of the CCD.
2. General information about the engine NK-8-2U and its basic data.
3. VNA. Construction and work.
4. The compressor engine NK-8-2U. General information.
5. The design of the low pressure compressor.
6. Front fan support Design and operation.
7. Rear bearing KND.
8. The design of the high pressure compressor.
9. Average support capacity NK8-2U. Engine power unit.
10. Compressor mechanization.

11. Combustion chamber of the NK-8-2U engine. Processes occurring in KS
12. Turbine engine NK-8-2U.
13. Jet nozzle of the engine NK-8-2U.
14. Automatic control system of the engine NK-8-2U.
15. NR-8-2U (pump regulator) of the engine NK-8-2U.

PNSK 3311 (1) Pilotage-navigation systems and complexes – 3 credits

Prerequisites: Digital electronics systems and devices.

Post-requisites: Instrumental and electronic equipment.

As a result of studying the discipline the student is able to:

- to apply knowledge of flight-navigation complex and systems, characteristics and parameters of using features of devices;
- set forth the theoretical basis for the operation of aircraft instruments and systems;
- to disassemble the experimental circuit of the device;
- to make calculations of elements of schemes and parameters of instrumentation equipment;
- analyze the work of satellite navigation systems.
- Master the work of the automatic on-board control system.
- know the general principles of construction and operation of typical computer complexes, differences in the operation of analog and digital types;
- know the principles of operation and construction of specialized systems.
- be able to use the necessary technical documentation; apply this knowledge when modeling automation processes and for analyzing possible failures of the PNS.
- to have skills rational methods of search and use of scientific and technical information.

Topics covered:

1. Gyroscopic instruments.
2. Gyroscopic induction compass GIK-1.
3. Coordinate systems used in navigation.
4. Autopilot (AP-28L-1).
5. The concept of the methods of reckoning.
6. Navigation devices (NI-50; ANU-1; NVU-BZ).
7. Remote Astronomical Compass (DAK-DB-5).
8. Satellite navigation systems.
9. Flight Management System (FMS).
10. Electronic Flight Instrument System (EFIS).
11. Traction control system (A | T).
12. Inertial system (IRS; INS).
13. Earth proximity early warning system (GPWS).

ADDITIONAL TYPES OF TRAINING (ATT) – 23 credits

OBLIGATORY COMPONENT (OC)

Physical Training Module – 8 credits

Upon successful completion of this module, students should be able to:

1. use in life practical skills and abilities that ensure the preservation and strengthening of health, development and improvement of psychophysical abilities and qualities;
2. independently maintain and develop basic physical qualities in the process of exercising;
3. use methods and means of physical culture to ensure full social and professional activities;
4. evaluate the current state of physical culture and sports in the world;
5. adhere to a healthy lifestyle;
6. to self-organization and self-education in the formation of a healthy lifestyle.

As a result of studying the module, a student is able to:

D1. have an idea of the basic teachings in the field of natural and socio-economic sciences, analyze socially significant problems and processes, be able to use the methods of these sciences in various types of professional activity, have sufficient theoretical training to analyze the socio-economic situation of countries and regions; to realize their professional, social, economic role in society.

Module of professional practice – 12 credits

Upon successful completion of this module students will be able to:

1. to work with the empirical base of the research in accordance with the chosen theme of the thesis (compilation of the program and research plan, formulation and formulation of tasks, definition of the object and subject of the research, choice of the methodological basis for the study, study of data collection and analysis methods);
2. work with bibliographic directories, with domestic and foreign electronic databases;
3. to select and apply in practice modern means of computer technology, communications and communications;
4. analyze engineering problems of design, development and support of automation and control systems;
5. develop educational and methodological materials, conduct training sessions on the academic discipline (lectures, seminars, practical and laboratory classes);

6. perform labor operations in the framework of the functional duties of the employees of the enterprise.

As a result of studying the module, a student is able to:

B1. possess a physical and mathematical culture, computer literacy;

B2. To be able to organize the metrological support of technological processes of aircraft maintenance and repair, to recognize and classify structural and raw materials according to their appearance, origin, properties, as well as certification processes for aircraft and air personnel;

B3. To be able to organize routine inspections and maintenance in order to maintain the airworthiness of aircraft and ensure flight safety;

B4. To be able to draw up applications for the necessary technical equipment and spare parts, prepare technical documentation for repairs and develop instructions for the operation of technical equipment and aviation equipment; B3. To be able to organize routine inspections and maintenance in order to maintain the airworthiness of aircraft and ensure flight safety;

B4. To be able to make applications for the necessary technical equipment and spare parts, prepare technical documentation for the repair and develop instructions for the operation of technical equipment and aviation equipment;

B5. To be able to perform professional primary skills, including metalworking, manufacturing and repairing simple parts, assembling components to ensure the health, efficiency and readiness of aircraft for their intended use and with the lowest operating costs;

C1. able to put into practice knowledge to calculate the reliability characteristics and determine the requirements for these characteristics in the process of design, manufacturing and operation, to demonstrate knowledge of the fundamentals of the technology of aviation production, aircraft equipment, fundamentals of operation of aircraft and aircraft design and engines;

C2. able to provide power supply of power plants, systems of energy supply of avionics and radio-electronic equipment, use power plants in various operating modes, in the event of an emergency situation and failures; to make decisions in the event of a non-standard situation in any elements of the power supply system; interpret the principles of functioning and mathematical models of biological control systems;

C3. capable of operation and maintenance of aircraft, to verify the technical condition and residual life of aircraft and equipment;

D1. have an idea of the basic teachings in the field of natural and socio-economic sciences, analyze socially significant problems and processes, be able to use the methods of these sciences in various types of professional activity, have sufficient theoretical training to analyze the socio-economic situation of countries and regions; to realize their professional, social, economic role in society.

UP Training practice – 2 credits

The purpose of the practice:

- the study of students of occupational safety and labor protection when working with tools, equipment and devices for performing mechanical and mechanical work;

- the acquisition by students of practical work skills as a performer;

- acquisition of practical experience in conducting mechanical and mechanical work.

As a result of passing mechanic-mechanical practice, a student must:

- consolidate the theoretical knowledge gained in the study of special disciplines;

- familiarize yourself with the mechanical and mechanical equipment, tools, instrumentation and be able to use them;

- to form practical skills in the repair and adjustment of aviation equipment, working with measuring instruments;

- be able to perform the functions of an aviation technician, engineer in aviation and electrical equipment;

- compile practice materials and issue a report on the work performed.

- be able to apply this knowledge in practice;

- to be able to work with the fitting and mechanical equipment, maintenance and repair of aircraft and special equipment.

Practice organization: In order for the student-trainee to have an idea of the full amount of mechanical and mechanical work, he must, during the period of practice, master the work in the main areas, which include: Workplace for plumbing; Workplace for cutting and felling of metals; Drilling workplace; Workplace on the nut; Workplace for electrical measurements.

PrP Industry practice in the specialty – 10 credits

The purpose of the practice is to consolidate the theoretical knowledge and deepen practical skills for technological research, the acquisition of skills of independent work, familiarity with the production activities of the organization of aviation profile.

Production practice is carried out in accordance with international standards and in the future gives the right to perform simple operations of the technological process used in the maintenance and repair of aircraft.

Practical training on AF is carried out in the organizations on maintenance and repair of aircraft equipment (further - THAT and RAT) with the experts allowed to work on AF. After the internship, the student will be fully acquainted with the company's procedures.

As a result of the internship, the student receives certificates confirming the exams for one or more programs of initial training in the form of modules according to the Order № 750 WORK of the Republic of Kazakhstan from 26.09.2013, which further give the right to obtain a certificate of a specialist in the aircraft in the CGA MIR of the Republic of Kazakhstan of the desired category A, B1.

CATALOG OF ELECTIVE DISCIPLINES

GENERAL EDUCATION DISCIPLINES (GE)			
COMPULSORY COMPONENT (CC)			
Social and humanitarian module - 6 credits			
Code MHK1101	Modern history of Kazakhstan		
Prerequisites	No	Prerequisites	no
Credits	3	Semester	1
Aim of discipline	To form a system of scientific views on the history of modern Kazakhstan society in the context of the world historical process.		
Abstract of discipline	<p>Large-scale transformations are accompanied by the modernization of public consciousness, which involves the transformation of learning based on a problem-based approach. Knowledge gained from the study of modern history of Kazakhstan contributes to the understanding of the dynamics of the development of historical processes and forms value reference points for ethnic, social, cultural identity in the surrounding world. The successful implementation of the state programs “Madeni Mura” and “Halyk Tarih Tolkynynda” broadened the horizons of historical knowledge and led to fundamental work aimed at changing the public consciousness and forming a unified Nation of strong and responsible people. The present stage of development of our country is characterized by the Third Modernization of Kazakhstan, the creation of a new model of economic growth that will ensure the global competitiveness of the country. Modernization of the economy is inextricably linked with the modernization of consciousness, when every citizen of Kazakhstan will understand the need for change in order to move to a qualitatively new level of development of his country. Kazakhstan society should have a spiritual and ideological core for the successful implementation of the goals set, this is facilitated by the program “Ruhani zhangyru” which reveals the mechanisms for modernization of public consciousness and is based on the continuity of spiritual and cultural traditions. Knowledge of the history of their people contributes to a broader perception and ability to rethink.</p>		
Code Phil2102	Philosophy		
Prerequisites	Modern history of Kazakhstan.	Postrequisites	no
Credits	3	Semester	4
Aim of discipline	Formation of students' holistic system understanding of philosophy as a special form of knowledge of the world, its main sections, problems and methods of their study in the context of future professional activity.		
Abstract of discipline	Discipline "Philosophy" is aimed at developing students' openness of consciousness, understanding their own national code and		

	national identity, spiritual modernization, competitiveness, realism and pragmatism, independent critical thinking, the cult of knowledge and education, and the mastery of such key ideological concepts as justice, dignity and freedom, as well as the development and strengthening of the values of tolerance, intercultural dialogue and the culture of peace. Particular attention is paid to the problems of preserving national identity, the inner core of the national “I” and the national spirit, which are reflected in the project “Ruhani zhangyru”, the role of philosophy in modernizing public consciousness and solving global modern problems. Philosophy contributes to the formation of students' philosophical reflection, skills of self-analysis and moral self-regulation, contributes to the development of research abilities and the formation of intellectual and creative potential.		
Instrumental Module – 15 credits			
Code FL1103	Foreign language		
Prerequisites	no	Postrequisites	Professionally-oriented Foreign Language
Credits	6	Semester	1,2
Aim of discipline	To form student’s knowledge for active use of a foreign language both in everyday and professional communication.		
Abstract of discipline	The “Foreign Language” discipline is aimed at further developing the language competencies acquired at school as a part of English language discipline program (General English), as well as deepening skills in the use of English as a means of communication with the formation of the following competencies: communicative (reading, writing, listening, speaking), language (pronunciation, vocabulary, grammar), general cultural and interpersonal.		
Code K(R)L1104	Kazakh (Russian) language		
Prerequisites	no	Postrequisites	Professional Kazakh (Russian) language
Credits	6	Semester	1, 2
Aim of discipline	Provide high-quality Kazakh (Russian) language proficiency in the context of Kazakh national culture as an instrument of social, intercultural, professional and personal communication through the formation of communicative competence in all types of speech activities in accordance with the levels of proficiency in a foreign language according to the Council of Europe scale (A1, A2 + LSP; B1, B2 + LSP; C1 + LSP).		
Abstract of discipline	The discipline "Kazakh (Russian) language" is aimed at shaping the social and humanitarian outlook of students in the context of a nationwide idea of spiritual modernization, involving the		

	development of internationalism, tolerant attitude to world cultures and languages as the basis of national consciousness and cultural code. Modern technologies, the use and transfer of which are able to ensure the modernization of the country and the personal career growth of future specialists.		
Code ICT1105	Information and communication technology		
Prerequisites	no	Postrequisites	Digital electronic systems and devices
Credits	3	Semester	2
Aim of discipline	Formation of the ability to critically evaluate and analyze processes, methods of searching, storing and processing information, methods of collecting and transmitting information through digital technologies.		
Abstract of discipline	The discipline "Information and communication technologies" is designed to build the ability to critically understand the role and importance of modern information and communication technologies in the era of digital globalization. In connection with the entry of the economy of Kazakhstan into the era of the Fourth Industrial Revolution, the adoption of a comprehensive program "Digital Kazakhstan", the development of new technologies such as the Internet of things, cloud technologies, big data, blockchain, etc. thinking, the acquisition of knowledge and skills in the use of modern information and communication technologies in various activities.		
ELECTIVE COMPONENT (EC) – 7 credits			
Finance and law module – 7 credits			
Code	Legal bases of corruption control		
Prerequisites	The human factor and psychology	Postrequisites	no
Credits	2	Semester	2
Aim of discipline	developing students' necessary knowledge and skills to analyze the causes and conditions conducive to the emergence and growth of corruption, and developing on this basis a civic attitude towards this phenomenon.		
Abstract of discipline	Theoretical and methodological foundations of the concept of "corruption". The historical development of the concept of "corruption". The concept of corruption as an antisocial phenomenon. The idea of intolerance to corruption. Transformation of corruption in modern states. Improving the socio-economic relations of Kazakhstan's society as a condition for countering corruption. Psychological features of the nature of corrupt behavior. The formation of anti-corruption culture. Features of the formation of anti-corruption culture of youth. Ethnic features of the formation of anti-corruption culture. Legal		

	liability for corruption acts. Moral and ethical responsibility for corruption acts in various fields. Religious norms and values as the principles of anti-corruption culture of society .		
Code	Basics of Transport Systems Security		
Prerequisites	no	Postrequisites	Flight safety system
Credits	2	Semester	3
Aim of discipline	Familiarization of future air traffic engineers with a set of constructive measures aimed at improving traffic safety. Teach them to explore the objective laws of the interaction processes in a person's accident (considering his mental and physical abilities) and technical means. The use of these patterns in the practice of creating, optimizing and operating transport systems.		
Abstract of discipline	Basic concepts of the BTS, the Aviation Security System of the Civil Aviation, international standards and ICAO recommendations on aviation security, terrorism on BT.		
Code	Psychology of interpersonal communication		
Prerequisites	Basics of Transport Systems Security	Postrequisites	Flight safety system
Credits	3	Semester	3
Aim of discipline	formation of graduates of the competencies necessary for effective professional communication and constructive interpersonal relations with other people in various spheres of social life and in the conditions of a modern polycultural society.		
Abstract of discipline	<p>Formation of students' skills of theoretical and empirical analysis of the problem of professional, intercultural and interpersonal communication in various aspects;</p> <ul style="list-style-type: none"> - development of students' knowledge and communication skills necessary for effective participation in the work of research seminars, conferences, symposia, the presentation of their own scientific achievements; <p>in production and technology activities:</p> <ul style="list-style-type: none"> - development of students' skills in analyzing various situations of business and interpersonal communication; - the formation of students' skills of effective communication for solving problems of interpersonal and intercultural interaction; - formation of the ability to work in a team, tolerantly perceiving social, ethnic, confessional and cultural differences; <p>in organizational and management activities:</p> <ul style="list-style-type: none"> - development of the ability to self-organization and self-education; - the development of students' ability to effectively build interaction in the working team and the formulation of organizational and managerial decisions, taking into account the specifics of the professional activity; 		

	in teaching activities: - the formation of professional and personal communication skills of future teachers.		
Cultural and communicative module - 7 credits			
Code Kul2106	Culture of speech and language communication		
Prerequisites	Modern history of Kazakhstan	Postrequisites	The human factor and psychology
Credits	2	Semester	5
Aim of discipline	To form students' understanding of the specifics of the development of national culture in the context of world culture and civilization, the need for preservation of the cultural code of the Kazakh people, and the ability to pursue the cultural heritage of the Kazakh people in a dynamically changing multicultural world and society in independent professional activity.		
Abstract of discipline	The discipline "Culturology" is aimed at developing the 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 an understanding of the nature of cultural processes, the specifics of cultural objects, the role of cultural values in intercultural communication.		
Code Psy2107	The human factor and psychology		
Prerequisites	Modern history of Kazakhstan	Postrequisites	Flight safety system
Credits	3	Semester	1
Aim of discipline	To form students' social-personal and instrumental competences in the field of psychological theory and practice of interpersonal communication, necessary in professional activities. Assisting all maintenance and flight personnel in understanding and limiting the work activities in themselves and in other people to be able to avoid, identify and correct errors, behavior and activities leading to their occurrence.		
Abstract of discipline	The discipline "The human factor and psychology" contributes to the formation of a general psychological culture of a person, awareness of his past, present and future from psychological positions, as well as for mastering knowledge of the socio-psychological patterns of behavior in interpersonal communication.		
Code ESD2108	Political Science and Sociology		
Prerequisites	no	Postrequisites	No
Credits	2	Semesters	3
Aim of discipline	Formation of sociological thinking and imagination of the dynamic social world in which we live, as well as in the formation of critical thinking and analysis of modern societies, their social		

	<p>structures, systems and institutions.</p> <p>The study of the laws governing the formation and functioning of politics, the preparation of students for participation in the political life of the country, the formation of an active citizenship</p>		
Abstract of discipline	<p>The discipline "Political Science and Sociology" will allow you to get deeper into the basics of sociology and political science, including topics and applied aspects of research, theory and methodology. By developing what S. Wright Mills calls "sociological imagination," the discipline will provide insight into how culture, religion, history, people and institutions intersect in shaping their own experience, life chances and identity. Throughout the course, a number of macro- and micro-sociological "perspectives" and issues related to social inequality and accessibility of education, ethnicity, gender, social class, as well as institutions such as family, education, and the media, which play an important role in shaping our our own life and the whole social world in which we live. Based on the Head of State programmatic paper "Looking into the Future: Modernizing Public Consciousness", the course considers the features of the modernization process. ration of consciousness and adaptation of Kazakhstan society to the global challenges of our time.</p>		
BASIC DISCIPLINES (BD) - 69 credits			
OBLIGATORY COMPONENT (OC) – 20 credits			
Professional kazakh and foreign language Module - 4 credits			
Code PK(R)Ya2201	Professional Kazakh (Russian) language		
Prerequisites	Kazakh (Russian) Language	Postrequisites	No
Credits	2	Semester	3
Aim of discipline	<p>To form students' skills and techniques of effective speech interaction in various situations of communication, the formation of grammatical skills and knowledge. Implementation of the main tasks of speech models and relative types at various levels of learning the state language.</p>		
Abstract of discipline	<p>The discipline "Professional Kazakh (Russian) language" is aimed at the further development of knowledge of Kazakh (Russian) language, based on pre-university knowledge and skills. The course goals and objectives are taken as a basis of the course at each level. The knowledge gained is aimed at the performance of all types of speech actions (listening, reading, speaking and writing), the formation of correct speech and literate writing, the definition of the requirements set for students.</p>		
Code POIYa2202	The professional focused foreign language		

Prerequisites	Foreign Language	Postrequisites	No
Credits	2	Semester	4
Aim of discipline	Formation of a professionally oriented communicative competence of students, allowing them to integrate into the international professional environment and use a professional oriental language as a means of intercultural and professional communication.		
Abstract of discipline	The discipline "Professionally-oriented foreign language" is aimed at contributing to the formation of functional features of oral and written vocational-oriented texts, documentation requirements (within the program), adopted in professional communication and in the country of the studied language, strategies of communicative behavior in situations of international professional communication.		
Physical and mathematical module – 12 credits			
Code	Higher Mathematics 1		
Prerequisites	no	Postrequisites	Higher Mathematics 2
Credits	3	Semester	1
Aim of discipline	<ul style="list-style-type: none"> - to give the future engineer a certain amount of knowledge in mathematics, which is necessary both for studying related engineering disciplines and for special courses; - develop mathematical intuition and the ability to use the studied mathematical methods in solving applied problems related to the future specialty; - to educate the mathematical culture and the ability to work with the book. 		
Abstract of discipline	Mastering the basic fundamental concepts of linear algebra: the basis of linear algebra and the method of coordinates; all forms and equations of geometric objects of the first and second order, basic definitions, theorems, rules, methods and formulas of linear algebra.		
Code	Higher Mathematics 2		
Prerequisites	Higher Mathematics 1	Postrequisites	Statistics
Credits	3	Semester	2
Aim of discipline	<ul style="list-style-type: none"> - to give the future engineer a certain amount of knowledge in mathematics, which is necessary both for studying related engineering disciplines and for special courses; - develop mathematical intuition and the ability to use the studied mathematical methods in solving applied problems related to the future specialty; - to educate the mathematical culture and the ability to work with the book. 		
Abstract of discipline	Mastering the basic fundamental concepts of linear algebra: the		

discipline	basis of linear algebra and the method of coordinates; all forms and equations of geometric objects of the first and second order, basic definitions, theorems, rules, methods and formulas of linear algebra.		
Code	Physics 1		
Prerequisites	no	Postrequisites	Physics 2
Credits	3	Semester	1
Aim of discipline	The goal of this course is to get students concepts of physical phenomena, as a generalization of the observations of practical experiments and experiments, set out at the appropriate mathematical level; about the main methods of observation, measurement and experimentation in physics, about the application of physical phenomena and laws in modern technology.		
Abstract of discipline	The course "Physics" is based on knowledge, shaping students 'understanding of the modern physical picture of the world and the scientific worldview, shaping students' knowledge and skills in using fundamental laws, theories of classical and modern physics, as well as methods of physical research as the basis of the professional activity system.		
Code	Physics 2		
Prerequisites	Physics 1	Postrequisites	Theoretical Mechanics
Credits	3	Semester	2
Aim of discipline	the goal of this course is to get students concepts of physical phenomena, as a generalization of the observations of practical experiments and experiments, set out at the appropriate mathematical level; about the main methods of observation, measurement and experimentation in physics, about the application of physical phenomena and laws in modern technology.		
Abstract of discipline	The course "Physics" is based on knowledge, shaping students 'understanding of the modern physical picture of the world and the scientific worldview, shaping students' knowledge and skills in using fundamental laws, theories of classical and modern physics, as well as methods of physical research as the basis of the professional activity system.		
Module Theoretical basis of aviation techniques - 4 credits			
Code TOAT 2207	Theoretical basis of aviation techniques 1		
Prerequisites	Physics	Postrequisites	Theoretical foundations of aviation technology 2; aircraft Design
Credits	2	Semester	3
Aim of discipline	To teach students the design elements of the aircraft, the basics of aerodynamics and operation of aircraft, as well as functional		

	systems.		
Abstract of discipline	<p>The training course "Theoretical foundations of aviation technology 1" is based on the knowledge gained in the study of the subject: "Physics". The content of the discipline includes the basics of aerodynamics; structural elements of aircraft; fuselage, wing, tail; the main stages and dynamics of the flight of the aircraft; mechanization of the wing; aircraft chassis design; functional systems of the aircraft: hydraulic system, fuel system, aircraft control system, air conditioning system and automatic pressure control, anti-icing system, fire system and household equipment.</p> <p>Upon successful completion of the course, the student is able to master the disciplines: "Theoretical foundations of aviation equipment 2" and "aircraft Design".</p>		
Code TOAT 2207	Theoretical basis of aviation techniques 2		
Prerequisites	Theoretical foundations of aviation technology-1	Postrequisites	Aircraft design
Credits	2	Semester	4
Aim of discipline	To teach students the theoretical foundations of aviation technology, including the design of the helicopter and its systems, engines and airport services.		
Abstract of discipline	<p>Academic discipline "Theoretical foundations of aviation technology-2" is the basis for further study of special disciplines'. The content of the discipline contains questions about the design of helicopters, the history of aircraft engines, the concept of the airport, airfield and heliport and their structural units. A feature of this course is its generality of concepts, as well as the feature that helicopters are considered in detail and in the future special disciplines do not occur. For successful completion of the course, students must master the discipline "Theoretical foundations of aviation technology-1". Upon successful completion of the course, the student is able to master the discipline: "aircraft Design»</p>		
ELECTIVE COMPONENT - 49 credits			
Main disciplines of the educational program			
Module Fundamentals of Electronics, Mechanics and Statistics – 8 credits			
Code OE 2201	Fundamentals of Electronics		
Prerequisites	Physics	Postrequisites	Digital electronic systems and devices, aircraft avionics System
Credits	2	Semesters	3
Aim of discipline	Students study the principles of construction, features of work, characteristics and parameters of schemes of aviation electronics,		

	the development of students 'skills of practical study of schemes, development of students' ability to use reference books and make calculations of schemes and their parameters.		
Abstract discipline of	<p>The course "Fundamentals of electronics" is a discipline of the curriculum of training.</p> <p>The course " Fundamentals of electronics "is based on the knowledge gained in the study of the subject:"Physics".</p> <p>The content of the discipline covers a range of issues related to the basic information about electrovacuum and semiconductor devices, rectifiers, oscillatory systems, antennas, amplifiers, generators of electrical signals. General information about the circuitry element base (resistors, chips, optoelectronics elements). Logical elements and logical design in the bases of chips. Digital-to-analog and analog-to-digital converters.</p> <p>After studying the course of the discipline "Fundamentals of electronics" the student must have the basis for the study of disciplines: "Digital electronic systems and devices" and "aircraft avionics System".</p>		
Code TM 2202	Theoretical Mechanics		
Prerequisites	Physics, mathematics	Postrequisites	Technical mechanics
Credits	3	Semesters	3
Aim of discipline	To teach students the main sections of theoretical mechanics: statics, kinematics and dynamics, and the acquisition of solid skills in solving problems.		
Abstract discipline of	<p>The training course "Theoretical mechanics" is part of the mathematical and natural science cycle of training.</p> <p>The discipline consists of three sections: solid state statics, kinematics and dynamics. In the section" solid state Statics " equilibrium conditions for different systems of forces applied to the body and methods of transformation of systems of forces are studied. In the section" Kinematics " the geometrical properties of motion of solids and their points are considered. In the section "Dynamics" we study the movement of material points, mechanical systems and solids, taking into account the forces applied to them.</p> <p>Theoretical mechanics is the basic discipline for further study by students of the course of technical mechanics, as well as special disciplines related to the direction and profile of training. Necessary prerequisites for the successful development of the course is the knowledge of the following disciplines: mathematics and physics.</p>		
Code St 2203	Statistics		
Prerequisites	Higher mathematics	Postrequisites	The reliability of aviation

			technology
Credits	3	Semesters	4
Aim of discipline	To teach students how to collect, analyze and interpret data on current phenomena and processes in aviation technology related to the causes of failures and malfunctions, which can be represented as a statistical set.		
Abstract of discipline	<p>The training course "Statistics" is a discipline of mathematical and natural science cycle of the curriculum of training. The content of the discipline covers a range of issues related to statistical methods of analysis. The peculiarity of the discipline is that the examples used in the learning process not only explain the General provisions of the theory, but also point to the relationship of these provisions with practical tasks, provide guidance on the application of General theoretical results, develop the ability to apply these results in specific tasks, for example, such as the study of the results of aviation production. The most important statistical methods and techniques are illustrated by real data of Kazakhstan and foreign statistics. Considerable attention is paid to the analysis and interpretation of the results of statistical processing of real (non-training) data in relation to failures and malfunctions of aircraft.</p> <p>To study the discipline "Statistics" a student must have the basics of mathematics, probability theory and mathematical statistics. After studying the course of the discipline "Statistics" the student must have the basis for the study of the discipline "Reliability of aircraft".</p>		
Module Aerodynamics, device, devices and systems of aircraft - 9 credits			
Code ADP 2204	Aerodynamics and flight dynamics		
Prerequisites	Physics	Postrequisites	Aircraft design Screw and its control systems
Credits	3	Semester	3
Aim of discipline	Disclosure of modern basic scientific concepts, concepts and ideas of motion theory research.		
Abstract of discipline	<p>Academic discipline "Aerodynamics and flight dynamics" is necessary in the course and diploma design.</p> <p>The basic concepts of aerodynamics and flight dynamics are considered, the theories and equations of aerodynamics, Zhukovsky's theory are briefly stated. Experimental research methods are described. Discusses the forces acting for LA in flight, takeoff, etc.</p> <p>The discipline "Aerodynamics and flight dynamics" is based on the study of the following disciplines: "Higher mathematics" and</p>		

	<p>"Physics". After studying this discipline, students are ready to study the disciplines: "aircraft Design", "Propeller and its control system".</p>		
Code SAVS 2305	Aircraft avionics system		
Prerequisites	Electronics basics	Postrequisites	The reliability of aviation technology
Credits	3	Semester	5
Aim of discipline	A study of the avionics systems of the aircraft.		
Abstract of discipline	<p>Discipline, "avionics System of the aircraft» based on the study of " Fundamentals of electronics." The main current state of the aircraft electrical equipment, operation of aircraft generators, aircraft electrical network, chemical sources of the aircraft, power supply systems of modern aircraft and the launch of aircraft engines. After studying this discipline, students are ready to study the discipline - "reliability of at".</p>		
Code VSU 2306	Screw and its control systems		
Prerequisites	Aerodynamics and flight dynamics	Postrequisites	Aircraft repair
Credits	3	Semester	6
Aim of discipline	Evaluation and repair of damages of the propeller to own schemes of service and repair of the propeller and to have an idea about the work of the propeller.		
Abstract of discipline	<p>The training course "Propeller and its control system "is based on the knowledge gained in the study of the subject:"Aerodynamics and flight dynamics". Tutorial "Screw and its control system" is necessary in the course and diploma design. Describes the basic concepts of aerodynamics of the propeller and summarized the theory of the isolated element of the blade, the ideal propeller and propeller theory sabinina pass and Zhukovsky. Experimental research methods are described. Recommendations on the selection of the propeller to the aircraft and its layout. Upon successful completion of the course, the student is able to master the discipline: "aircraft Repair".</p>		
Module Materials and production of aviation equipment - 13 credits			
Code HTVS 2307	Chemistry and ground supply of aircraft		
Prerequisites	Theoretical foundations of aviation technology	Postrequisites	Aircraft engine design
Credits	2	Semester	6
Aim of discipline	The study of the natural science cycle, in which students are		

	introduced to the properties of fuels and lubricants and their use in AIRCRAFT systems.		
Abstract of discipline	<p>The training course "chemical And fuel supply of aircraft" is based on the knowledge gained in the study of the subject: "Theoretical foundations of aviation technology."</p> <p>The textbook "Chemistry and fuel supply of aircraft" provides brief information on the use of various fuels in engines and their behavior in operating conditions. The classification of fuel is given. The principal physico - chemical characteristics and requirements to quality of fuel, composition and performance properties of the main types of fuels in engines; anti-knock value of automotive and aviation gasoline, the Flammability of diesel fuels; the tendency of various fuels to the deposition of sludge and carbon deposits; the properties of reactive hydrocarbon rocket and gas turbine fuels; application of compressed and liquefied gases as fuels for internal combustion engines. The classification, requirements to various lubricating oils, composition and operational properties of the main types of oils, greases, additives to fuels and oils are considered in detail. Upon successful completion of the course, the student is able to master the discipline: "aircraft engine Design".</p>		
Code 2208	JGSBS	Liquid gas systems of aircraft	
Prerequisites	Theoretical foundations of aviation technology	Postrequisites	Aircraft design
Credits	3	Semester	4
Aim of discipline	Mastering by students of the General provisions of hydraulics necessary for the aircraft mechanical engineer, element base and the theory of functional systems of aircraft in which liquids or gases are used as a working fluid, the principles of calculation of these systems and the study of the basic rules of their operation.		
Abstract of discipline	<p>The training course "Liquid-gas systems of aircraft" is based on the knowledge gained in the study of the subject: "Theoretical foundations of aviation technology."</p> <p>The manual "Liquid-gas systems of aircraft" includes the following main provisions: liquid and its physical properties; hydrostatics, differential equations of fluid equilibrium, the basic equation of hydrostatics, fluid pressure on the wetted wall, the relative rest of the liquid. Hydrodynamics-continuity equation, Bernoulli equation, hydraulic resistance, the Basis of the theory of similarity and dimensions, the flow of liquids through the holes and nozzles, hydraulic calculation of non-pressure and pressure pipelines; dynamic and volumetric masses; Hydraulic machines-classification, the main parameters; cavitation in pumps; methods</p>		

	<p>and devices of pressure regulation and giving of volume pumps; hydraulic motors of reciprocating action, pressure multipliers; hydraulic motors of rotational action (hydraulic motors). Fundamentals of hydro-and pneumatic drive: structure and typical schemes, the main energy ratios and external characteristics. To teach students, future bachelors, to use the laws of hydrostatics and hydrodynamics and methods of calculation of General engineering problems with their subsequent use in General technical and special disciplines, and then in practical activities in the workplace.</p> <p>Upon successful completion of the course, the student is able to master the discipline: "Aircraft construction".</p>		
Code TM 2209	Technical mechanics		
Prerequisites	Theoretical mechanics, technical drawing and computer graphics	Postrequisites	Strength of aircraft structures, Standardization and quality management
Credits	3	Semester	4
Aim of discipline	Teach students the basics of research and teach to make calculations of structural elements.		
Abstract of discipline	<p>The course of discipline " Technical mechanics "is an applied discipline, which is based on the knowledge gained in the study of the subject" Theoretical mechanics "and"technical drawing and computer graphics". This course contains laboratory work that allows you to determine the load capacity of the cylindrical reducer, to investigate the stability of compressed rods, etc.</p> <p>The peculiarity of this course is that the concepts of mechanisms and mechanical gears are laid, which, upon successful completion of the course, will help to study the "Strength of aircraft structures" and "Standardization and quality management".</p>		
Code Mat 2210	Materials Science		
Prerequisites	Physics 1-2	Postrequisites	Aircraft design
Credits	3	Semester	3
Aim of discipline	To teach students the basic provisions of the structure and properties of metals, to form the ability of students to apply their knowledge in practice and in production activities.		
Abstract of discipline	<p>Educational discipline "materials Science" is a discipline of General professional cycle, which gives the concept of the properties and types of materials. The basis of this course of discipline: "Chemistry" and " Physics". This course covers a wide range of issues, ranging from the structure of the material, ending with the laws of crystallization and structure of the formation of materials and alloys. The peculiarity of this course is the consideration of various materials, especially alloys and</p>		

	composite materials used in the production of aircraft and its parts. After successful completion of the course "materials Science " the student has sufficient knowledge to study the discipline "aircraft Design".		
Code TPAT 2211	Technology of aircraft production		
Prerequisites	Physics 1-2	Postrequisites	Aircraft design
Credits	2	Semester	3
Aim of discipline	To analyze and evaluate the production technology at the stages of design and Assembly of aircraft TO ensure their reliability and safety; to summarize the information obtained in various disciplines of aviation profile, and show their place in solving the problems of design and manufacture of aircraft and equipment.		
Abstract of discipline	<p>The training course "technology of production of aviation equipment" is based on the knowledge gained in the study of the subject: "Physics".</p> <p>"Technology of production of aircraft", Modul1. Technological processes of Assembly of at-Technological processes. Definition. Requirements for the manufacturing process. Components of the technological process. Groups of technological processes. Module 2. Manufacturability of design, interchangeability and methods of linking the Manufacturability of the design. Definition. Design and production technology. Maintainability. Ways to improve manufacturability. Purpose of joints and connectors. The concept of interchangeability of the design. Definition. Types of interchangeability. The technological requirements for the interchangeability of the design. Methods of geometric linking and shaping of the AIRCRAFT structure. Module 3. Methods of Assembly of the airframe-The use of various methods of connection in the design of aircraft and their manufacturability. Methods of Assembly of the airframe. Basic concepts of aircraft Assembly technology. The basic scheme of linking shapes and sizes of parts and equipment. Module 4. Design of Assembly jigs and Assembly fixtures. Definition. The purpose of the devices. Requirements for stocks. Structure and elements of JV. Features installation and testing of functional systems and units. Upon successful completion of the course, the student is able to master the discipline: "aircraft Design".</p>		
Module International relations and aviation legislation - 5 credits			
Code AZ 1212	Aviation legislation		
Prerequisites	Human factor and psychology	Postrequisites	Flight safety, health And environment
Credits	2	Semester	2
Aim of discipline	To train students to apply ICAO regulations on the organization,		

	provision and implementation of flights, air traffic control of civil aviation aircraft. And also teach students the rules of EACS 23/25/27/29 certification and type certification.		
Abstract discipline	of	<p>The training course "Aviation legislation" is a discipline that shows the legal regulation in the aviation sector.</p> <p>The content of the discipline covers international and Kazakh legal documents regulating the actions of aviation personnel. This discipline deals with the Chicago Convention, the relationship between Part-145, Part-66, Part-147 and Part-M.</p> <p>The peculiarity of the discipline is that the normative legal acts and documents used in the process of training explain aviation activities in the territory of Kazakhstan, but also indicate the continuity of international documentation in the territory of Kazakhstan. After studying the course of the discipline " Aviation legislation "the student must have a legal basis for further study of the disciplines:" safety system","occupational Safety and environment".</p>	
Code MEO 3213		International economic relations	
Prerequisites	Political science and sociology	Postrequisites	Process control in the airline
Credits	3	Semester	5
Aim of discipline	To deepen the theoretical knowledge of students in the field of modern world economy and international economic relations in the context of international economic organizations.		
Abstract discipline	of	<p>The training course " International economic relations "is based on the knowledge gained in the study of the subject:"political Science and sociology".</p> <p>The textbook "International economic relations" includes the following main provisions: world politics, the history of diplomacy, international conflicts, the foundations of international security. The theoretical part also includes the history of international relations. Also, students learn to create diplomatic documents, various draft agreements, contracts.</p> <p>definition of international economic law as a branch of international law, its subject, structure, as well as its place in the General system of legal regulation of international economic relations. As a systemic regulator, international economic law is a priority in relation to private international law, transnational law and national foreign economic law; at the same time, such special branches as international trade, transport, financial and credit law should be removed from its composition. As a system-forming industry that establishes the foundations of a fair economic world order, international economic law is currently in its infancy, and the process of its formation is unlikely to be completed in the near future. Upon successful completion of the course, the student is</p>	

	able to master the discipline: "process Control in the airline."		
Module System security and quality management – 10 credits			
Code OTE 3214	Labor protection and ecology		
Prerequisites	Aviation legislation	Postrequisites	Aircraft repair
Credits	2	Semester	6
Aim of discipline	Reducing to a minimum the likelihood of disorders or diseases running while providing comfort with maximum productivity and a high quality of products, works and services.		
Abstract of discipline	<p>The training course "occupational Safety and environment" is based on the knowledge gained in the study of the subject: "aviation legislation".</p> <p>The manual "occupational Safety and environment" includes the following main provisions: the basics of BDZ. Life safety management. The negative factors of the technosphere. The main dangers in the technosphere. Prevention of accidents and catastrophes in the technosphere. Methods and means of protection of the population and territories from emergency. Emergency assessment, prediction and analysis</p> <p>The basis of the content of the discipline "health And Environment" is the concept of sustainable development. In accordance with it, the following content lines are highlighted: ecology as a scientific discipline and ecological regularities; interaction of "nature" and "society" systems; applied issues of solving environmental problems in the Educational publication within the framework of the concept of sustainable development; methods of scientific knowledge in ecology: natural-scientific and humanitarian aspects. Upon successful completion of the course, the student is able to master the discipline: "aircraft Repair".</p>		
Code SUK 3215	Standardization and quality management		
Prerequisites	Technical mechanics	Postrequisites	Ect
Credits	3	Semester	6
Aim of discipline	Formation of students ' system of special knowledge of the basics of standardization and quality management.		
Abstract of discipline	<p>This course is based on the knowledge gained on the "technical mechanics" of the mechanisms and compounds. Application of standardization to these details allows to apply on AF such indicators of operational adaptability as interchangeability, controllability and ease of removal. This course discusses the theory of standardization and quality management, also outlines the principles of integrated systems in the enterprise. Upon successful completion of the course, the student is able to write a thesis.</p>		
Code SBP 3216	Flight safety system		
Prerequisites	Aviation legislation	Postrequisites	Aircraft systems

Credits	3	Semester	5
Aim of discipline	Acquisition of knowledge of the requirements of the basic regulations to ensure safety, to know the main causes of the AP. To impart skills of working with documents on the provision of PD in the industry. To master the General principles of development of measures to prevent AP.		
Abstract of discipline	The discipline " flight safety System "is based on the study of the discipline"Aviation legislation". The basic concepts of flight safety, safety requirements, accident investigation, aviation security, the work of the flight Subcommittee on the results of the investigation of the AP. After studying this discipline, students are ready to study the discipline "aircraft System".		
Code UTPA 4217	Management of technological processes in the airline		
Prerequisites	Technology of aircraft production	Postrequisites	Ect
Credits	2	Semester	7
Aim of discipline	Is to provide students with the necessary knowledge on the theoretical foundations of the management of I processes of operation of aircraft (at) and the use of skills and abilities to analyze I processes of operation, evaluation and prediction of indicators of their effectiveness, program and operational management I processes of operation of at, design systems and programs of maintenance and repair of at.		
Abstract of discipline	The training course "management of technological processes in the airline" is based on the knowledge gained in the study of the subject: "technology of production of aircraft." The textbook "Management of technological processes at the enterprise" includes a subject and task management processes, operation of aviation technology (at). Processes of operation of aviation equipment (at) as objects of management, methods of management of processes of operation of aviation equipment (at), Design of systems and processes of operation of aviation equipment (at), automation of management of processes of operation of aviation equipment (at), quality management system in the organizations on technical service and repair, system of management of efficiency of processes of operation of aviation equipment (at) On successful completion of the course the student is able to write a thesis.		
Module Computer technology – 4 credits			
Code TChKG 1218	Technical drawing and computer graphics		
Prerequisites	Higher mathematics 1-2	Postrequisites	Technical mechanics

Credits	2	Semester	2
Aim of discipline	Teach students to read, draw drawings, diagrams and graphics.		
Abstract discipline of	<p>The discipline "Technical drawing and computer graphics" is based on the discipline "mathematics".</p> <p>This course contains the rules of reading design and technological documentation on the profile of the discipline. The course considers methods of graphical representation of objects, spatial images, technological equipment and schemes. The course "technical drawing and computer graphics" is the main basis for further study of special disciplines, such as "Technical mechanics" and allows you to continue to write term papers and theses.</p>		
Code ChESP 2219	Digital electronic systems and devices		
Prerequisites	Electronics basics	Postrequisites	The avionics system of the aircraft
Credits	2	Semester	4
Aim of discipline	To teach students basic knowledge of the principles of construction of digital electronic systems and devices. To teach students to design electronic components, including on the basis of microprocessor elements, to read and understand simple schemes of typical electronic equipment on the digital integral element base.		
Abstract discipline of	<p>The training course "Digital electronic systems and devices" is based on the knowledge gained in the study of the subject: "Fundamentals of electronics". The content of the discipline covers a range of issues related to the principles of construction, features, characteristics and parameters of digital integrated circuits of basic logic elements. Classification, marking and conditional graphic designations on schematic diagrams are considered in detail. The principle of operation of functional units and semiconductor storage devices of computers, the composition and purpose of microprocessor systems and programming methods.</p> <p>After studying the course "Digital electronic systems and devices" the student must have the basis for the study of the discipline: "aircraft avionics System".</p>		
MAJOR DISCIPLINES – 32 credits			
OBLIGATORY COMPONENT – 5 credits			
Module Construction and reliability of aviation equipment - 5 credits			
Code KLA 3301	Construction of aircraft		
Prerequisites	Theoretical foundations of aviation technology, Aerodynamics and	Postrequisites	Technical operation of AIRCRAFT and AD

	flight dynamics		
Credits	3	Semester	5
Aim of discipline	The study of the characteristics, construction and principles of operation of components, assemblies, Assembly of airframe components and functional systems of a modern aircraft. To study the basic concepts of aerodynamics of AIRCRAFT.		
Abstract of discipline	Academic discipline " AIRCRAFT Design "is based on the study of disciplines:" Theoretical foundations of aviation technology", "Aerodynamics and flight dynamics". Reviewed the major systems of the aircraft, the principle of operation of the hydraulic system, supply scheme gidrofilnostju aircraft, the principle of operation of the fuel system, the principle of PIC, the working principle of PPP, the principle of operation of the emergency equipment of the aircraft, etc. After studying this discipline, students are ready to study the discipline: "technical operation of AIRCRAFT and HELL."		
Code NAT 4302	Reliability of aviation equipment		
Prerequisites	Technology of production of aviation equipment stick, avionics system of the aircraft, Aircraft systems, Statistics	Postrequisites	Ect
Credits	2	Semester	7
Aim of discipline	To teach students the necessary knowledge of the theory of reliability of aviation technology (at) and teach how to apply the skills and abilities to analyze the reliability of the test data and operational observations.		
Abstract of discipline	Discipline "Reliability of aviation equipment" is an applied discipline. The basis for the study of this discipline are "technology of production of aircraft", "avionics systems of aircraft" and "Statistics". The content of the discipline contains questions from the theory of probability, the calculation of the probability of failure and the probability of failure. The peculiarity of this course is the possibility of calculating non-renewable products for the accounting of resource and service life. This course traces the importance of maintaining a high level of reliability at every stage of the facility's existence. After successful completion of the course, the student is able to pass state exams and write a thesis.		
ELECTIVE COMPONENT – 27 credits			
Module Maintenance, repair and operation of aircraft – 12 credits			

Code PTO 3303	Maintenance Practice		
Prerequisites	Theoretical bases AT	Postrequisites	Organization and maintenance of aircraft maintenance, technical operation of aircraft
Credits	3	Semester	6
Aim of discipline	To train students to evaluate the operational and technical properties of AIRCRAFT and aircraft engines and ensure their compliance with the ETD.		
Abstract of discipline	<p>The training course "maintenance Practice" is a fundamental discipline for practical training.</p> <p>The content of the discipline covers a range of issues related to the theoretical and technological foundations of aircraft and aircraft engine repair. The peculiarity of the discipline is that the approaches used in the process of training to the repair technology, allows to provide the required level of readiness and performance of at during the service life or resource.</p> <p>After studying the course "maintenance Practice" the student is able to master the following disciplines: "Organization and maintenance of aircraft maintenance" and " technical operation of aircraft»</p>		
Code OTOVS 4304	Organization and maintenance of aircraft maintenance		
Prerequisite	Maintenance practices	Prerequisite	Ect
Credits	2	Semester	7
Aim of discipline	Training students in the process of aircraft preparation for flights, maintenance of serviceability, efficiency and correct functioning of the AT when used for its intended purpose, during storage and transportation.		
Abstract of discipline	<p>The training course of discipline "organization and maintenance of aircraft" can be successfully studied, thanks to the knowledge gained in the discipline "maintenance Practice". This course contains:</p> <ul style="list-style-type: none"> - assessment of compliance aircraft maintenance, execution of directives for the maintenance of airworthiness of the aircraft in time and operating time; - the study failed of the aircraft; - accounting and analysis of failures and malfunctions with the assessment of reliability indicators and the development of preventive effects; - organization of flight information processing and analysis; - procedures of registration of the admission of the aircraft equipment to operation after maintenance and repair; 		

	<p>- procedures of quality system in the field of maintenance and repair of aircraft of the operator taking into account requirements of the existing regulations.</p> <p>After the successful completion of this course, the student is able to apply their knowledge in writing final works and passing state exams.</p>		
Code	TEVS	Technical operation of aircraft	
4305			
Prerequisites	Maintenance practices	Postrequisites	Ect
Credits	3	Semester	7
Aim of discipline	To teach students the scientific, theoretical, organizational and technological basis of technical operation.		
Abstract of discipline	<p>The course of the discipline "Technical operation" considers a number of issues related to the operation of all parts and units. For the successful mastering of the course students should have a knowledge base about the practice of maintenance. The content of the discipline includes the strategy of maintenance; considers operational manufacturability as a factor of quality operation; fixes the processes and stages of operation of operational documentation. After successful completion of the course, the student is able to pass state exams and write a thesis.</p>		
Code	RAT	Repair of aviation equipment	
4306			
Prerequisites	Health and safety	Postrequisites	Ect
Credits	4	Semester	7
Aim of discipline	<p>To teach students the technological process of aircraft repair.</p> <p>To form knowledge and skills that allow to scientifically solve the problems of repair and restoration of aircraft products using the achievements of science in the field of technology and production.</p>		
Abstract of discipline	<p>Practical training in the discipline: "aircraft Repair" as a rule, should be carried out in hangars, laboratories on the basis of aircraft repair plant. To access the bases of the laboratory, students need to undergo safety training. In addition, he must know the issues of environmental protection (ecology). On this basis, the student to study this discipline must master the knowledge of the discipline "Health and environment".</p> <p>The training course "aircraft repair" covers a range of issues related to the study of the technological process of aircraft repair. Identification of the nature of the main causes of receipt of aircraft in repair.</p> <p>The study of the processes of restoring the performance of aircraft aircraft and aircraft engines.</p> <p>After studying the course "aircraft Repair" the student must have the basis for writing a thesis.</p>		

Module Technical maintenance systems of avionics in exhaust airplanes – 12 credits			
Code Rn 3303(1)	Radio navigation		
Prerequisites	Digital electronic systems and devices	Postrequisites	No
Credits	3	Semester	6
Aim of discipline	The purpose of the discipline is to study the basics of radio navigation, systematic presentation of tasks and means of navigation, the basics of cartography, the basics of navigation theory, methods used in radio navigation, the main directions and prospects of development of radio navigation.		
Abstract of discipline	Educational discipline "Radio navigation" is based on the study of disciplines: "Antenna-feeder devices and radio wave propagation", "Receiving and transmitting devices". The main means and methods of radio navigation, the main navigation elements of the flight are considered, cartography and cartographic projections are investigated. Global coordinate systems are studied. Also, the navigation methods used to determine the location of the aircraft and radio navigation equipment are considered. After studying this discipline, students are ready to study the discipline: "Instrumentation and electronic equipment."		
Code Rs 4304 (1)	Radiocontact		
Prerequisites	Radio navigation	Postrequisites	No
Credits	2	Semester	7
Aim of discipline	The purpose of the discipline radio-consideration of the principles and features of the organization of modern systems and devices of terrestrial, satellite radio and radio. The discipline of RS deals with issues related to the coding, transmission, reception, processing and reproduction of various types of information. These issues can be successfully solved by radio engineers developers (and operating systems can be successfully serviced by radio engineers operators) with the knowledge of certain laws inherent in the coordinated interaction of many links in the chain: the source of information consumer information. In this regard, the main task of the discipline RSE is to teach students complex technical thinking on the examples of analysis of the principles of work and construction of modern electronic systems of long-range information transmission using wire, cable, electromagnetic and fiber-optic communication lines.		
Abstract of discipline	The training course "radio Communication "is based on the knowledge gained in the study of the subject: "Physics, mathematics, electrical engineering, computer science."		

	The content of the discipline-are considered principles of organization of aviation telecommunication (radio) in civil aviation of the Republic of Kazakhstan. Typical schemes of the organization of aviation communication in the centers of air traffic control are given. Requirements to means of aviation radio communication are formulated, conditions of work of means of communication of civil aviation and criteria of an assessment of their characteristics are analyzed. Bases of the theory of systems of transmission of speech messages and the principles of construction of aviation radio stations are given, systems of data transmission (telecode communication) are considered.		
Code TOR 4305 (1)	Theoretical bases of radar detection		
Prerequisites	Radio navigation	Postrequisites	No
Credits	3	Semester	7
Aim of discipline	The purpose of the discipline is to study the basics of radar, types of radar surveillance. The range of the radar.		
Abstract of discipline	Academic discipline " Theoretical foundations of radar» based on the study of the discipline: «Radio navigation.» Overview radar; secondary radiation of radio waves; fundamentals of the theory and principles of optimal signal detection on the background of fluctuation noise; fundamentals of the theory and principles of optimal measurement of radar signals parameters; radar methods for probing space by radio pulses of short duration; radar methods for probing space with coherent radio signals of long duration and the principal interference of the active radar and the principles of protection from interference.		
Code TORAEA 4306 (1)	Technical maintenance and repair of aviation systems and avionics		
Prerequisites	The avionics system of the aircraft	Postrequisites	No
Credits	4	Semester	7
Aim of discipline	Purpose of discipline – performance of works on technical operation, maintenance and repair of electrical and Electromechanical equipment; use of basic measuring instruments.		
Abstract of discipline	The training course "maintenance and repair of aviation electrical systems and avionics" is based on the knowledge gained in the study of the subject: "Standardization and quality management". The content of the discipline covers a range of issues related to basic information about electrovacuum and semiconductor devices.		
Module Power plants and controls – 15 credits			
Code	AUGD	Automation and control of gas turbine engines	

3307			
Prerequisites	Aircraft engine design	Postrequisites	Aircraft engine control systems
Credits	2	Semester	6
Aim of discipline	The aim of the discipline – to teach students the theoretical foundations of the devices of automatic control systems (regulation) of aircraft gas turbine engines.		
Abstract of discipline	Discipline "Automation and control of gas turbine engines" lays the knowledge about the process of control of aircraft engines, thanks to the basics obtained on the course "design of aircraft engines." A feature of this course is its relevance in modern aviation. The course contains questions related to the regulation of the engine operating modes, protection of the engine from harmful processes occurring in the engines and indicates the main ways of development and improvement of the automation system. Upon successful completion of the course, the student is able to master the discipline: "aircraft engine control Systems".		
Code SUAD 4308	Aviation engine control systems		
Prerequisites	Automation and control of gas turbine engines, aircraft engine Design	Postrequisites	no
Credits	3	Semester	7
Aim of discipline	The aim of the discipline – the study of the basic provisions of automatic control, regulation, protection and control of the AD system, methods of calculation and design of these systems, the acquisition of theoretical and practical skills in practical training, training of specialists who are able to perform work on the operation, maintenance of the aircraft engine.		
Abstract of discipline	Discipline " control systems of aircraft engines» based on the study of disciplines: "Automation and control of gas turbine engines" and "aircraft engine Design". Academic discipline "control systems of aircraft engines" is necessary in the diploma design. The main components of the engine, the principle of operation of aircraft engines, start-up system and control processes of aircraft engines are considered. After studying this discipline, students are ready to write DR.		
Code PAK 4309	Strength of aircraft construction		
Prerequisites	Technical mechanics	Postrequisites	no
Credits	3	Semester	7
Aim of discipline	The aim of the discipline is the study of mathematical models by		

	students - boundary problems, deformable elastic structures, as well as the study of engineering methods for calculating the stress-strain state of structures		
Abstract of discipline	The course of discipline "Strength of aircraft structures" is aimed at the formation of students ' General cultural and professional competencies. The basic discipline for the successful mastering of this course is "Technical mechanics". The course contains General information about aviation structures, static and vibration strength. After successful completion of the course, the student is able to competently write graduation papers and pass state exams successfully.		
Code KAD 3310	Aircraft engine design		
Prerequisites	Theoretical basis of aviation techniques	Postrequisites	Aviation engine control systems, Chemistry and ground supply of aircraft, Automation and control of gas turbine engines
Credits	4	Semester	5
Aim of discipline	The aim of discipline – to teach students to identify and distinguish the basic elements of aircraft engine design and to know their functional purpose.		
Abstract of discipline	The training course "Aircraft engine Design" deepens and expands the conceptual framework of the engines studied on the theoretical foundations of aviation technology. The importance of the discipline is that not only explains the General provisions of the theory, but also indicates the relationship of these provisions with practical tasks. The main content of the course is a description of the design and their elements, consideration of the characteristics of the engine and the description of the processes. Upon successful completion of the course "design of aircraft engines" the student is able to master and understand the following disciplines: "Aircraft engine control systems", "Air conditioning and chemical control", "Automation and control of gas turbine engines."		
Code SVS 3311	Aircraft systems		
Prerequisites	Flight safety system	Postrequisites	Reliability of aviation technology
Credits	3	Semester	6
Aim of discipline	Formation of students ' engineering knowledge, practical skills in the field of electrical SUPPORT systems.		
Abstract of discipline	The discipline "Aircraft Systems" is based on the study of the discipline - "flight safety System". Reviewed the major systems of the aircraft, the principle of operation of the hydraulic system, supply scheme gidrofilnostju		

	<p>aircraft, the principle of operation of the fuel system, the principle of PIC, the working principle of PPP, the principle of operation of the emergency equipment of the aircraft, etc.</p> <p>After studying this discipline, students are ready to study the discipline - "reliability of at".</p>		
Module Radioelectronic, instrumentation and electrical equipment of aircrafts – 15 credits			
Code Ed 3307 (1)	Electrodynamics, AFU and RRV		
Prerequisites	Digital electronic systems and devices	Postrequisites	Instrumentation and radio-electronic equipment
Credits	2	Semester	6
Aim of discipline	<p>The goal is to train specialists in the field of ensuring the functioning of antenna-feeder devices in aviation radio-technical systems, radio communication systems, television and broadcasting, taking into account the peculiarities of radio wave propagation of various ranges.</p>		
Abstract of discipline	<p>Academic discipline "Electrodynamics, AFU and RRV" based on learning "Physics", "Theory of electrical circuits".</p> <p>The main types of feeder lines and elements of the feeder path, the main parameters of transmitting and receiving antennas, the main types of antennas: vibrator, aperture, antenna arrays, etc., the propagation of radio waves in free space and the earth's atmosphere are considered.</p>		
Code PReO 4308 (1)	Instrumentation and radio-electronic equipment		
Prerequisites	Electrodynamics, AFU and RRV	Postrequisites	no
Credits	3	Semester	7
Aim of discipline	<p>The student's study of the basic concepts of the discipline, the ability to calculate reliability indicators, both simple and complex systems, competently evaluate the reliability of systems and AT structures. Independently solve the problem of determining the reliability of units, nodes, systems, AT. Independently and creatively work with reference books.</p>		
Abstract of discipline	<p>The training course "Instrument and Radioelectronic Equipment" is based on the knowledge gained in the study of the subject: "Mathematics, Physics, Electrical Engineering and Fundamentals of Electronics."</p> <p>The content of the discipline covers a range of issues related to basic information about vacuum and semiconductor devices.</p>		
Code Ael4309 (1)	Aviation Electrical Equipment		
Prerequisites	Electrodynamics, AFU and RRV	Postrequisites	no

Credits	3	Semester	7
Aim of discipline	The purpose of the discipline is to study general information, composition, structure, principle of operation of power supply systems and aircraft electricity consumers.		
Abstract of discipline	<p>Academic discipline "Aviation electrical equipment" based on the study of disciplines: "Basics of electrical engineering", "Aviation devices".</p> <p>The main modules of the discipline are considered:</p> <ol style="list-style-type: none"> 1. Protection and power distribution systems of aircraft. 2. Aircraft DC. 3. AC aircraft machines. 4. Aviation electrical converters. 5. Chemical power sources. 6. Aviation electric drive. 7. Switching system and electromagnetic circuits and devices. 8. Aviation transformers. 		
Code SU 3310 (1)	Silent installations		
Prerequisites	Technical mechanics	Postrequisites	Electrodynamics, AFU and RRV
Credits	4	Semester	5
Aim of discipline	<p>The goal is to study:</p> <ul style="list-style-type: none"> - gas turbine engines. -systems of engine operation indication, main parts of aircraft engines, aerodynamics basics. 		
Abstract of discipline	Academic discipline "Power plants" based on the study "Theoretical foundations of aviation technology." The main features of the design arrangement and operation of turbo-jet, turbofan, turboshaft and turbine engines are considered.		
Code PNSK 3311 (1)	Pilotage-navigation systems and complexes		
Prerequisites	Digital electronic systems and devices	Postrequisites	Instrumentation and radio-electronic equipment
Credits	3	Semester	6
Aim of discipline	The purpose of the discipline is to study the composition and structure of the onboard flight-navigation complex, the conditions of its operation, as well as the theoretical foundations of the operation of aircraft instruments and systems that ensure the safety of aircraft operations.		
Abstract of discipline	Academic discipline "Flight navigation systems and complexes" based on the study of disciplines: "Electrical Engineering", "Fundamentals of Electronics", "Aviation Devices and Systems". Considered basic information about flight - navigation systems and complexes. Studied the main elements of the flight.		

EXPERTS CONCLUSION

Review Comments on Aviation Engineering

November 19, 2018

To whom it may concern,

Subject : Review comments on the Curriculum Design at al-Farabi Kazakh National University

It is my great privilege to take this opportunity to write a review report for the Aviation Engineering curriculum. The following comments are made.

1. General Comments:

- The curriculum is well prepared including general disciplines and major curriculums designed for Aviation Engineering. Not only fundamental principles in engineering, but also it includes practical issues such and maintenance and repair, which makes the program quite unique compared to that of our institute(KAIST).
- The foreign language course may include English if possible.
- The ICT(If it stands for Information and Communication Technology) course may include S/W training. Understanding commercial design S/Ws such as NASTRAN, CATIA, Matlab, and CAD/CAM is so important.
- Higher Mathematics courses are recommended to include probability, statistics, and random process if possible.
- The 7 semester plan looks fine, but it could be a little bit tight to cover all necessary components of Aviation Engineering education. Hands-on training and system design courses could be offered during 8 semester.

2. Specific Comments;

- 1) The “Aerodynamic and flight dynamics” course could be offered separately. They are quite

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different disciplines requiring extra credits. For instance, in aerodynamics, we may have compressible flow, incompressible flow, and viscous fluid dynamics. At least, 2 separate 3-credit courses could be considered for aerodynamics only.

- 2) Capstone design courses can be offered during 7 or 8 semester. It could be in the form of conceptual design of target aircraft in group projects. At this point, there is "Aircraft engine design" course only during 5 semester.
- 3) As mentioned in General Comments, S/W is so important in recent Aviation education. Special attention could be paid to the S/W courses.
- 4) It is an almost standard that vibration and dynamics courses are provided in aerospace engineering curricula. I am wondering the curriculum already include those courses.
- 5) ATM(Air Traffic Management) course or a related special topic could be considered.
- 6) Automatic control in combined with flight dynamics or flight control could be considered. It seems like the current program offers largely electronic equipment. Fundamentals of flight dynamics with automatic control theory may be a key component in Aviation engineering.
- 7) Lab. sessions such as wind tunnel test, material test, vibration test, basic electronics experiments can be offered.
- 8) The title of "Screw and its control systems" during 6 semester looks a little bit confusing. In my best understanding "Screw" is usually adopted in ships not aircraft. So, I wonder if the title is correct or "Screw" has a different meaning.
- 9) I am so careful to mention that "Chemistry and ground supply of aircraft" looks also a little bit unconventional as Aviation engineering curriculum. I am just curious what are the main subjects and goals of the course. The title can be changed into more standard a title.

3. Other Comments;

- 1) Graduate thesis could be considered for capacity building of students.
- 2) Any program for students with industry experiences such as internship program may be quite useful.
- 3) Students extra activities such as design, build, and fly(DBF) of small drones are highly recommended.



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- 4) Seminar courses inviting experts from outside(industry or government agencies) as speakers could be considered with minimum credit.

It briefly concludes my report by adding some additional components with suggestions.

Thank you for your attention. If you have any question or comment regarding my report, please contact with me.

Sincerely,

A handwritten signature in black ink, appearing to read 'Hyochoong Bang'.

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**КОММЕНТАРИИ К ОБРАЗОВАТЕЛЬНОЙ ПРОГРАММЕ
ПО СПЕЦИАЛЬНОСТИ 5B071400 "АВИАЦИОННАЯ ТЕХНИКА И ТЕХНОЛОГИИ"**

Рига

25 ноября 2018 г.

№ 01.201/1149

Тема: комментарии к образовательной программе Казахского Национального университета
им. Аль-Фараби

Для меня большая честь воспользоваться этой возможностью, чтобы написать обзорный доклад для учебной программы АВИАЦИОННАЯ ТЕХНИКА И ТЕХНОЛОГИИ. Сделаны следующие замечания:

Общие комментарии:

- Учебная программа хорошо подготовлена, включая общие дисциплины и основные учебные планы предназначенные для авиационной техники. Не только фундаментальные принципы в технике, но также включает в себя практические вопросы, такие как техническое обслуживание и ремонт.
- Для подтверждения соответствия требованиям принципам Болонского процесса, в описании программы указывать объем дисциплин как в национальных, так и международных кредитных пунктах.

Особые комментарии:

- В курсах высшей математики рекомендуется включать основы теории вероятности и статистики в области надежности и диагностики.
- На практических занятиях студенты должны иметь возможность знакомиться с примерами современных технологий конструкций.
- Рекомендуется в описаниях термин "винт" заменить на "пропеллер".
- Для обеспечения требований к современным авиационным специалистам, необходимо обеспечить соответствие профессиональных дисциплин требованиям программы EASA Part-66.

Другие комментарии:

- Для повышения профессиональной компетенции рекомендуется приглашать при проведении занятий как специалистов из действующих эксплуатационных предприятий, так и преподавателей из зарубежных авиационных вузов.
- Предоставить студентам возможность в процессе учебы сдавать экзамены по профессиональным модулям программы EASA Part-66. Для этого в Академии ГА имеется сертифицированный класс учебной организации EASA Part-147.



С учетом изложенных замечаний данную программу можно рекомендовать для учебного процесса.

Институт Транспорта и связи
Академический профессиональный авиационный центр
EASA Part-147
Факультет транспорта и логистики
заведующий кафедрой Авиационного транспорта
профессор, Dr.sc.ing.



Александр Медведев

Подпись А. Медведева подтверждаю
и. о. ректора института Транспорта и связи



Юрис Канелс



COMMENTS ON THE STUDY PROGRAMME
SPECIALITY 5B071400 "AVIATION TECHNIQUE AND TECHNOLOGY"

Rīga

November, 25, 2018

No. 01-201/1449

Subject: Review comments on the Curriculum Design at al-Farabi Kazakh National University

It is a great honor for me to take this opportunity to write a review report for the study program - AVIATION TECHNIQUE AND TECHNOLOGY. The following comments are made:

1. General Comments:

- The study program is well prepared including general disciplines and major curriculums designed for Aviation Technique. Not only fundamental principles in engineering, but also it includes practical issues such as maintenance and repair.
- To confirm the compliance with the requirements of the Bologna process principle, both national and international credit points are indicated in the program description in the scope of disciplines.

2. Specific Comments:

- It is recommended to include review of basic probability and statistics in the field of reliability and diagnostics in the higher mathematics course.
- In practical classes, students should be able to get examples of modern technologies and structures.
- Replace the word "screw" with the term "propeller" in the abstracts.
- To meet the requirements of modern aviation professionals, it is necessary to ensure that the professional disciplines comply with the requirements of the EASA Part-66 program.

3. Other Comments

- In order to increase professional competence, when conducting classes, it is recommended to invite specialists from maintenance and repair organization and lecturers from foreign aviation universities.
- To provide the students with the opportunity to take exams in the professional modules of EASA Part-66 program during their studies. In addition, the Civil Aviation Academy has a certified classroom training organization EASA Part-147.



Taking into account the stated remarks, this program can be recommended for educational process.

Transport and Telecommunication Institute
Academic and Professional Aviation Centre
EASA Part-147
Transport and Logistics Faculty
Head of Aviation Transport Department
Professor, Dr.sc.ing.



Aleksandrs Medvedevs

A. Medvedev Signature Approved
by the Acting Rector
of Transport and Telecommunication Institute



Juris Kanelis

The purpose of this review is to compare the program “Aviation Technique and Technology” in the Al-Farabi Kazakh National University, Almaty, Kazakhstan with a similar program in the Embry-Riddle Aeronautical University (ERAU), Daytona Beach, Florida USA.

The ERAU (<http://erau.edu>) is the world’s largest and oldest aviation institution, serving more than 31,000 students at two residential campuses in Florida and Arizona, through the Worldwide Campus at 125 locations around the world, and through online programs. It prepares pilots, aviation engineers and managers for large number of American and foreign companies. Its AMS program is certified by the US Federal Aviation Administration (FAA) and it is one of the best similar programs in the world. The ERAU teaches the Bachelor of Science (BS) program in Aviation Maintenance Science (AMS) which is similar in scope to the ATT program in KazNU.

Aviation Maintenance Science (AMS) Program @ ERAU

The Aviation Maintenance Science bachelor’s degree is made up of general education courses, technical courses, and labs that lead to FAA Airframe and Powerplant (A&P) mechanic’s certification. The degree is composed of 126 credit hours, and the minimal requirements for the BS AMS degree include:

General Education Courses:

Communication Theory and Skills (COM 122, COM 219, COM 221)	9
Lower-Level Humanities	3
Lower-Level Social Sciences (PSY 101)	3
Lower or Upper-Level Humanities or Social Sciences	3
Upper-Level Humanities or Social Sciences	3
Computer Science (CS 120)	3
Mathematics (MA 111 or MA 140 and MA 222)	6
Physical Sciences (PS 103 and PS 104)	6
<i>Total Credits</i>	<i>36</i>

Aviation Maintenance Science Core Courses:

AMS 115	Aviation Mathematics and Physics	2
AMS 116	Fundamentals of Electricity	4
AMS 117	Tools, Materials and Processes	4
AMS 118	Aircraft Familiarization and Regulations	2
AMS 261	Aircraft Metallic Structures	3
AMS 262	Aircraft Composite Structures	3
AMS 263	General Aviation Aircraft Systems	3
AMS 264	General Aviation Aircraft Electrical and Instrument Systems	3
AMS 271	Aircraft Reciprocating Powerplant and Systems	3
AMS 272	Powerplant Electrical and Instrument Systems	3
AMS 273	Propeller Systems	2
AMS 274	Aircraft Turbines Powerplants and Systems	4
AMS 365	Transport Category Aircraft Systems	3
AMS 366	Transport Category Aircraft Electrical and Instrument Systems	3

AMS 375	Repair Station Operations	3
AMS 376	Powerplant Line Maintenance	3
<i>Total Credits</i>		<i>48</i>

Open Elective Courses

Open Electives allow the student, with the guidance of an academic advisor, to select from a wide range of possible courses, which would help prepare for his or her individual career path.

<i>Total Credits</i>	<i>15</i>
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AMS Suggested Plan of Study

Year One	Credits
AMS 115 Aviation Mathematics and Physics	2
AMS 116 Fundamentals of Electricity	4
AMS 117 Tools, Materials and Processes	4
AMS 118 Aircraft Familiarization and Regulations	2
COM 122 English Composition	3
COM 219 Speech	3
CS 120 & CS 120L Introduction to Computing in Aviation	3
MA 111 College Mathematics for Aviation I	3
PSY 101 Introduction to Psychology	3
Lower-Level Humanities Elective	3
<i>Credits Subtotal</i>	<i>30</i>
Year Two	
AMS 261 Aircraft Metallic Structures	3
AMS 262 Aircraft Composite Structures	3
AMS 263 General Aviation Aircraft Systems	3
AMS 264 General Aviation Aircraft Electrical and Instrument Systems	3
AMS 365 Transport Category Aircraft Systems	3
AMS 366 Transport Category Aircraft Electrical and Instrument Systems	3
AMS 271 Aircraft Reciprocating Powerplant and Systems	3
AMS 272 Powerplant Electrical and Instrument Systems	3
MA 112 College Mathematics for Aviation II	3
PS 103 Technical Physics I	3
<i>Credits Subtotal</i>	<i>30</i>
Year Three	
AMS 273 Propeller Systems	2
AMS 274 Aircraft Turbines Powerplants and Systems	4
AMS 375 Repair Station Operations	3
AMS 376 Powerplant Line Maintenance	3
AS 121 Private Pilot Operations	5
AS 221 Instrument Pilot Operations	3
FA 121 Private Single Flight	1

FA 221	Instrument Single Flight	1
COM 221	Technical Report Writing	3
PS 104	Technical Physics II	3
WX 201	Survey of Meteorology	3
	Lower-Level Social Science Elective	3
	<i>Credits Subtotal</i>	<i>34</i>
Year Four		
AMSA 490	Aviation Technical Operations	3
AS 309	Aerodynamics	3
AS 310	Aircraft Performance	3
AS 321	Commercial Pilot Operations	3
AS 350	Domestic and International Navigation	3
AS 357	Flight Physiology	3
FA 324	Commercial Multi Instrument Flight	1
FA 326	Commercial Single Add On Flight	1
WX 301	Aviation Weather	3
	Upper-Level Open Electives	6
	Upper-Level Humanities or Social Science Elective	3
	<i>Credits Subtotal</i>	<i>32</i>
	Credits Total:	126

Aviation Technique and Technology (ATT) Program at KazNU

The suggested plan of study for ATT program is shown in Table 1. The program consists of General Education Courses (28 credits), Core Courses (69 credits), and Major Courses (32 credits). The total number of credits is 129. Each of these sections consists of Obligatory Courses (OC) and Elective Courses (EC). Thus, the General Education part of ATT includes 21 OC and 7 EC credits; the Core part includes 20 OC and 49 EC credits; and the Major part includes 5 OC and 27 EC credits.

Comparison Between ATT (KazNU) and AMS (ERAU) Programs

Both, ATT and AMS are four-year programs with a similar total number of credit-hours: The ATT program contains 129 credit-hours and the AMS program contains 126 credit-hours. Some of these courses are quite similar to each other and some are not.

There are several important differences between ATT and AMS programs.

1. The first important difference is the ratio of “technical” to “non-technical” courses. The ATT program contains more courses devoted to language skills (Kazakh, Russian and English), philosophy, and sociology than the AMS program. As a result, the number of “technical” courses/credit hours in the ATT program is less than in AMS program. This can be a problem for the ATT graduates if/when they will compete with AMS graduates on the global market, or if they will decide to continue their education abroad.
2. The second important difference is the proportions of the Obligatory Component to the Elective Component in two programs. The total number of credits for the electives courses in AMS program is 15 or 12%. The total number of credits for electives courses in ATT is 83 or 64%. Unless the “elective component” in the ATT program means something very different from the open elective courses in AMS program, it is hard to understand how the ATT program with a such level of flexibility can guarantee the high and uniform quality of all graduates.

3. The third important difference is the distribution of the teaching loads between the programs. The AMS program distributes courses with 126 credit hours uniformly through 8 semesters (or 4 years). The ATT programs distributes courses with 129 credit hours through 7 semesters (or 3.5 years). Therefore, it is hard to understand what exactly the students will do at ATT program during the last, 8th semester at the ATT program. It is also hard to believe that students in ATT program will have enough time to get the same quality (and quantity) of knowledge if they will spend less time to cover more credit hours than students in AMS program.

With these remarks I conclude that both programs have a good potential for preparation high quality specialists in the field of Aviation Techniques and Maintenance, and can provide a good, solid foundation for collaboration and exchange between students and faculty from KazNU and ERAU.

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Review of the Aviation Techniques and Technology (ATT)

1 semester	Оц.б.	2 semester	Оц.б.	3 semester	Оц.б.	4 semester	Оц.б.	5 semester	Оц.б.	6 semester	Оц.б.	7 semester	Оц.б.	8 semester	Оц.б.
History, Theory of Aviation	2	Foreign Language	2	Mathematical English (English) Language	2	Physics	2	Basic course of technical drawing	2	Оценки: 3,4,5	2	Внеучебные задания	2	Оценки: 3,4,5	2
Foreign Language	2	English (B2 level) Language	2	Технический чертёж (CT)	2	Технический чертёж (CT)	2	Basic course of technical drawing	2	Вне и дополнительные задания	2	Оценки: 3,4,5	2	Оценки: 3,4,5	2
English (B2 level) Language	2	ICT	2	Математика в авиации	2	Mathematical English (Foreign) Foreign Language	2	Основы авиационного технического чертёж	2	Математика в авиационной технике	2	Оценки: 3,4,5	2	Оценки: 3,4,5	2
Математика (технический)	2	Математика (технический)	2	Графика (технический чертёж)	2	Графика (технический чертёж)	2	Графика (технический чертёж)	2	Графика (технический чертёж)	2	Оценки: 3,4,5	2	Оценки: 3,4,5	2
Математика I	2	Математика I	2	Технический чертёж	2	Математика (технический чертёж)	2	Математика (технический чертёж)	2	Математика (технический чертёж)	2	Оценки: 3,4,5	2	Оценки: 3,4,5	2
Технический чертёж и графика	2	Математика (технический чертёж)	2	Технический чертёж	2	Технический чертёж	2	Техника (технический чертёж)	2	Техника (технический чертёж)	2	Оценки: 3,4,5	2	Оценки: 3,4,5	2
		Технический чертёж на компьютерном графике	2	Оценки: 3,4,5	2	Оценки: 3,4,5	2	Оценки: 3,4,5	2	Оценки: 3,4,5	2	Оценки: 3,4,5	2	Оценки: 3,4,5	2
				Оценки: 3,4,5	2										
				Оценки: 3,4,5	2										
Total	18		18		18		18		18		18		18		18

Module	Total credit	ECTS	OC credit	ECTS	BC credit
English Language (B2 level)	26	10	26	10	7
Mathematical English (B2 level)	10	10	10	10	10
Technical Drawing (B2 level)	10	10	10	10	10
Total	46	30	46	30	27
	129		46		51

Table 1

Description of Aviation Maintenance Science Core Courses

AMS 115 Aviation Mathematics and Physics 2 Credits

This course covers the fundamentals of mathematics and physical sciences appropriate to the training of the aviation maintenance technician. The math topics include fractions, decimals, ratio, geometry, formulae, and proportions. The aviation physics topics include atmospheric properties, thermodynamics, fluid power, heat, power, work, basic machines, and sound.

AMS 116 Fundamentals of Electricity 4 Credits

This course covers direct and alternating current electricity, electrical circuit design, measuring devices, transformers, solid state, and logic devices. Emphasis is placed on voltage, current, resistance, and impedance relationships. The classroom theory is reinforced with laboratory projects.

AMS 117 Tools, Materials and Processes 4 Credits

This course introduces the student to common and precision measurement tools, aviation hardware, and materials used in aircraft manufacturing, maintenance and repair. Various methods of nondestructive testing are also studied and performed. The course studies the principles of corrosion control and allows the student to apply its theory. Aircraft drawings, blueprints, charts, and graphs are also introduced and applied.

AMS 118 Aircraft Familiarization and Regulations 2 Credits

This course is a familiarization course in terminology, basic aerodynamics, and human factors. The course also offers a comprehensive summary of the privileges and limitations of the Federal Aviation Administration's (FAA) Federal Aviation Regulations (FAR, Title 14 Code of Federal Regulations) parts 43, 65, 91 as well as other regulations pertinent to aircraft maintenance. The course identifies the associated documents, publications, and records applicable to the maintenance technician. AMS 118 also identifies the standards for aircraft ground operation, movement, and associated safety procedures in addition to the concepts and computation of aircraft weight and balance.

AMS 261 Aircraft Metallic Structures 3 Credits

A study of aircraft structural characteristics and methods of fabrication with an emphasis on aluminum sheet metal applications. Explains metal-working processes and develops the techniques necessary for airworthy manufacturing as well as acceptable methods of repair employed in the industry. The course also covers the theory and practice of aircraft welding relevant to several approved industry standards.

Prerequisites: AMS 115 and AMS 117 and AMS 118.

AMS 262 Aircraft Composite Structures 3 Credits

This is a course of study encompassing the structural and nonstructural use of composite, plastic, wood, and fabric materials on aircraft. Fabrication, repairs, finishing, and safety practices relating to these materials will be discussed and practiced. Included will be the application of adhesive and plastic resins, composite machining, and vacuum bagging of composite parts.

Prerequisites: AMS 117 and AMS 118.

AMS 263 General Aviation Aircraft Systems 3 Credits

This course covers the operating principles and basic troubleshooting techniques for aircraft systems found in general aviation aircraft. Theory of operation, inspection, and troubleshooting will be emphasized for all systems covered in the course. These systems include hydraulic systems, air conditioning and heating systems, oxygen systems, landing gear systems, brake

systems, ice and rain detection/protection systems, fire detection/extinguishing systems, fuel systems, and flight controls.

Prerequisites: AMS 116 and AMS 117 and AMS 118.

AMS 264 General Aviation Aircraft Electrical and Instrument Systems 3 Credits

The theory/application of aircraft wiring, basic electrical troubleshooting of airframe systems, DC alternator power systems, and instruments/avionics for general aviation aircraft are developed through the use of laboratory projects and classroom material.

Prerequisites: AMS 116.

AMS 271 Aircraft Reciprocating Powerplant and Systems 3 Credits

This is a study of various types of aircraft engines in use in the aviation industry. Reciprocating engine disassembly, inspection, and reassembly procedures are practiced. A study of the inspection, repair, and operation of powerplant fuel metering units and superchargers as well as induction, cooling, and exhaust systems.

Prerequisites: AMS 115 and AMS 117 and AMS 118.

AMS 272 Powerplant Electrical and Instrument Systems 3 Credits

A study of various electrical and instrumentation systems use in support of aircraft powerplants. Included in the course are the overhaul and testing procedures for reciprocating and turbine engine electrical system components, including auxiliary power units.

Prerequisites: AMS 116 and AMS 117 and AMS 118.

AMS 273 Propeller Systems 2 Credits

Maintenance, repair, and trouble-shooting theory and practices for propellers and propeller system components are covered as they pertain to reciprocating and turboprop engines found in modern aircraft.

Prerequisites: AMS 115 and AMS 116 and AMS 117 and AMS 118.

AMS 274 Aircraft Turbines Powerplants and Systems 4 Credits

A study of the construction and design of modern gas turbine engines used on the current generation of aircraft. Turbine engine systems will be studied, including lubrication, fuel scheduling, starting, and ignition. Emphasis is placed on proper inspection, troubleshooting, and maintenance techniques.

Prerequisites: AMS 116 and AMS 117 and AMS 118.

AMS 365 Transport Category Aircraft Systems 3 Credits

This course covers the operating principles and basic troubleshooting techniques for systems found in today's transport category aircraft. The theory of operation, troubleshooting, maintenance, and inspection will be emphasized for all systems covered in the course. These systems include hydraulic and pneumatic systems as well as environmental control systems; oxygen systems; landing gear systems; brake and anti-skid systems; ice and rain detection/protection systems; fire detection/extinguishing systems; fuel; and flight control systems. This course incorporates practical lab situations for learning reinforcement.

Prerequisites: AMS 116 and AMS 118 and AMS 263 and AMS 264.

AMS 366 Transport Category Aircraft Electrical and Instrument Systems 3 Credits

The theory/application of transport category aircraft power systems including AC power on large aircraft, and DC generator systems on multiengine turbine powered aircraft are developed. Electrical troubleshooting is addressed in depth, and large aircraft avionics/instrument systems are presented in general.

Prerequisites: AMS 116 and AMS 264.

AMS 375 Repair Station Operations 3 Credits

This course contains a detailed study supported by the actual overhaul of operational reciprocating engines in a certificated engine repair station environment. Included is a study of the procedures and acceptable techniques used in engine disassembly, inspection, repair, and reassembly. Advanced techniques of nondestructive testing are included in this course.

Prerequisites: AMS 271 and AMS 272.

AMS 376 Powerplant Line Maintenance 3 Credits

A course of study that details the correct procedures and methods of installation, inspection, and operational checks of reciprocating and turbine engines. Includes adjustment and troubleshooting of fuel, oil, electrical, and propeller systems on operational aircraft engines.

Prerequisites: AMS 271 and AMS 272.



EXPERT CONCLUSION

TO THE EDUCATIONAL PROGRAM ON SPECIALTY 5B071400 “AVIATION TECHNIQUE AND TECHNOLOGIES”

After reviewing the passport specialty and the educational program "Aviation technique and technology" of the Kazakh National University Al-Farabi I have made the following notes and recommendations:

The educational program is well prepared and takes into account international and national requirements for the training of aviation specialists in the field of maintenance and repair of aviation equipment, as well as the requirements for the level of education "Bachelor" - the disciplines of both the general education and general humanitarian cycle, as well as professional technical directions (engineering) disciplines are shown and described.

1. To ensure the international principle of mobility and compliance with the Bologna process, it is also necessary to indicate the scope and value of disciplines at international credit points.
2. In terms of the correctness of aviation terminology, it is necessary to replace the term "screw" by the term "propeller".
3. The study of the theory of probability, reliability and statistics should be studied in higher mathematics courses or carried out as a separate discipline, for example, "Reliability Theory of Aviation Systems".
4. To ensure the attractiveness of graduates in terms of employment in civil aviation organizations for the maintenance and repair organizations (MRO or Part-145) they need not only a diploma of education, but also a certificate (license) from a civil aviation authorities . To do this, when introducing such a specialty into the educational process, it is necessary to ensure the following:
 - 1) Certify (approve) this training course at the Civil Aviation Authority of the Republic of Kazakhstan (Civil Aviation Committee) or EASA (European Aviation Safety Agency) - Part-147;
 - 2) Ensure that students can take exams in professional modules provided by EASA Part-66 for the relevant license category;
 - 3) To provide students with the opportunity to undergo practical training at maintenance and repair organizations with appropriate certificates - Part-145.



5. A modern specialist should be properly trained in the field of information and communication technologies, in particular, be able to use modern technical software such as: MatLab, Compass, Solidworks.
6. According to the requirements of EASA Part-66 for this category of specialists (engineer category B1), the minimum duration of training should be 2400 hours, of which at least 1200 hours of theoretical training. The volume of this educational program is 129 credits (or about 3870 hours for practical and lecture classes), which fully satisfies the specified requirement.
7. It is recommended to involve practitioners from the aviation industry (Airlines, Maintenance Organization) for practical training and seminars.
8. Particular attention is recommended to focus on work with composite materials and non-destructive methods of control, methods of identification of corrosion.
9. Laboratory work may include: vibration experiments, metal fatigue experiments, electrical and electronic work, and wind tunnel experiments.

In general, taking into account the above, the educational program can be recommended to provide training for aviation specialists in the field of engineering and technology. The presented educational program contains questions, the study of which is provided for by modern requirements, taking into account the advanced European and international experience in this field, the requirements of employers for qualified specialists. The developers of this educational program took into account the peculiarities of the international concept of education.

The list of recommended training equipment, textbooks and manuals correspond to modern achievements in the field of aviation technology and technology.

Head of Training

Training center Part-FCL

Ph.D

M. Kireiev



ЭКСПЕРТНОЕ ЗАКЛЮЧЕНИЕ

К ОБРАЗОВАТЕЛЬНОЙ ПРОГРАММЕ ПО СПЕЦИАЛЬНОСТИ 5B071400 «АВИАЦИОННАЯ ТЕХНИКА И ТЕХНОЛОГИИ»

Просмотрев паспорт специальности и образовательную программу «Авиационная техника и технологии» Казахского Национального университета им. Аль-Фараби мною отмечены следующие моменты и рекомендации:

Образовательная программа подготовлена хорошо и учитывает международные и национальные требования к подготовке авиационных специалистов в области технического обслуживания и ремонта авиационной техники, а также требования к уровню образования «Бакалавр» - представлены дисциплины как общеобразовательного и общегуманитарного цикла, так и профессионально-направленные технические (инженерные) дисциплины.

1. Для обеспечения международного принципа мобильности и соответствия Болонскому процессу необходимо указывать также объем дисциплин в международных кредитных пунктах.
2. С точки зрения правильности авиационной терминологии, необходимо заменить термин «винт» на термин «пропеллер».
3. Изучение теории вероятности, надежности и статистики необходимо изучать в курсах высшей математики или вынести отдельной дисциплиной, например, «Теория надежности авиационных систем».
4. Для обеспечения привлекательности выпускников с точки зрения трудоустройства в организациях гражданской авиации по техническому обслуживанию и ремонту авиационной техники (ТОиР АТ или Part-145) требуется наличие у них не только диплома об образовании, но также и сертификата (лицензии) от уполномоченного органа гражданской авиации. Для этого при внедрении такой специальности в образовательный процесс необходимо обеспечить следующее:

- 1) Сертифицировать (одобрить) данный курс подготовки в Уполномоченном органе гражданской авиации РК (Комитет гражданской авиации) или EASA (Европейское агентство по авиационной безопасности) – Part-147;



- 2) Обеспечить возможность сдачи студентами экзаменов по профессиональным модулям, предусмотренным EASA Part-66 для соответствующей категории лицензии;
 - 3) Обеспечить студентам возможность прохождения практики в организациях по ТООП АТ имеющих соответствующие сертификаты – Part-145.
5. Современный специалист должен быть соответствующим образом подготовлен в области информационно-коммуникационных технологий, в частности, уметь пользоваться современным техническим программным обеспечением таким как: MatLab, Compass, Solidworks.
 6. Согласно требованиям EASA Part-66 к такой категории специалистов (инженер категории B1), минимальная продолжительность обучения должна составлять 2400 часов, из которых минимум 1200 часов теоретического обучения. Объем данной образовательной программы составляет 129 кредитов (или около 3870 часов на практические и лекционные занятия), что полностью удовлетворяет указанному требованию.
 7. Рекомендуется привлекать специалистов-практиков из авиационной отрасли (Авиакомпаний, Организации по ТО) для проведения практических занятий и семинаров.
 8. Особое внимание рекомендуется уделить занятиям по работе с композитными материалами и неразрушающим методам контроля, методам идентификации коррозии.
 9. Лабораторные работы могут включать: вибрационные эксперименты, эксперименты по усталости металлов, работы по электрике и электронике, эксперименты с аэродинамической трубой.

В целом, принимая во внимание вышесказанное, можно рекомендовать образовательную программу для обеспечения подготовки авиационных специалистов в области техники и технологий. Представленная образовательная программа содержит вопросы, изучение которых предусмотрено современными требованиями с учетом передового европейского и мирового опыта в данной области, требований работодателей, предъявляемых к квалифицированным рабочим кадрам. Разработчиками



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данной образовательной программы были учтены особенности международной концепции обучения.

Перечень рекомендованного учебного оборудования, учебной литературы и пособий соответствуют современным достижениям в области авиационной техники и технологиям.

Заведующий учебной частью

Training center Part-FCL

к.т.н.

М.Э. Киреев



To whom it may concern

Berlin, 4. Dezember 2018

Subject: Review comments on the Curriculum Design at al-Farabi Kazakh National University

In November 2018, I have been asked by scientific staff from al-Farabi Kazakh National University to perform an end-evaluation on the curriculum for the "Aviation engineering and technologies" – new Bachelor degree program am happy to follow this request with the final evaluation report, given in this document.

The task of evaluation comprises the evaluation of the process of implementation as well as the contents provided by al-Farabi Kazakh National University

Basis of the evaluation are the provided and used documents. Furthermore, additional information exchange has taken place with staff from KazNU via E-mail and in phone calls.

The methods applied in the reviewed documents comprise an evaluation on consistency and completeness (internal evaluation). Furthermore, based on the reviewers experience with other curricula and education systems, an evaluation can be performed in comparing various aspects of the deliveries with education, typical in a European framework (external evaluation).

Main Conclusions

With new Curricula (including courses, modules and materials) target universities are able to propose projects in integration of education, science and manufacturing as a single innovation process ("basic sciences – applied R&D – training of innovation-oriented personnel – new or advanced product");

- Al-Farabi KazNU has necessary recourses (human, methodical, information) to support the curricula development.
- Courses for general education, general engineering are adequate and appropriate for the program.
- Al-Farabi KazNU demonstrated high support of their administrations and it also can assured future sustainability of the project.
- Products and services contribute to strengthen of the network of teachers and specialists.

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Unser Zeichen: KB

- The General Education and General Engineering objectives are fine.
- Focus on practical value and offers for industry/businesses participation in education process by offering a wider scope of engineering services in transport technology and cooperation agreements to ensure sustainability of the programme outcomes;
- The curricula stimulated transition process to the three-cycle engineering education
- Curriculum in high-technological fields based on current needs of international and national labour markets; it contributed to university-enterprise cooperation and responded directly to the needs of the national labor markets;
- New curricula meet needs and requirements specified for the major, it is in compliance with the best practices of the Bologna Process that can increase competitiveness of graduates at both national and international labour markets;
- Students and teachers of target universities received opportunity of becoming familiar with the practical parts;
- The developed program in the course of the research is universal and can be used for other scientific experiments

Summary of Recommendations

- Develop an Action Plan for further cooperation with integrated parts/sections on curricula development, dissemination and sharing of teaching materials;
- Consider the mechanism in order to involve national stakeholders into curricula references, discussing and piloting;
- Ensure evaluation of Curricula package in the end of an academic year with involvement of academic staff, administration and students/graduates
- Continue regular assessment of the new curricula and its compliance with national reforms in higher education;
- Focus on curricula update/accreditation at institutional and national levels.

The curriculum gives a good flow of studies. The developed program in the course of the research is universal and can be used for other scientific experiments

In general, despite these remarks, the presented curriculum was carried out at a high scientific and technical level using modern technical means and information sources.

with best regards,



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ЭКСПЕРТНОЕ ЗАКЛЮЧЕНИЕ К ОБРАЗОВАТЕЛЬНОЙ ПРОГРАММЕ ПО СПЕЦИАЛЬНОСТИ 5В071400 «АВИАЦИОННАЯ ТЕХНИКА И ТЕХНОЛОГИИ»

На основании проведенного анализа материалов паспорта образовательной программы «Авиационная техника и технологии» Казахского Национального университета им. Аль-Фараби хотелось бы отметить некоторые особенности подготовки авиационных специалистов в соответствии с правилами принятыми в международном авиационном сообществе. В соответствии с этими правилами при приеме на работу в организации гражданской авиации по техническому обслуживанию и ремонту авиационной техники главным условием является наличие у специалиста соответствующего сертификата отвечающего требованиям «Типовых правил подготовки авиационного персонала в Республике Казахстан» и утвержденных уполномоченным органом – Комитетом гражданской авиации, и которые отвечают требованиям Международной организации гражданской авиации (ИКАО).

Специалист может приступить к работе лишь при наличии у него вышеуказанного сертификата, при этом для получения данного сертификата не требуется высшее образование. Вместе с тем дальнейшее его продвижение по квалификационной лестнице требует как приобретение опыта работы так и уровня образования. Поэтому программы ведущих зарубежных авиационных ВУЗОВ часто предусматривают получение авиационными специалистами высшего образования, при этом специальные предметы предусмотренные сертификатами, даются в более углубленном варианте.

Предложенный паспорт программы предусматривает именно такую подготовку специалистов, способных без особых усилий сдавать специальные модули предусмотренные требованиями сертификатов и в дальнейшем позволяет ускоренно продвигаться по квалификационной лестнице.

Программа составлена в соответствии с требованиями Болонского процесса и включает в себя циклы общеобязательных, специальных и профессиональных модулей.

Программа предусматривает освоение 32 профессиональных модулей охватывающих весь перечень дисциплин необходимых для освоения при обучении по специальности 5в071400 «авиационная техника и технологии»,

которые являются общепринятыми в ведущих зарубежных авиационных Вузах.

В паспорте программы указано в разделе «компьютерные технологии», что целью обучения является умение проектировать электронные узлы, в т.ч. на базе микропроцессорных элементов, читать и понимать простые схемы типовой электронной аппаратуры на цифровой интегральной элементной базе; выбирать необходимые элементы по справочной информации в соответствии с условиями работы элементов в схеме, применять теоретические знания для решения задач, связанных с построением цифровых и микропроцессорных систем и приборов; применять знания, полученные по данному курсу на практике при построении, разработке и эксплуатации интегральных схем авиационной техники. Однако в базовых программных средствах обучения не указаны программные пакеты которые он должен освоить.

Эти же моменты упущены в основном учебном плане по специальности.

В разделе 4.2 Паспорта специальности указано что к видам профессиональной деятельности, к которым готовятся выпускники относятся:

- производственно-технологическая;
- эксплуатационно-техническая.

Мне кажется что выпускнике получивший высшее образование должен владеть навыками экспериментально исследовательской работы.

Учитывая интенсивное развитие информационных и телекоммуникационных технологий сегодня при изучении модуля «Прочность авиационных конструкций» в рамках учебного процесса должна быть предусмотрена связь с модулем «Техическое черчение и компьютерная графика» процесс математического моделирования, расчета и конструирования элементов авиационной техники.

Это же касается и модулей: «Конструкция летательных аппаратов, «Аэродинамика и динамика полета, «Констр авиадвигателей», «Основы электроники», «Винт и его системы управления», «Система управления авиационных двигателей»

Не смотря на наличие всех необходимых лабораторных и практических работ, желательно в дальнейшем установит более тестные контакты с эксплуатантами.

В целом данная образовательная программа включает в себя полный курс необходимых дисциплин. которые изучаются практически во всех авиационных учреждениях мира и дающих высшее образование. Данная программа значительно отличается от ранее используемых в Казахстане

подобных программ и существенным преимуществом данной программы, на мой взгляд, является успешная ее адаптация к Болонскому процессу.

Таким образом данная программа может быть использована при подготовке авиационных специалистов по данной специальности в высших учебных заведениях Республики Казахстан. Разработчиками данной образовательной программы были учтены особенности международной концепции обучения по этой специальности.

**Зав. Лабораторией
летательных аппаратов и глобального
геопозиционирования,
«Национального центра
космических исследований и
технологий»
к.ф.-м.н**



А.Поздняков



ЭКСПЕРТНОЕ ЗАКЛЮЧЕНИЕ
на разработанную образовательную программу «АВИАЦИОННАЯ ТЕХНИКА
И ТЕХНОЛОГИИ» на английском языке, разработанную в рамках заказа
МОН РК

Общая характеристика образовательной программы.

Производя оценку представленных к экспертизе следующих материалов, а именно:

- краткое описание образовательной программы,
- паспорт специальности,
- основной учебный план,
- список разработчиков образовательной программы;
- каталог элективных дисциплин;
- syllabus дисциплин,

следует заключить, что образовательная программа разработана в строгом соответствии типовому учебному плану специальности 5В071400 –«Авиационная техника и технологии».

Поскольку разработчиками образовательной программы являются ведущие ученые Республики Казахстан, представители работодателей по направлению специальности, профессора из зарубежных вузов, занимающих лидирующие позиции в рейтингах, можно говорить о том, что представленная к экспертизе образовательная программа удовлетворяет требованиям конкурентоспособности и актуальна для современного цифрового мира.

Программа разработана в соответствии с требованиями МОН РК об образовательных программах, а также вполне удовлетворяет запросам рынка труда на сегодняшний день, поскольку заявленные компетенции выпускника, описанные в паспорте специальности, удовлетворяют потребностям работодателей.

Детально изучив описательную часть дисциплин, можно заявить, что набор дисциплин образовательной программы актуален и за рубежом.

Набор дисциплин настоящей образовательной программы предусматривает модульное обучение, в состав которой вошли:

- Государственный обязательный модуль;
- Социально-коммуникативный модуль;
- Блок профессиональных модулей;
- Модули элективных курсов;
- Междисциплинарный модуль;
- Профессиональная практика (по видам практик).

Представленная к экспертизе образовательная программа «Авиационная техника и технологии» предусматривает обучение только на английском языке, что дает ей преимущество перед другими отечественными программами, будет способствовать привлечению иностранных студентов и профессоров.

Актуальность основного учебного плана.

Актуальность настоящей программы обоснована следующими факторами:

- английским языком обучения;
- направлением подготовки специалистов,
- востребованностью специалистов по направлению использования авиационной техники в мире.

Оценка значимости и практической ценности учебной программы.

Поскольку сферой профессиональной деятельности выпускника данной образовательной программы является – область науки и техники, которая включает совокупность технологий; средств; способов и методов производственной деятельности, направленной на обеспечение эксплуатации авиационной техники и технологий, можно заключить, что востребованность выпускников такой программы, тем более реализуемой на английском языке, крайне высока.

Предусмотрено, что выпускник бакалавриата авиационной техники и технологии могут выполнять следующие виды профессиональной деятельности:

- производственно-технологическая;
- сервисно-эксплуатационная;
- монтажно-наладочная;
- расчетно-проектная;
- экспериментально-исследовательская.

Предложения по совершенствованию программы с учетом требований квалификационных характеристик специалиста.

Следует отметить, что выпускник настоящей образовательной программы получит достаточно хорошую базу знаний по фундаментальным дисциплинам, однако, с моей точки зрения, к реализации образовательной программы рекомендуется привлекать специалистов-практиков из авиационной отрасли – крупные авиакомпании – для проведения практических занятий и семинаров.

Также рекомендуется уменьшить количество социальных дисциплин в пользу профилирующих.

Выводы: образовательная программа «Авиационная техника и технологии» соответствует Государственному общеобразовательному стандарту РК указанной специальности и может быть рекомендована к реализации на территории Республики Казахстан на английском языке.

Экспертизу провел:

Исполнительный директор
Ассоциации научных и
технологических организаций
Республики Казахстан



Иманғалиев Е.И.

**Экспертное заключение
к образовательной программе «5В071400-Авиационная техника и
технологии».**

Профессиональная образовательная программа «5В071400-Авиационная техника и технологии» направлена на решение задач последовательного повышения профессионального уровня, подготовку специалистов соответствующей квалификации.

Программа соответствует требованиям к образованности по основным циклам учебных дисциплин, содержит конкретные учебные планы специальности.

Рекомендую при использовании данной программы в учебном процессе внести следующие дополнения.

Предложения и рекомендации

№ и/и	Предложения и рекомендации эксперта	Обоснование предложений и рекомендаций
1	Теоретические основы авиационной техники	Дополнить содержание для освоения специальности и уровню квалификации
2	Основы электроники, механики и статистики	Дополнить содержание квалификации (<i>ожидаемые результаты при изучения</i>) для освоения специальности и уровню
3	Аэродинамика, устройство, приборы и системы самолета	Дополнить содержание модуля и изложить в редакции: -понимать о принципах полета летательных аппаратов и природе образования аэродинамических сил; - изучить основные законы аэродинамики
4	Материалы и производство авиационный техники	Пункт 3 : «в том числе композитных» необходимо изменить и изложить в редакции «на нанотехнологии». Пункты 6,7 дополнить с изменением содержанию модуля.
5	Международные отношения и авиационное законодательство	Чрезмерно большой по объему модуля
6	Безопасность системы и управление качеством	Дополнить содержание модуля
7	Компьютерная технология	Использовать дополнительные программ по проведению лабораторных работ
8	Конструкция летательных аппаратов и надежность авиационной техники	Содержание, формирующее модуль, необходимо дополнить: <i>Новое направление в подходе к проблеме обеспечения максимальной долговечности пассажирских самолетов связано с разработкой безопасно разрушающихся конструкций панелей, стенок, стыковых узлов, кронштейнов навески поверхностей укрепления и других ответственных деталей и т.д.</i>

**Экспертное заключение
к образовательной программе «5В071400-Авиационная техника и
технологии».**

Профессиональная образовательная программа «5В071400-Авиационная техника и технологии» направлена на решение задач последовательного повышения профессионального уровня, подготовку специалистов соответствующей квалификации.

Программа соответствует требованиям к образованности по основным циклам учебных дисциплин, содержит конкретные учебные планы специальности.

Рекомендую при использовании данной программы в учебном процессе внести следующие дополнения.

Предложения и рекомендации

№ и/и	Предложения и рекомендации эксперта	Обоснование предложений и рекомендаций
1	Теоретические основы авиационной техники	Содержание недостаточно для освоения специальности и уровню квалификации
2	Основы электроники, механики и статистики	Не соответствует содержанию специальности и уровню квалификации
3	Аэродинамика, устройство, приборы и системы самолета	Дополнить содержание модуля и изложить в редакции: -понимать о принципах полета летательных аппаратов и природе образования аэродинамических сил; - изучить основные законы аэродинамики
4	Материалы и производство авиационной техники	Пункт 3 : «в том числе композитных» необходимо изменить и изложить в редакции «на нанотехнологии». Пункты 6,7 не соответствуют содержанию модуля.
5	Международные отношения и авиационное законодательство	Чрезмерно большой по объему модуль и не соответствует содержанию специальности и уровню квалификации
6	Безопасность системы и управление качеством	Дополнить содержание модуля
7	Компьютерная технология	Отсутствуют программ по проведению лабораторных работ, использовать дополнительные программ
8	Конструкция летательных аппаратов и надежность авиационной техники	Содержание, формирующее модуль, необходимо дополнить: <i>Новое направление в подходе к проблеме обеспечения максимальной долговечности пассажирских самолетов связано с разработкой безопасно разрушающихся конструкций панелей, стенок, стыковых узлов, кронштейнов навески</i>

9	Техническое обслуживание, ремонт и эксплуатация ВС	Содержание модуля необходимо дополнить
10	Силовые установки летательных аппаратов и управления АД	Дополнить содержание модуля
11	2.3 Матрица формирования компетенций по модулям образовательной программы	отсутствует – модуль Материалы и производство авиационный техники

Эксперт - магистр технических наук,
директор Авиационного колледжа



И. Кошанова

		<i>поверхностей укрепления и других ответственных деталей и т.д.</i>
9	Техническое обслуживание, ремонт и эксплуатация ВС	Содержание модуля необходимо дополнить
10	Силовые установки летательных аппаратов и управления АД	Не соответствует содержанию специальности и уровню квалификации
11	2.3 Матрица формирования компетенций по модулям образовательной программы	отсутствует – модуль Материалы и производство авиационной техники

Эксперт - магистр технических наук,
директор Авиационного колледжа



Ш.Кошанова

ЭКСПЕРТНОЕ ЗАКЛЮЧЕНИЕ

К ОБРАЗОВАТЕЛЬНОЙ ПРОГРАММЕ ПО СПЕЦИАЛЬНОСТИ 5В071400

«АВИАЦИОННАЯ ТЕХНИКА И ТЕХНОЛОГИИ»

На основании проведенного анализа материалов паспорта специальности и образовательной программы «Авиационная техника и технологии» Академии Гражданской Авиации, мною отмечены следующие моменты рекомендации:

Представленный материал паспорта содержит вопросы, изучение которых предусмотрено современными требованиями с учетом передового европейского и мирового опыта в авиационной области. Данные материалы паспорта учтены особенности мирового концепции обучения. Профессиональные модули составляет основу профессиональной подготовки с учетом будущей специализации, модули содержат определенные часы по теоретическими и практическими, и лабораторным работам.

Содержание модулей в полной мере отражает необходимые требования к специалистам, которые будут готовиться по данной программе.

Вариативная часть образовательной программы дает возможность расширения и углубления подготовки будущих выпускников за счет формирования компетенций, обеспечивающих конкурентоспособность выпускника в соответствии с требованиями рынка труда. Данные модули обеспечивают углубленную подготовку в области авиации.

В ОП бакалавра объем теоретической подготовки, реализуемый за 4 года позволяет обеспечить уровень, соответствующий требованиям обучения, за счет введения компетентного подхода, использования активных образовательных технологий, привлечения работодателей к учебному процессу

Разработчиками основной образовательной программы по направлению подготовки специалистов на основе компетентной модели построена матрица распределения совокупности компетенций выпускника в образовательном процессе на весь период обучения по элементам учебного плана. Такой подход дает возможность для выделения поэтапных компетентных моделей обучающихся по завершении каждого этапа обучения, учебной дисциплины, модуля. Разработчиками заданы обязательные и продвинутые уровни сформированной результатов образования и компетенций студента, по этапам

освоения основной образовательной программы, по направлению подготовки выпускников.

В паспорте образовательной программы указаны виды профессиональной деятельности, к которым относятся выпускники, к производству и эксплуатантам.

Имея необходимое количество лабораторных и практических часов, желательно в дальнейшем установить более тесные контакты с лабораториями авиапредприятий, авиакомпаний, авиаремонтными заводами для проведения лабораторных работ и практических занятий по специальным дисциплинам.

Таким образом, данная образовательная программа включает полный курс необходимых дисциплин, которое изучается во всех авиационных образовательных центрах в мире. Представленная образовательная программа содержит вопросы, изучение которых предусмотрено современными требованиями и с учетом передового мирового опыта в данной области.

Заместитель гендиректора по ИАС
АО «Авиакомпания Samal Air»



Есиркепов Б.Е.

ЭКСПЕРТНОЕ ЗАКЛЮЧЕНИЕ

К ОБРАЗОВАТЕЛЬНОМУ ПРОГРАММУ ПО СПЕЦИАЛЬНОСТИ 5В071400 «АВИАЦИОННАЯ ТЕХНИКА И ТЕХНОЛОГИИ»

На основании проведенного анализа материалов паспорта специальности и образовательной программы «Авиационная техника и технологии» Казахского национального университета имени аль-Фараби мною отмечено следующие моменты рекомендации:

Представленный материал паспорта содержит вопросы, изучение которых предусмотрено современными требованиями с учетом передового европейского и мирового опыта в авиационной области. Данные материалы паспорта учтены особенности мирового концепции обучения. Профессиональные модули составляет основу профессиональной подготовки с учетом будущей специализации, модули содержат определенные часы по теоретическими и практическими, и лабораторным работам.

Содержание модулей в полной мере отражает необходимые к специалистам, которые будут готовится по данной программе.

Вариативная часть образовательной программы дает возможность расширения и углубления подготовки будущих выпускников за счет формирования компетенций, обеспечивающих конкурентоспособность выпускника в соответствии с требованиями рынка труда. Данные модули обеспечивают углубленную подготовку в области авиации.

В ОП бакалавра объем теоретической подготовки, реализуемый за 4 года позволяет обеспечить уровень, соответствующий требованиям обучения, за счет введения компетентного подхода, использования активных образовательных технологий, привлечения работодателей к учебному процессу

Разработчиками основной образовательной программы по направлению подготовки специалистов на основе компетентности модели построена

матрица распределения совокупности компетенций выпускника в образовательном процессе на весь период обучения по элементам учебного плана. Такой подход дает возможность для выделения поэтапных компетентностных моделей обучающихся по завершении каждого этапа обучения, учебной дисциплины, модуля. Разработчиками заданы обязательные и продвинутое уровни сформированной результатов образования и компетенций студента по этапам освоения основной образовательной программы по направлению подготовки выпускников.

В основу программы положена модульная система с расчетом часовой нагрузки на каждый модуль. Все они имеют свою специфику, углубляют и расширяют знания в своей области. В данных модульных программах циклы социально-экономических, общепрофессиональных и специальных дисциплин интегрированы в модули и разбиты на квалификации, которые интегрируются между собой в рамках вида профессиональной деятельности.

Модули носят последовательный, интегрированный и междисциплинарный характер. Совокупность отдельных модулей направлена на получение определенной квалификации. Для каждой последующей квалификации необходимо освоить модули предыдущих квалификации. В них прослеживается логическая последовательность и системность в преподавании дисциплин.

Содержание каждого модуля описано в виде результатов обучения, которые четко отражают компетенцию. Изучаемые дисциплины прослеживаются в данных результатах, что означает переход от процесса обучения к результату обучения.

В связи с присутствием в паспорте образования модульных дисциплин по управлению технологическими процессами и технологии производства авиапредприятия, рекомендуется сотрудничества с эксплуатантами.

Разработчикам следовало представить словарь терминов и сокращения, используемых в паспорте образовательной программы.

Перечень рекомендованного учебного оборудования, учебной литературы и пособий соответствуют современным достижениям в области техники и технологии в гражданской авиации.

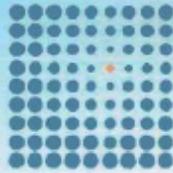
В целом образовательная программа «Авиационная техника и технологии» можно рекомендовать для обеспечения подготовки авиационных специалистов. Разработчиками данной образовательной программы были учтены особенности международной концепции обучения.

Начальник линейной станции

а/к SCAT

A handwritten signature in black ink is written over a circular stamp. The stamp contains the text "SCAT" at the top, "000665" in the center, and "SCAT" at the bottom. The signature is a stylized, cursive script.

И. Вертьянов



АЛМАТЫЭНЕРГОСЕРВИС

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Исх.№ 586
от 30.11.2018г.

**Экспертное заключение
на образовательную программу «Авиационная техника и технологии»,
разработанной в рамках специальности бакалавриата 5B071400
–«Авиационная техника и технологии» разработчиками
Казахского национального университета имени аль-Фараби**

Общая характеристика образовательной программы.

Образовательная программа «Авиационная техника и технологии» разработана для учащихся бакалавриата высших учебных заведений Республики Казахстан и предполагает изучение в течении 4-х лет. Инициатором к разработке новой образовательной программы выступило Министерство образования и науки РК. В число разработчиков программы вошли сотрудники Казахского национального университета имени аль-Фараби.

Образовательная программа разработана в целях реализации принципов Болонского процесса и современных стандартов качества, намеченных задач Посланием Президента РК «100 конкретных шагов» для реализации долгосрочной Стратегии "Казахстан - 2030", предполагающей поэтапный переход на трехязычное обучение в государственной системе образования. Соответствует программа и текущим поручениям поставленных Президентом Республики Казахстан в Послании «Третья модернизация Казахстана: глобальная конкурентоспособность», а именно четвертому приоритету - улучшение качества человеческого капитала, целью которого является достижение общенационального прогресса путем внедрения английского языка, и его овладения, во всех отраслях экономики, повышения конкурентоспособности национальных образовательных программ и академической мобильности учащихся.

Программа полностью соответствует Государственному общеобразовательному стандарту специальности 5B071400 – «Авиационная техника и технологии» и предусматривает внедрение инновационных технологий в образовательный процесс, посредством включения в программу дисциплин, в том числе и IT-сферы, изучение которых приводит к инновационным компетенциям выпускника, востребованным на отечественном, транснациональном и международном рынке труда.

В учебный план программы вошли следующие модули:

- ✓ Социально-коммуникативный модуль;
- ✓ Инструментальный модуль;
- ✓ Культурно-коммуникативный модуль;

- ✓ Профессиональный казахский и иностранный язык;
- ✓ Физико-математический модуль;
- ✓ Теоретические основы авиационной техники;
- ✓ Основы электроники, механики и статистики;
- ✓ Аэродинамика, устройство, приборы и системы самолета;
- ✓ Международные отношения и авиационное законодательство;
- ✓ Безопасность системы и управление качеством;
- ✓ Компьютерная технология;
- ✓ Конструкция ЛА и надежность авиационной техники;
- ✓ Техническое обслуживание, ремонт и эксплуатация ВС;
- ✓ Силовые установки летательных аппаратов и управления АД.

Цель образовательной программы: осуществить профессиональную подготовку высококвалифицированных кадров, заключивших в себе конкурентоспособные компетенции, адаптированные к современным требованиям отечественного, транснационального и международного рынка труда в области авиационной техники и технологии, авиационной безопасности непрерывное развитие, которых идет параллельно развитию всех отраслей экономики страны.

Основные задачи учебной программы: формирование у выпускника программы развитых способностей критического мышления, навыков самостоятельного оригинального применения полученных знаний для решения системных, процессных и оперативных задач в своей профессиональной деятельности, а именно при технической эксплуатации систем летательных аппаратов и двигателей, анализе работ систем летательных аппаратов, технико-экономическом анализе технической эксплуатации и ремонта систем летательных аппаратов, экономичном и безопасном обслуживании систем летательных аппаратов и двигателей, и в обрабатывающей промышленности, развитие которой поменяло структуру и придало новое качество традиционным отраслям экономики.

1. Актуальность основного учебного плана.

Государственная политика в области качества высшего образования, выделяя приоритеты развития до 2030 г., указывает на повышение качества технического образования во всех отраслях высшего профессионального образования, вследствие которого будет достигнуто улучшение качества человеческого капитала. Техническое образование в области авиационной индустрии является важнейшей компонентой в системе фундаментальной подготовки современного высококвалифицированного специалиста. Важными направлениями совершенствования уровня образования, указанных в образовательной программе 5В071400 – «Авиационная техника и технологии» являются усиление блока модулей профессиональной направленности и индивидуализация учебного процесса. В настоящее время отмечается расширение профессиональной деятельности будущих специалистов, что, несомненно, требует введения новых курсов в систему обучения, что является целью

разработки данной образовательной программы. В целях реализации государственной программы «Цифровой Казахстан», наличие в учебном плане модулей по изучению программных комплексов инженерной и компьютерной графики, консолидации баз данных, методов и средств защиты информации, имитации сетей симуляционных программ, по решению задач технологических процессов обеспечения авиационной безопасности, сборки, ремонта и технического сопровождения авиационной техники является важным условием становления новых инновационных индустрий и способствует форсированию адаптации выпускников под новые реалии отечественного, транснационального и международного рынка труда.

В данном контексте разработка настоящей программы является актуальной задачей для нашей страны.

2. Новизна учебной программы.

Представленная для экспертизы учебная программа «Авиационная техника и технологии», в рамках специальности бакалавриата 5B071400 – «Авиационная техника и технологии» является новой в смысле разработки новых компонентов состоящих не только из основных технических блоков, но и из блоков законодательных межгосударственных норм в области авиационной техники и технологии, безопасности, также норм по соответствию международным стандартам ISO. Требования национального рынка труда к специалисту данной области включает наличие знания в области международных нормативно-правовых актов, таких как: Чикагской конвенции о международной гражданской авиации, требований EASA, ICAO, JAR и другое. В современном мире английский язык является языком новых технологий, новых производств, новой экономики и 90% информации создается на английском языке. Таким образом, данная учебная программа, включающая ее изучение на трёхязычных модулях, сопряженные с практическим их применением, представляет собой центральное звено новой модели образования, которое дает импульс развитию современной системы профессиональной подготовки и будет способствовать получению выпускниками программы актуальных на сегодняшний день компетенций.

3. Оценка значимости и практической ценности учебной программы.

Значимость учебной программы определена потребностью казахстанской экономики в отечественных высококвалифицированных специалистах по направлению «Авиационная техника и технологии». Программа основана на сокращение разрыва в качестве образования между выпускниками с зарубежным и отечественным образованием. Таким образом, в практике этот критерий можно применить при привлечении иностранного специалиста с условием¹ его обучения выпускников данной программы, которые уже будут иметь соответствующую необходимую базу теоретических знаний, практические навыки, инновационный

¹ Приказ Министра здравоохранения и социального развития РК от 27.06.2016г. №559 «Правила и условия выдачи и (или) продления разрешений работодателям на привлечение иностранной рабочей силы, а также осуществление внутрикорпоративного перевода». <https://egov.kz/cms/ru/law/list/N1600014170>

компетенций и отсутствие языкового барьера. Это позволит воспитать (вырастить) отечественных высококвалифицированных специалистов их числа обучающихся по данной программе во время их прохождения производственных, технологических и преддипломных практик на базе отечественных и транснациональных компании.

4. Предложения по совершенствованию программы с учетом требований квалификационных характеристик специалиста.

Производя экспертизу образовательной программы, необходимо отметить, что выбор дисциплин произведен достаточно рационально и целесообразно, однако остается открытым вопрос о дефиците квалифицированных педагогов из состава доцентов и профессоров с профессиональным знанием английского языка. В связи с чем, образовывается необходимость в их стажировке за рубежом для качественной организации ведения занятий по дисциплинам учебного плана. Также для наглядной демонстрации последних научно-исследовательских достижений (программные продукты, лаборатории и пр.) применяемых в авиационной индустрии при возможности, необходимо рассмотреть вопрос сотрудничества в области совместной подготовки специалистов с международно-признанными организациями, такими как ФГУП "Центрально-аэрогидродинамический институт им. профессора Н.Е.Жуковского", РФ, г. Жуковский.

5. Оценка образовательной программы.

При разработке образовательной программы учитывались пререквизиты специальности, а также предусмотрено логическое продолжение изучения постреквизитов. Данный подход позволит подготовить отечественных высококвалифицированных специалистов при полном прохождении образовательной программы.

6. Выводы: образовательная программа «Авиационная техника и технологии», по специальности бакалавриата 5В071400 –«Авиационная техника и технологии» соответствует требованиям современного рынка труда, предъявляемым к квалификации выпускника.

Экспертизу провел:

Заместитель
генерального директора
ООО «Алматыэнергосервис»



Сыргалиева А.А.

М.П.

ЭКСПЕРТНОЕ ЗАКЛЮЧЕНИЕ
К ОБРАЗОВАТЕЛЬНОЙ ПРОГРАММЕ ПО СПЕЦИАЛЬНОСТИ
5В071400 «АВИАЦИОННАЯ ТЕХНИКА И ТЕХНОЛОГИИ»

Просмотрев паспорт специальности и образовательную программу «Авиационная техника и технологии» Академии Гражданской Авиации (далее – АГА) мною отмечены следующие моменты и рекомендации:

В целом образовательная программа подготовлена хорошо и учитывает международные и национальные требования к подготовке авиационных специалистов в области технического обслуживания и ремонта (далее – ТОиР) авиационной техники (далее – АТ), а также требования к уровню образования «Бакалавр» - представлены дисциплины как общеобразовательного и общегуманитарного цикла, так и профессионально-направленные технические (инженерные) дисциплины.

1. Для обеспечения международного принципа мобильности и соответствия Болонскому процессу необходимо указывать также объем дисциплин в международных кредитных пунктах.

2. С точки зрения правильности авиационной терминологии, необходимо заменить термин «винт» на термин «пропеллер».

3. Изучение теории вероятности, надежности и статистики необходимо изучать в курсах высшей математики или вынести отдельной дисциплиной, например, «Теория надежности авиационных систем».

4. Для обеспечения конкурентно способности выпускников АГА с точки зрения трудоустройства в организациях гражданской авиации по ТОиР АТ или Part-145 требуется наличие у них не только диплома об образовании, но также и сертификата (лицензии) от уполномоченного органа гражданской авиации.

Авиационный специалист — это специально обученный высококлассный специалист, на плечи которого ложится высокая ответственность по поддержанию самолетов и вертолетов в хорошем техническом состоянии. Этот человек должен следить за всеми мелкими неисправностями и поломками, возникающими во время полета и на земле, и уметь оперативно и качественно исправлять их. Именно авиационный техник несет ответственность за безопасность всех людей, находящихся на борту воздушного судна. Разумеется, для выполнения такой серьезной и важной работы подобный человек должен быть самым лучшим в своем деле.

Для этого при внедрении такой специальности в образовательный процесс настоятельно рекомендую обеспечить следующее:

1. Сертифицировать (одобрить) данный курс подготовки технических специалистов в Комитете гражданской авиации МИР РК или EASA (Европейское агентство по авиационной безопасности) – Part-147 (Британская модель);

2. Обеспечить возможностью прохождения курсов первоначальной подготовки, включающей теоретические и практические элементы в виде

модулей предусмотренным EASA Part-66 для соответствующей категории лицензии с дальнейшим получением лицензии авиационного специалиста;

3. Обеспечить студентов возможностью прохождения профессиональной практики в организациях по ТОиР АТ имеющих соответствующие сертификаты – Part-145.

4. Современный авиационный специалист должен быть соответствующим образом подготовлен в быстро области развивающихся информационно-коммуникационных технологий, в частности, уметь пользоваться современным техническим программным обеспечением такими как: Amos, MatLab, Compass, Solidworks и самое главное знать технический английский язык.

Помимо специальных требований к уровню образования, им также применяется и целый спектр требований к состоянию их здоровья. Условия работы авиатехника не всегда комфортны, так как очень часто ремонт и обслуживание авиатехники происходят не в ангаре, а прямо на летном поле (перроне). Именно поэтому авиатехник должен быть физически выносливым, способным к длительной концентрации внимания, предельно аккуратным и обладать фантастической исполнительностью и чувством ответственности, ведь в авиации цена даже самой незначительной ошибки может быть очень и очень высока.

В целом, принимая во внимание вышесказанное, можно рекомендовать образовательную программу для обеспечения подготовки авиационных специалистов в области авиационной техники и технологий.

Представленная образовательная программа содержит вопросы, изучение которых предусмотрено современными требованиями с учетом передового европейского и мирового опыта в данной области, требований работодателей, предъявляемых к квалифицированным рабочим кадрам. Разработчиками данной образовательной программы были учтены особенности международной концепции обучения.

*Директор
Центра по подготовке
технических специалистов (г.Алматы)*

Олжас Алтанбеков

*Деятельность Авиационного учебного центра
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CONCLUSION OF REMC

Выписка из протокола № 4
заседания учебно-методического объединения
Республиканского учебно-методического совета
высшего и послевузовского образования
на базе Академии гражданской авиации (далее УМО РУМС)
от 20 ноября 2018 г.

ПРИСУТСТВОВАЛИ: Председателя УМО РУМС на базе Академии ГА Беришев Ш.Т., Зам.председателя Алтаева Гульмира Орынбаевна – руководитель УУВР; проректор по НИД Карипбаев С.Ж., Начальник ОР Изтилеуов М.К., декан механико-математического факультета КазНУ им. аль-Фараби, доктор PhD, доцент Жакебаев Д.Б., координатор ОП «Авиационная техника и технологии» к.ф.м.н., доцент Ракишева З.Б., ученый секретарь УМО РУМС Тельбаева Г.М., разработчики образовательной программы «Авиационная техника и технологии».

СЛУШАЛИ:

- **Председателя УМО РУМС на базе Академии ГА Беришев Ш.Т.:** В 2018 г. в соответствии с договором № 183 от 14.05.2018 года КазНУ им. аль-Фараби было поручено разработать 10 образовательных программ на английском языке (далее ОП), в их числе ОП «Авиационная техника и технологии». Слово предоставляется декану механико-математического факультета КазНУ им. аль-Фараби, доктору PhD, доценту Жакебаеву Д.Б.

- **Жакебаев Д.Б.:** ОП «Авиационная техника и технологии» была разработана в рамках выполнения пункта 133 Плана мероприятий по реализации Государственной программы развития образования и науки Республики Казахстан на 2016-2019 годы, в соответствии с Законом Республики Казахстан «Об образовании» от 27 июля 2007 года № 319-III, нормативно-правовыми актами МОН РК, с технической спецификацией по разработке образовательных программ на английском языке. В период разработки программ в МОН РК было отправлено 2 промежуточных отчета и дrafта ОП – 1 июля 2018 г., 1 октября 2018 г. Все дисциплины и модули ОП были согласованы с ведущими отечественными и зарубежными учеными и экспертами, а также работодателями.

Слово предоставляется координатору ОП «Авиационная техника и технологии» к.ф.м.н., доценту Ракишевой З.Б.

- **Ракишева З.Б.:** В полном соответствии с требованиями технической спецификации для разработки ОП «Авиационная техника и технологии» были привлечены ведущие отечественные и зарубежные специалисты, владеющие английским языком и опытом работы в сфере высшего образования: Жакебаев Д.Б., Ракишева З.Б., Карипбаев С.Ж., Изтилеуов М.К., Алдамжаров К.Б., Костюченко В.М., Анаятова Р.К. и др. Киреев М.Э. – Ph.D. Training center Part-FCL; Medvedev A. - Professor, Doctor's Degree, Head of Aviation Transport Department, Transport and telecommunication institute, Riga, Latvia; Anatoly Streltsov – PhD, Candidate of Mathematical and Physical

Sciences, Professor of Engineering Physics, Department of Physical Sciences, Embry-Riddle Aeronautical University, Daytona Beach, Florida, USA; Hyochoong Bang – PhD, Professor, Vice-Dean of College of Engineering, Director of high Speed Vehicle Research Center, Department of Aerospace Engineering, Korean Advanced Institute of Science and Technology, Daejeon, Korea; Dmitriy Ostroverkhov – Dipl. Eng., MSc, Head of Unit, Technische Universität Berlin. Представители работодателей: Поздняков А.В. - к.ф.-м.н., заведующий лабораторией, АО «Национальный центр космических исследований и технологий», Алматы; Сыргалиева А.А. - заместитель генерального директора ТОО «Алматыэнергосервис»; Имангалиев Е.И. – к.ф.-м.н., представитель Национальной палаты предпринимателей Республики Казахстан «Атамекен»; Кошанова Ш.К. – директор Авиационного колледжа при Академии гражданской авиации.

- **Беришев Ш.Т.:** ОП «Авиационная техника и технологии» разработана в соответствии с требованиями технической спецификации, структура и содержание ОП согласованы с работодателями, сроки выполнения работ соблюдены. Предлагаю одобрить ОП на английском языке «Авиационная техника и технологии». Прошу коллег высказать свое мнение. Принято единогласно.

ПОСТАНОВИЛИ:

Одобрить образовательную программу на английском языке «Авиационная техника и технологии»

**Председателя УМО РУМС
на базе Академии гражданской авиации,
и.о. ректора**



Ш.Беришев

Ученый секретарь УМО РУМС

Г.Тельбаева