**AL-FARABI KAZAKH NATIONAL UNIVERSITY**

**Faculty of Mechanics and Mathematics**

**Department of Mechanics**

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| **RECOMMENDED**  Dean of the faculty  \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_Bektemesov M.А.  Protocol № \_\_ of meeting of the Scientific advice of faculty «\_\_\_\_\_\_»\_\_\_\_\_\_\_\_\_\_\_\_\_2016 |  | CONFIRMED Vice Rector for Academic Affairs\_\_\_\_\_\_\_\_\_\_\_\_\_ Hykmetov А.К. Protocol №\_\_\_of meeting of the Scientifically-methodical advice  «\_\_\_\_\_\_\_»\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_2016 |

# Educational and professional program

On specialty 6D060300 - Mechanics

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| Coordinator |  | Turalyna D.E. |
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| Head of the department |  | Rakysheva Z.B. |
| Protocol №\_\_\_of meeting  departments from " \_\_\_"\_\_\_\_\_\_\_2016 | | |
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| Chairman of methodological office of faculty |  | Gusmanova F.R. |
| Protocol №\_\_\_of meeting  methodological office  from " \_\_\_"\_\_\_\_\_\_\_2016 | | |

Almaty, 2016 г.

**Passport of educational and professional program**

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| **Specialty** | 6D060300 – PhD |
| **Level of the International Standard Classification of Education (ISCE 2011)** | 8 – PhD |
| **Purpose of program** | Preparation of scientific experts of the highest qualification in the field of mechanics, competitive both on the domestic and the world labor market  - having fundamental scientific training,  - able to organize and conduct research activities on the topic of a dissertation corresponding to one of the topical problems of mechanics, containing scientific novelty and practical significance, based on modern achievements of science and technology;  - owning modern methods of scientific research; modern information technologies, including methods for obtaining, processing and storing scientific information;  - possessing a high level of English language skills, professional communication skills, speaking skills and public speaking at international scientific forums, conferences and seminars. |
| **Professional activity** | The sphere of professional activity is the field of education, science and technology:  - higher educational institutions;  - research institutes;  - research and development centers;  - public service. |
| **Types of economic activity in CCEA, in which this profession is in demand** | 51.22.0 Space transportation system  61.3 Satellite telecommunications system  61.30 Activity in the field of satellite telecommunications  62.01 Activity in the field of computer programming  62.01.1 Software development  71.2 Technical testing and analysis  71.12 Activity in the field of engineering researches and provision of technical consultations in this field  72 Research and development  72.1 Scientific research and experimental development in the field of natural sciences and engineering  72.19 Other research and development in natural science and engineering  85.42.0 Higher education |

**Competencies of a specialist** (GC – general-cultural competences, PC – professional competences)

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| **Competence code** | **Competence description** |
| GC-1 | knowledge of the basic concepts, principles, theoretical foundations and flow analytical methods in micro- and nano-channels; the ability to explain the nature of the phenomena occurring during the flow in micro- and nano-channels; To determine the flow regimes in micro- and nano-channels; Ability to analyze research results. |
| PC-1 | - knowledge of mathematical foundations of creation of satellite attitude control systems; ability to use modern methods of creation of satellite attitude control systems; possession of skills of creation of mathematical models of satellite attitude control systems; skills of numerical calculations for synthesis of control systems |
| PC-2 | - knowledge of modern high-performance methods of modeling and the sampling circuit with high precision;  - the ability to study methods for accuracy and convergence, apply methods of high accuracy for the study of the problem of fluid mechanics; possession of programming techniques of methods of high accuracy order and realization of parallel computations |
| PC-3 | - the ability to design mechatronic systems; modeling of mechatronic motion modules, create modern control systems for mechatronic systems. |
| PC-4 | - knowledge of the basic packages of programs of analytical calculations;  - the ability to solve complex problems of mechanics and conduct research using these packages.  - possess the skills of using analytical software packages to solve problems of mechanics. |
| PC-5 | - knowledge of the basic concepts, terms and definitions, the subject and object of research, methods of studying chemical processes.  - the ability to apply the acquired knowledge in the study of physical and chemical processes; possession of theoretical foundations and methods for studying chemical processes occurring during adsorption, combustion, and so on. |
| PC-6 | - the ability to use the computer-aided design system INVENTOR, a computer system for modeling and research of robots and machines ADAMS, a computer system for modeling and controlling robots EASY5. |
| PC-7 | - knowledge of modern methods of theoretical and celestial mechanics;  - the ability to apply modern mathematical methods in solving problems of celestial mechanics of bodies with variable masses, visualize the results of analysis of the dynamics of gravitating systems;  - possession of the principles of theoretical and celestial mechanics accepted in the study of non-stationary gravitating systems. |
| PC-8 | - knowledge of theoretical foundations and models of heat and mass transfer processes; The ability to compose models and conduct research on heat and mass transfer tasks, including in the software package Comsol,  possession of methods of solving problems of heat and mass transfer, and software Comsol Multiphysics |
| PC-9 | - the ability to create kinematic models and their use to create robot control; dynamic models and their use to create robot control; systems of continuous and discrete control of robots; systems of adaptive and intelligent control of robots. |
| PC-10 | - knowledge - how to effectively use space imagery in the implementation of projects on environmental research and for making optimal decisions; The ability to automate existing data processing algorithms, create custom algorithms and perform complex data processing; possession of the skills of quickly processing large amounts of data, conducting deep analysis of space images and creating 3D-images. |
| PC-11 | - knowledge of theoretical foundations and compilation of models of complex physical processes in the COMSOL Multiphysics software; the ability to conduct research in the COMSOL software package using existing Comsol modules and creating custom modules; possession of methods for studying complex physical processes in COMSOL Multiphysics |
| PC-12 | - ability to write down the equations of kinematics, motion dynamics of mobile robots; - possession of methods of programming and the solution of the equations of kinematics, motion dynamics of mobile robots in the Matlab and Lego Maindstorms systems; methods possession of creation of control programs of mobile robots during the solution of navigation and localization problems. |

**Correlation of the expected learning outcomes of the program with forms of study and assessment tools in the formation of competence**

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| **Speciality code and the name of competence** | **Expected results (competence components)** | **Modules, practices** |
| GC-1 | * to know the basic concepts, principles, theoretical foundations and flow analytical methods in micro- and nano-channels; * to be able to explain the nature of the phenomena occurring during the flow in micro- and nano-channels; * to be able to determine the flow regimes in micro- and nano-channels; * to possess the ability to analyze research results. | **Compulsory module** |
| PC-1 | * to know mathematical foundations of creation of satellite attitude control systems; * ability to use modern methods of creation of satellite attitude control systems; * possess skills of creation of mathematical models of satellite attitude control systems; skills of numerical calculations for synthesis of control systems. | **Elective module 1** |
| PC-2 | - to know modern high-performance methods of modeling and the sampling circuit with high precision;  - to be able to study methods for accuracy and convergence, apply methods of high accuracy for the study of the problem of fluid mechanics;  - to possess programming techniques of methods of high accuracy order and realization of parallel computations |
| PC-3 | - to be able to design mechatronic systems; modeling of mechatronic motion modules, create modern control systems for mechatronic systems |
| PC-4 | - to know the basic packages of programs of analytical calculations;  - to be able to solve complex problems of mechanics and conduct research using these packages.  - to possess the skills of using analytical software packages to solve problems of mechanics. | **Elective module 2** |
| PC-5 | - to know the basic concepts, terms and definitions, the subject and object of research, methods of studying chemical processes.  - to be able to apply the acquired knowledge in the study of physical and chemical processes; possession of theoretical foundations and methods for studying chemical processes occurring during adsorption, combustion, and so on. |
| PC-6 | - to be able to use the computer-aided design system INVENTOR, a computer system for modeling and research of robots and machines ADAMS, a computer system for modeling and controlling robots EASY5 |
| PC-7 | - to know modern methods of theoretical and celestial mechanics;  - to be able to apply modern mathematical methods in solving problems of celestial mechanics of bodies with variable masses, visualize the results of analysis of the dynamics of gravitating systems;  - to possess the principles of theoretical and celestial mechanics accepted in the study of non-stationary gravitating systems | **Elective module 3** |
| PC-8 | - to know the theoretical foundations and models of heat and mass transfer processes;  - to be able to compose models and conduct research on heat and mass transfer tasks, including in the software package Comsol,  - to possess methods of solving problems of heat and mass transfer, and software Comsol Multiphysics |
| PC-9 | - to be able to create kinematic models and their use to create robot control; dynamic models and their use to create robot control; systems of continuous and discrete control of robots; systems of adaptive and intelligent control of robots. |
| PC-10 | - to know - how to effectively use space imagery in the implementation of projects on environmental research and for making optimal decisions;  - to be able to automate existing data processing algorithms, create custom algorithms and perform complex data processing;  - to possess the skills of quickly processing large amounts of data, conducting deep analysis of space images and creating 3D-images | **Elective module 4** |
| PC-11 | - to know theoretical foundations and compilation of models of complex physical processes in the COMSOL Multiphysics software;  - to be able to conduct research in the COMSOL software package using existing Comsol modules and creating custom modules;  - to possess the methods for studying complex physical processes in COMSOL Multiphysics |
| PC-12 | - to be able to write down the equations of kinematics, motion dynamics of mobile robots;  - to possess the methods of programming and the solution of the equations of kinematics, motion dynamics of mobile robots in the Matlab and Lego Maindstorms systems; methods possession of creation of control programs of mobile robots during the solution of navigation and localization problems |

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| **Modules, practices** | **Expected results** | **Disciplines** | **Types of occupations** | **Technologies and methods of formation** | **Controlling and estimating means** |
| **Compulsory module** | * knowledge of the basic concepts, principles, theoretical foundations and flow analytical methods in micro- and nano-channels; * the ability to explain the nature of the phenomena occurring during the flow in micro- and nano-channels; to determine the flow regimes in micro- and nano-channels; * ability to analyze research results. | NM 7201  Nanomechanics | Lectures, seminars | Educational technologies and methods | Exam |
| **Specialization disciplines**  **Elective module 1** | * - knowledge of mathematical foundations of creation of satellite attitude control systems; * ability to use modern methods of creation of satellite attitude control systems; * possession of skills of creation of mathematical models of satellite attitude control systems; skills of numerical calculations for synthesis of control systems. | UOKA 7301  The spacecraft attitude control | Lectures, seminars | Educational technologies and methods | Exam |
| - knowledge of modern high-performance methods of modeling and the sampling circuit with high precision;  - the ability to study methods for accuracy and convergence, apply methods of high accuracy for the study of the problem of fluid mechanics;  -possession of programming techniques of methods of high accuracy order and realization of parallel computations. | ChMG 7301  Numerical Methods in Fluid Dynamics | Lectures, laboratory classes |  |  |
| - the ability to design mechatronic systems; modeling of mechatronic motion modules,  - to be able to create modern control systems for mechatronic systems | MUMS 7301  Modeling and control of mechatronic systems | Lectures, seminars |  |  |
| **Specialization disciplines**  **Elective module 2** | - knowledge of the basic packages of programs of analytical calculations;  - the ability to solve complex problems of mechanics and conduct research using these packages.  - possess the skills of using analytical software packages to solve problems of mechanics. | OSSVM 7302  Fundamentals of Symbolic Computations «Mathematica» | Lectures, seminars | Educational technologies and methods | Exam |
| - knowledge of the basic concepts, terms and definitions, the subject and object of research, methods of studying chemical processes.  - the ability to apply the acquired knowledge in the study of physical and chemical processes; possession of theoretical foundations and methods for studying chemical processes occurring during adsorption, combustion, and so on. | OKh 7302  General chemistry |
| - the ability to use the computer-aided design system INVENTOR, a computer system for modeling and research of robots and machines ADAMS, a computer system for modeling and controlling robots EASY5. | SMPR 7302  Modern methods of designing robots |
| **Specialization disciplines**  **Elective module 3** | - knowledge of modern methods of theoretical and celestial mechanics;  - the ability to apply modern mathematical methods in solving problems of celestial mechanics of bodies with variable masses, visualize the results of analysis of the dynamics of gravitating systems;  - possession of the principles of theoretical and celestial mechanics accepted in the study of non-stationary gravitating systems | MMTNM 7303 Mathematical Methods of Theoretical and Celestial Mechanics | Lectures, seminars | Educational technologies and methods | Exam |
| - to know the theoretical foundations and models of heat and mass transfer processes;  - to be able to compose models and conduct research on heat and mass transfer tasks, including in the software package Comsol,  - to possess methods of solving problems of heat and mass transfer, and software Comsol Multiphysics | MMZTM 7303 Methods of Heat and Mass Transfer problems modeling | Lectures, seminars, laboratory classes |
| - - the ability to create kinematic models and their use to create robot control; dynamic models and their use to create robot control; systems of continuous and discrete control of robots; systems of adaptive and intelligent control of robots. | URRS 7303  Management of robots and robotic systems | Lectures, seminars |
| **Specialization disciplines**  **Elective module 4** | - knowledge - how to effectively use space imagery in the implementation of projects on environmental research and for making optimal decisions;  - The ability to automate existing data processing algorithms, create custom algorithms and perform complex data processing;  - possession of the skills of quickly processing large amounts of data, conducting deep analysis of space images and creating 3D-images | OSDPPPE 7304 Satellite data processing using the software ENVI | Lectures, seminars |  |  |
| - knowledge of theoretical foundations and compilation of models of complex physical processes in the COMSOL Multiphysics software;  - the ability to conduct research in the COMSOL software package using existing Comsol modules and creating custom modules;  - possession of methods for studying complex physical processes in COMSOL Multiphysics | MSPhPCM 7304 Simulation of complex physical processes in COMSOL Multiphysics | Lectures, seminars, laboratory classes | Educational technologies and methods | Exam |
| - ability to write down the equations of kinematics, motion dynamics of mobile robots;  - possession of methods of programming and the solution of the equations of kinematics, motion dynamics of mobile robots in the Matlab and Lego Maindstorms systems;  - methods possession of creation of control programs of mobile robots during the solution of navigation and localization problems. | PMR 7304  Design of mobile robots | Lectures, seminars |  |  |
| Профессиональные практики | - preparation of PhD students for scientific and pedagogical activities in a higher educational institution;  - acquisition and consolidation of the skills of practical activities for the implementation of the teaching and educational process in higher education (teaching of special disciplines, the organization of training activities of students, scientific and methodical work on the subject); | PP Pedagogical Practice | Practices | Educational technologies and methods | Defense of practices report |
| - Ability to work with empirical base of a research according to the chosen subject of dissertation (drawing up the program and plan of a research, statement and the formulation of tasks, determination of an object and object of research, the choice of a methodological basis of a research, studying of methods of collecting and the analysis of data);  - study of reference-bibliographic systems, methods of information search; Acquisition of skills of work with bibliographic directories, compilation of scientific and bibliographic lists, use of bibliographic description in scientific works, work with domestic and foreign electronic databases;  - conduction scientific and experimental research related to the topic of the dissertation, processing, analysis and generalization of the obtained data | IP Research practice | Practices | Educational technologies and methods | Defense of practices report |
| Research work of PhD student | The organizational and methodological support of the scientific work of PhD students includes the *scientific seminar of the department*; Planning, reporting and monitoring of research; Scientific and technical reports; Organization of the use of research results in the learning process; Participation in competitions of scientific works; participation in exhibitions; Discussion of the results of scientific research work of PhD students on the topic of the dissertation. | Scientific seminar I-II | Discussion | Report, presentation, discussion | Defense of research report |
| Discussion of the results of scientific and research works of PhD students on the topic of the dissertation. | Scientific seminar III-IV | Discussion | Report, presentation, discussion | Defense of research report |
| Discussion of the results of scientific and research works of PhD students on the topic of the dissertation. | Scientific seminar V-VI | Discussion | Report, presentation, discussion | Defense of research report |
| Preparation of abstracts, reports and presentations on the results of scientific research; Speaking at conferences. | Publications in the proceedings of international conferences | Discussion | Report, presentation, discussion | Publication in the conference proceedings |
| Collecting, the analysis of information and materials of scientific-theoretical and scientific and practical character for writing of the dissertation in the specialty on the basis of library stock and other resources of other higher education institutions and the countries | Scientific internship |  |  |  |
| **EXECUTION of Dissertation** | Generalization of the results of an independent scientific research by a PhD student on the topic of the dissertation | Execution of dissertation |  |  |  |
|  | The results of the PhD dissertation submitted for defense will be published in at least 7 (seven) scientific publications, including at least 3 (three) in scientific publications recommended by the Committee, at least 1 (one) in an international publication that has information of company of Thomson Reuters (ISIWebofKnowledge, ThomsonReuters) has a non-zero impact factor or is included in the Scopus database, 3 (three) in the materials of international conferences, including 1 (one) in the materials of foreign conferences | Publications in periodicals recommended by CCSES or included in Thomson Reuters, Scopus |  |  |  |
| **Final Attestation** | Not later than 3 months before protection of the PhD dissertation the complex exam is taken | Complex exam |  |  | Exam |
|  | Registration and presentation of the dissertation for the defense performed in accordance with the requirements of the "Rules for awarding academic degrees" approved by the order of the Minister of Education and Science of the Republic of Kazakhstan.  Adoption of the dissertation on the basis of defense. | Registration and presentation of the dissertation |  | Report, presentation, discussion | PhD dissertationdefense |

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| **6D060300 – Механика**  мамандығы бойынша | **ОСНОВНОЙ УЧЕБНЫЙ ПЛАН**  ДЛЯ СПЕЦИАЛЬНОСТИ | **CORE CURRICULUM**  FOR THE SPECIALTY |
| **НЕГІЗГІ ОҚУ ЖОСПАРЫ** | **6D060300 – Механика** | **6D060300 – Mechanics** |
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| **Білім беру компоненті / Образовательный компонент / Taught Component** | | | | | | | | |
| 1. **БАЗАЛЫҚ ПӘНДЕР/БАЗОВЫЕ ДИСЦИПЛИНЫ/FUNDAMENTAL DISCIPLINES** | | | | | | | | |
| **Модуль коды**  **Код модуля**  **Module Code** | **Пәндер мен жұмыстырдың түрлері**  **Наименование дисциплин и видов деятельности**  **Disciplines and activities** | **Кред.саны**  **Кол.кред.**  **Credits** | **семестрлер/семестры/semesters** | | | | | |
| **Лек+пр+лаб /Лек+пр+лаб/L+P+Lb** | | | | | |
| **I** | **II** | **III** | **IV** | **V** | **VI** |
| * 1. **міндетті модуль / Обязательный модуль / Compulsory Module** | | | | | | | | |
| NM 7201 | Наномеханика | ***3*** | 1+2+0 |  |  |  |  |  |
| Наномеханика |
| Nanomechanics |
| **2.ПРОФИЛЬДІК ПӘНДЕР / ПРОФИЛИРУЮЩИЕ ДИСЦИПЛИНЫ / SPECIALIZATION DISCIPLINES 12 credits** | | | | | | | | |
| **Элективтік модуль 1/ Элективный модуль 1/Elective module 1** | |  | | | | | | |
| UOKA 7301 | Ғарыш аппатаратының бағдарын басқару | 3 | 2+1+0 |  |  |  |  |  |
| Управление ориентацией космического аппарата |
| The spacecraft attitude control |
| ChMG 7301 | Гидродинамикадағы сандық әдістер | 2+0+1 |  |  |  |  |  |
| Численные методы в гидродинамике |
| Numerical Methods in Fluid Dynamics |
| MUMS 7301 | Мехатронды жүйелерді модельдеу және бақылау | 1+2+0 |  |  |  |  |  |
| Моделирование и управление мехатронными системами |
| Modeling and control of mechatronic systems |
| **Элективтік модуль 2 / Элективный модуль 2/Elective module 2** | |  | | | | | | |
| OSSVM 7302 | «Mathematica» есептеу нышандарының негіздер | 3 |  | 2+1+0 |  |  |  |  |
| Основы системы символьных вычислении «Mathematica» |
| Fundamentals of Symbolic Computations «Mathematica» |
| OKh 7302 | Жалпы химия |  | 2+1+0 |  |  |  |  |
| Общая химия |
| General chemistry |
| SMPR 7302 | Роботтарды жобалаудың қазіргі заманғы әдістері |  | 1+2+0 |  |  |  |  |
| Современные методы проектирования роботов |
| Modern methods of designing robots |
| **Элективтік модуль 3 / Элективный модуль 3/Elective module 3** | |  | | | | | | |  |  |  |  |
| MMTNM 7303 | Теориялық және аспан механикасының математикалық әдістері | 3 |  | 2+1+0 |  |  |  |  |
| Математические методы теоретической и небесной механики |
| Mathematical Methods of Theoretical and Celestial Mechanics |
| MMZTM 7303 | Жылу және масса алмасу есептерін модельдеу әдістері |  | 1+1+1 |  |  |  |  |
| Методы моделирования задач тепло и массообмена |
| Methods of Heat and Mass Transfer problems modeling |
| URRS 7303 | Роботтарды және роботты техникалық жүйелерді басқару |  | 1+2+0 |  |  |  |  |
| Управление роботами и робототехническими системами |
| Management of robots and robotic systems |
| **Элективтік модуль 4 / Элективный модуль 4/Elective module 4** | |  | | | | | | |  |  |  |  |
| OSDPPPE 7304 | ENVI бағдарламалық пакетімен серіктік мәліметтерді өңдеу | 3 |  |  | 1+2+0 |  |  |  |
| Обработка спутниковых данных с помощью пакета программ ENVI |
| Satellite data processing using the software ENVI |
| MSPhPCM 7304 | COMSOL Multiphysics-те күрделі физикалық процестерді модельдеу |  |  | 1+1+1 |  |  |  |
| Моделирование сложных физических процессов в COMSOL Multiphysics |
| Simulation of complex physical processes in COMSOL Multiphysics |
| PMR 7304 | Мобильді роботтарды жобалау |  |  | 1+2+0 |  |  |  |
| Проектирование мобильных роботов |
| Design of mobile robots |

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| **Окудың қосымша түрлері / Дополнительные виды обучения / Additional Types of Training** | | | | | | | | | | | | | | | | |
| **3. Кәсіби тәжірибе / Профессиональные практики / Professional Practice**  (5 кредит/5 кредитов/5 credits) | | | | | | | | | | | | | | | | |
| PT/PP/PP | Педагогикалық тәжірибе / Педагогическая практика/ Pedagogical Practice | | | **3** | | |  |  | | 3 | |  | |  | |  |
| ZT/IP/RP | Зерттеу тәжірибесі / Исследовательская практика / Research practice | | | **2** | | |  |  | |  | | 2 | |  | |  |
| **4.1. Докторанттың ғылыми-зерттеу жұмысы (20 кредит) /**  **Научно-исследовательская работа докторанта (20 кредитов) //**  **Doctoral Student's Research Work (20 credits)** | | | | | | | | | | | | | | | | |
| Ғылыми семинар I-II/Научный семинар I-II/Research Seminar I-II | | | **2** | | 1 | 1 | | |  | |  | |  | |  | |
| Ғылыми семинар III-IV/Научный семинар III-IV/Research Seminar III-IV | | | **3** | |  |  | | | 1 | | 2 | |  | |  | |
| Ғылыми семинар V-VI/Научный семинар V-VI/Research Seminar V-VI | | | **3** | |  |  | | |  | |  | | 1 | | 2 | |
| Халықаралық конференциялар материалдарындағы жарияланымдар/ Публикации в материалах международных конференций/ Publication in the Proceedings of International Conferences | | | **4** | |  | 1 | | |  | | 1 | |  | | 2 | |
| Ғылыми тағылымдама/Научная стажировка/ Scientific Internship | | | **8** | |  |  | | |  | |  | | 4 | | 4 | |
| **4.2.диссертацияны орындау(30 кредит)/выполнение диссертации(30 кредитов)/**  **EXECUTION of Dissertation (30 сredits)** | | | | | | | | | | | | | | | | |
| Dиссертацияны орындау/Выполнение диссертации **/**Execution of dissertation | | **20** | | | 3 | 3 | | | 4 | | 4 | | 3 | | 3 | |
| Thomson Reuters, Scopus базасына енетін немесе ККСОН ұсынатын мерзімді баспасөздердегі жарияланымдар/ Публикации в периодических изданиях, рекомендуемых ККСОН или входящих в базы Thomson Reuters, Scopus/ Publications in Journals recommended by CCSES or Included in Thomson Reuters, Scopus Databases | | **10** | | |  | 2 | | |  | | 2 | | 2 | | 4 | |
| **ИТОГО** | | **50** | | | **10** | **13** | | | **11** | | **11** | | **10** | | **15** | |
| **5. Қорытынды аттестаттау / Итоговая аттестация / Final Attestation (5 кредитов / 5 кредитов / 5 credits)** | | | | | | | | | | | | | | | | |
| Кешенді емтихан / Комлексный экзамен / Complex Examination | | **1** | | |  |  | | |  | |  | |  | | 1 | |
| Диссертацияны рәсімдеу және қорғау /Оформление и защита диссертации / Preparation and Defence of the dissertation | | **4** | | |  |  | | |  | |  | |  | | 4 | |
| **БАРЛЫҒЫ / ИТОГО / TOTAL** | | **75** | | | **75** | | | | | | | | | | | |

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| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| |  |  | | --- | --- | | Механика-математика факультеттің Ғылыми Кеңесініңмәжілісінде \_\_\_\_\_\_ 2016ж. №\_\_\_\_\_\_ хаттамамен бекітілген | | | Утверждено на заседании Ученого Совета механико-математического факультета Протокол №\_\_\_\_\_ от \_\_\_\_\_\_\_\_\_\_\_\_\_ 2016г. | | | | Approved at the meeting of the Academic Council of the Faculty of Mechanics and Mathematics Minutes №\_\_\_\_\_ of \_\_\_\_\_\_\_\_\_\_\_\_\_\_ 2016. | | | Факультет деканы/Декан факультета/Dean of Faculty \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ М.А. Бектемесов |  | | Кафедра меңгерушісі/Зав. кафедрой /Head of Department \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ З.Б. Ракишева |  | | AMД директоры /Директор ДАВ / Director of the AAD \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ Т.М.Мухитдинова |  |     Разработчик: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ А. Калтаев | |
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