**КАЗАХСКИЙ НАЦИОНАЛЬНЫЙ УНИВЕРСИТЕТ ИМ. АЛЬ-ФАРАБИ**

**Механико-математический факультет**

**Кафедра дифференциальных уравнений и теории управления**

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|  | Утверждаю Декан факультета:  \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_Жакебаев Д.Б.  «\_\_\_\_»\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_2018 |

# УЧЕБНО-МЕТОДИЧЕСКИЙ КОМПЛЕКС ДИСЦИПЛИНЫ

### MPMVSh5205 «Методика преподавания математики высшей школы»

**Специальность: «6M060100 – Математика»**

**Образовательная программа: Проектирование и разработка ПО**

**Курс – 1**

**Семестр – 1**

**Кол-во кредитов – 3**

**Форма обучения дневная**

**Алматы 2018 г.**

Учебно-методический комплекс дисциплины составил д.ф.м.н профессор кафедры Серовайский С.Я.

На основании рабочего учебного плана по специальности «6M060100 – Математика».

Рассмотрен и рекомендован на заседании кафедры Дифференциальных уравнений и теории управления

от «\_\_\_ » \_\_\_\_\_\_\_\_\_\_\_\_\_\_ 2018 г., протокол №\_\_\_

Заведующий кафедрой \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ Х. Хомпыш

### Рекомендовано методическим бюро факультета

«\_\_\_\_» \_\_\_\_\_\_\_\_\_\_\_ 2018 г., протокол №\_\_\_

Председатель методбюро факультета \_\_\_\_\_\_\_\_\_\_­­­­­ Кушербаева У.Р.

**AL-FARABI KAZAKH NATIONAL UNIVERSITY**

**Faculty of Mechanics and Mathematics**

**Department of Fundamental Mathematics**

**Educational program in the specialty «5M060100-Mathematics».**

**SYLLABUS**

**Teaching method of mathematics for high school**

**Fall semester, 2018-2019**

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| **Discipline’s code** | **Discipline’s title** | **Type** | **No. of hours per week** | | | | **Number of credits** | | ECTS |
| **Lect.** | **Pract.** | | **Lab.** |
|  | Teaching method of mathematics for high school |  | 2 | 1 | |  | 3 | |  |
| **Prerequisites** | Mathematical analysis, algebra, mathematical logic | | | | | | | | |
| **Lecturer** | S. Serovajsky | | | | **Office hours** | | | Scheduled | |
| **e-mail** | [serovajskys@mail.ru](mailto:serovajskys@mail.ru) | | | |
| **phone** | +7 701 8315197 | | | | **Auditory** | | | room 4 | |

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| **Description of the discipline** | The logical construction of mathematics |
| **Course Objective** | The main purpose of the course is to familiarize students with the fundamental concepts of mathematics as a unified science. |
| **Learning Outcomes** | By the end the course, students should be able to:   * To know the applications basis of mathematics; * To know the general mathematical directions; * To know the general classes of mathematical objects; * To know the principle of the unification of mathematics; * To know the logical structure of mathematics |

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| **Literature and Information resources** | 1. Серовайский С.Я. Архитектура математики. – Алматы, Print-S, 2005. 2. Букур И., Деляну А. Введение в теорию категорий и функторов. – М., Наука, 1972. 3. Бурбаки Н. Алгебра. Алгебраические структуры. Линейная и полилинейная алгебры. – М., Наука, 1962. 4. Бурбаки Н. Общая топология. Основные структуры. – М., Наука, 1968. 5. Бурбаки Н. Очерки по истории математики. – М., ИЛ, 1962. 6. Вейль Г. Математическое мышление. – М., Мысль, 1984. 7. Гелбаум Б., Олмстед Дж. Контрпримеры в анализе. – М., Наука, 1967. 8. Общая алгебра. Под ред. Л.А.Скорнякова. Том 1. – М., Наука, 1990; Том 2. – М., Наука, 1990. | |
| **Organization of the course** | This course is an introductory course, where a general acquaintance with a large volume of theoretical and practical material is given. In the preparation for the discipline, an essential role is given to the textbook and the collection of problems. Sufficient attention is also paid to the actual solution of problems.  Two sets of homework assignments (in the form of a set of tasks) will give you the opportunity to fully in-depth acquaintance with the practical application of theoretical material. | |
| **Course Requirements** | You must present your assignments in written form before the deadline announced by teacher. The mark is given only after passing of the SIS in a form of quiz. Homework should be done in a thin notebook. Problems with solutions must be numbered and ordered. It is important that you show the work in an organized manner clearly showing the final answer with appropriate units. Final answers should be highlighted. Students may collaborate solving homework on the condition that each student actively works on solving of each problem and is able to give clear explanation for the solution of any problem.  For consultations on the implementation of homework, as well as additional information on the studied material, and all other questions, please contact the course instructor during his office hours.  Students with disabilities may receive advice on e-mail: [serovajskys@mail.ru](mailto:serovajskys@mail.ru) |
| **Evaluation system** | Criteria-based evaluation: assessment of learning outcomes in correlation with descriptors (verification of formation of competences on attestation controls and examinations).  Summative assessment: evaluation of attendance and activity in the classroom; evaluation of assignments and Student’s Individual Studies (SIS1, SIS2).  These types of evaluation are given in the table below:   |  |  | | --- | --- | | Types of work | % | | Attendance | 11% | | Active participation in the class work | 10% | | Homework (SIS-1, SIS-2) | 9% | | Control works (Quiz-1,2; Test-1,2) | 30% | | Exams | 40% | | TOTAL | 100% |   Your final grade is calculated by the formula:  Total = 0.6\*(At1+At2)\2+0.1\*MidTermExam+0.3\*FinalExam    The final grade will be calculated according to the evaluation system accepted in University:  95% - 100%: А 90% - 94%: А-  85% - 89%: В+ 80% - 84%: В 75% - 79%: В-  70% - 74%: С+ 65% - 69%: С 60% - 64%: С-  55% - 59%: D+ 50% - 54%: D- 0% -49%: F |
| **Policy of Discipline** | Cellular phones must be silenced during lecture or seminar. Regular and punctual attendance at all scheduled classes is expected. Attendance will be taken regularly. Students should consult with the instructor when an unavoidable absence due to an emergency or illness occurs. Deadlines of homework or control works can be prolonged in the case of circumstances such as illness, emergency, unforeseen events, etc. in accordance with the University's academic policy.  In order to maintain an excellent working environment, students are expected to be respectful and courteous to each other. Formulate your objections in correct manner. Plagiarism and other forms of cheating are not allowed. Any cheating is unacceptable during tests, quizzes and exams. Student convicted of falsifying any information of the course will receive a final grade «F». |

**STRUCTURE AND CONTENT OF DISCIPLINE**

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| **Week** | **Topics** | **Hours** | **Max point** |
| 1 | Lecture 1. Introduction. Language. Alphabet. Syntax. Semantics | 2 | 0 |
|  | Practical work 1. Language. Examples | 1 | 3 |
|  | Homework 1. Language. Examples |  | 10 |
| 2 | Lecture 2. Sets. Sets. Subsets. Sets product. Correspondences. | 2 | 1 |
|  | Practical work 2. Sets. Examples | 1 | 3 |
|  | Homework 2. Sets. Examples |  | 10 |
| 3 | Lecture 3. Sets. Relations. Operators. Equivalence | 2 | 2 |
|  | Practical work 3. Relations and operators. Examples | 1 | 3 |
|  | Homework 3. Relations and operators. Examples |  | 10 |
| 4 | Lecture 4. Numbers. Cardinal numbers. Solutions | 2 | 1 |
|  | Practical work 4. Natural, integer and rational numbers. Examples | 1 | 3 |
|  | Homework 4. Natural, integer and rational numbers. Examples |  | 10 |
| 5 | Lecture 5. Numbers. Cuts. Vectors | 2 | 2 |
|  | Practical work 5. Real and complex numbers. Examples | 1 | 3 |
|  | Homework 5. Real and complex numbers. Examples |  | 10 |
| 6 | Lecture 6. Ordered objects. Different ordered sets | 2 | 1 |
|  | Practical work 6. Ordered sets. Examples | 1 | 3 |
|  | Homework 6. Ordered sets. Examples |  | 10 |
| 7 | Lecture 7. Algebraic objects. Groupoids. Rings | 2 | 2 |
|  | Practical work 7. Groupoids. Examples | 1 | 3 |
|  | Homework 7. Groupoids. Examples |  | 10 |
|  |  |  |  |
|  | Border control 1 |  | 100 |
| 8 | Lecture 8. Algebraic objects. Linear spaces. Abstract algebras | 2 | 1 |
|  | Practical work 8. Linear spaces. Examples | 1 | 3 |
|  | Homework 8. Linear spaces. Examples |  | 8 |
| 9 | Lecture 9. Topological objects. Topological spaces | 2 | 2 |
|  | Practical work 9. Topological spaces. Examples | 1 | 3 |
|  | Homework 9. Topological spaces. Examples | 0 | 8 |
| 10 | Lecture 10. Topological objects. Metric spaces | 2 | 1 |
|  | Practical work 10. Metric spaces. Examples | 1 | 3 |
|  | Homework 10. Metric spaces. Examples |  | 8 |
| 11 | Lecture 11. Measurable objects. Measures | 2 | 2 |
|  | Practical work 11. Measures. Examples | 1 | 3 |
|  | Homework 11. Measures. Examples |  | 8 |
| 12 | Lecture 12. Measurable objects. Integrals | 2 | 1 |
|  | Practical work 12. Integrals. Examples | 1 | 3 |
|  | Homework 12. Integrals. Examples |  | 8 |
| 13 | Lecture 13. Composite objects. Topological groups. Linear topological spaces. Linear normalized spaces | 2 | 2 |
|  | Practical work 13. Topological groups. Examples | 1 | 3 |
|  | Homework 13. Topological groups. Examples |  | 8 |
| 14 | Lecture 14. Synthesis. Structures | 2 | 1 |
|  | Practical work 14. Structures. Examples | 1 | 3 |
|  | Homework 14. Structures. Examples |  | 8 |
| 15 | Lecture 15. Synthesis. Categories | 2 | 2 |
|  | Practical work 15. Categories. Examples | 1 | 3 |
|  | Homework 15. Categories. Examples |  | 8 |
|  |  |  |  |
|  | Border control 2 |  | 100 |

Dean of the Faculty

Chairman of the Faculty Methodical Bureau

Head of the Department

Lecturer: