APPROVED

at the meeting of the Academic Council

of the Faculty

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Dean of the Faculty of Chemistry

and Chemical Technology

\_\_\_\_\_\_\_\_\_Ongarbaev E.K.

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| AL-FARABI KAZAKH NATIONAL UNIVERSITY  Faculty of Chemistry and Chemical Technology Department of Chemistry and Technology of  Organic Substances, Natural Compounds and Polymers  **EDUCATIONAL-METHODICAL COMPLEX OF DISCIPLINE**  **BH 3419 – “Bioorganic Chemistry”**  Specialty 5B072100 - Chemical technology of organic substances  **Sillabus**  Semester – 2 (spring)  **2017-2018 yy.** | | | | | | | | | | | | |
| Code of the discipline | | The name of discipline | Type | No. of hours per week | | | | Number of credits | | | ECTS | |
| Lecture |  | |  |
| BH 3419 | | **Bioorganic chemistry** | OK | 1,5 | 0 | | 3 | 4,5 | | | 7,5 | |
| Lecturer | | **Kipchakbayeva A.K., PhD** | | | | Office Hours | | | According to the  timetable | | | |
| **e-mail** | | aliya\_k85@mail.ru | | | |
| Phone (mob.) | | 87027558564 | | | | Office Room | | | 525 | | | |
| Assistant | | Gadetskaya Anastassiya, Ph.D. | | | | Office Room | | | According to the timetable | | | |
| e-mail | | [avg01.08@mail.ru](mailto:avg01.08@mail.ru) | | | |  | | | |
| Phone (mob.) | | 87017470048 | | | |  | | | 525 | | | |
| Academic presentation of the course | | **The purpose of the discipline** is to form a systematic knowledge of the relationship between the structure and chemical properties of biologically important classes of organic compounds, biopolymers and their structural components as a basis for understanding and understanding the essence of life processes at the molecular level. As a result of studying the discipline, the student will be able to:   * describe the structure and chemical synthesis of biologically active substances; * to determine the relationship between the structure of biopolymers and their biological effect; * apply chemical transformations, chemical modification of biologically active substances to penetrate their behavior into the body; * Identify the biological active substance underlying the processes of vital activity; * to determine the structure, structure and properties of the most important bi-organic compounds, their components, methodological aspects of synthesis and structural analysis; * apply the methodology of information theory when assessing the composition of biologically active substances of any plant, the block scheme of processing plant material; * synthesize the information of bioorganic sources on the basis of theoretical and experimental data for their active use in their research work; * to evaluate modern methods for studying biologically active compounds, theoretical information on groups of compounds, including their definitions, classification, physical and chemical properties, methods for identifying qualitative and quantitative determinations; * to determine the patterns of chemical behavior at the molecular and cellular levels of biologically important molecules in correlation with their structure. | | | | | | | | | | |
| Prerequisites and Postrequisites | | Chemical Technology of Organic Substances Chemistry, Chemical Technology organic substances    Chemistry and technology natural product, Biochemistry, Plant Chemistry, Chemical technology of dosage forms | | | | | | | | | | |
| Literature | | **literature:**   1. Жусупова Г.Е. Биоорганическая химия. Учебное пособие. Часть Алматы, 2009. 2. L.G. Wade, Organic Chemistry. - 8th edition. 2011. 3. Fromm, Herbert J., Hargrove, Mark Essentials of Biochemistry, 2012th edition. 4. Тюкавкина Н.А. Бииорганическая химия. 2012г 5. S.E. Zhurabyan. Fundamentals Bioorganic chemistry. 2012 | | | | | | | | | | |
| Academic policy of the course in the context of university moral and ethical values | | **Rules of academic behavior**: Obligatory presence in the classroom, inadmissibility of late arrivals. Absence and delay in classes without prior warning teacher are estimated at 0 points. Mandatory compliance with the deadlines for completion and delivery of tasks (on CDS, RK,control, laboratory, etc.), examinations. If the deadline for delivery is breached the executed task is evaluated taking into account deduction of penalty points. **Academic values**: Academic honesty and integrity: independence of performance of all assignments; the inadmissibility of plagiarism, forgery, the use of cheat sheets, at all stages of the control of knowledge, deceit of the teacher and disrespectful attitude towards him. (Code of Honor of a student of KazNU named after al-Farabi) Students with disabilities may receive consulting assistance by e-mail: Aliya.Kypchakbaeva@kaznu.kz | | | | | | | | | | |
| Evaluation and appraisal policy | | **Criterial evaluation**: evaluation of learning outcomes in relation to descriptors (checking the formation of competences on the boundary control andexaminations). **Summative assessment**: assessment of the presence and activity of work in the classroom; estimation of the fulfilled laboratory task, the CDS The formula for calculating the final grade. | | | | | | | | | | |
| Calendar for the implementation of the training course content | | | | | | | | | | | | |
| Week/  date | Topic title (lecture, practical classes, ISW) | | | | | | | | | No. of  hours | | Maximum  Score |
| 1 | Lecture 1. Introduction. Bioorganic chemistry and the Unity of Life. | | | | | | | | | 1 | |  |
| Laboratory 1. Laboratory Safety. | | | | | | | | | 4 | |  |
| **2-3** | Lecture 2-3. Biopolymers and their structural components. Amino acids, structure, properties. | | | | | | | | | 2 | |  |
| Laboratory 2-3. Preparation of acetyl salicylic acid. . Preparation of acetyl salicylic acid. Continued. | | | | | | | | | 4 | |  |
| ISWT: Submission of the task 1  (Nomenclature of main biomolecules) | | | | | | | | |  | | 6 |
| **4-5** | Lecture 4-5. Carbohydrates and their classification. Determine the carbohydrates, quantitative and qualitative analysis. | | | | | | | | | 2 | |  |
| Laboratory 4-5. Extraction of a known mixture. Extraction of a known mixture. Continued. | | | | | | | | | 8 | |  |
| ISWT: Submission of the task 2  (Difference in use of detergents based on) | | | | | | | | |  | | 6 |
| 6,7,8 | Lecture 6-7-8. Polyphenol compound and their classification. Flavonoids | | | | | | | | | 3 | |  |
|  | Laboratory 6,7,8 Extraction of an unknown mixture. Extraction of an unknown mixture. Continued. | | | | | | | | | 12 | | 6 |
|  | ISWT: Submission of the task 3 (Functional groups in biological molecules) | | | | | | | | |  | | 3 |
|  | (Short Exam 1) | | | | | | | | |  | | 21 |
|  | **Midterm Exam** | | | | | | | | |  | | 100 |
| **9-10** | Lecture 9-10. Vitamins and Lipids | | | | | | | | | 2 | |  |
|  | Laboratory 9,10. Synthesis of acetanilide. | | | | | | | | | 8 | |  |
| **11-12** | Lecture 11-12. Essential oil. Terpenes: monoterpenes and sesquiterpenes | | | | | | | | | 2 | |  |
|  | Laboratory 11-12. Recrystallization of acetanilide. | | | | | | | | | 8 | |  |
|  | ISWT: Submission of the task 5  (Molecular diseases) | | | | | | | | |  | | 6 |
| **13** | Lecture 13. Alkaloids and their classification | | | | | | | | | 1 | |  |
|  | Laboratory 13. The synthesis of soap. | | | | | | | | | 4 | |  |
|  | ISWT: Submission of the task 6  (Cell structure and organization) | | | | | | | | |  | | 6 |
| **14** | Lecture 14. Saponins. Structure. Qualitative reaction. Biological activity. | | | | | | | | | 1 | |  |
|  | Laboratory 14. Essential oils of plants. | | | | | | | | | 4 | |  |
|  | ISWT: Submission of the task 7  (Protein Sequencing) | | | | | | | | |  | | 6 |
| **15** | Lecture 15. Determination of cardiac glycosides. Classification. | | | | | | | | | 1 | |  |
|  | ISWT: Submission of the task 7  (Cell structure and organization) | | | | | | | | |  | | 3 |
|  | Коллоквиум | | | | | | | | |  | | 21 |
|  | Short Exam 2 | | | | | | | | |  | | 100 |
|  | **Exam** | | | | | | | | |  | | 100 |

Lecturer Kipchakbayeva A.K.

Head of the Department Mun G.A.

Chairman of the Methodical Bureau of the Faculty Kumaragliyeva S.SH  
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