**Al FARABI KAZAKH NATIONAL UNIVERSITY**

**Faculty of chemistry and chemical technology**

**Department of chemistry and technology of organic compounds, natural substances and polymers**

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| **Coordinated**At the meeting of the Academic council of facultyThe protocol No. 1 from "26" \_\_ 08 \_\_ 2016.Dean of faculty \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ Ongarbayev E. K. | ApprovedAt the meeting of Scientific and methodical  Council of universityThe protocol No. 1 of 27.08.2016.By provost for study\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ Hikmetov A. K. August "27", 2016. |

**EDUCATIONAL AND METHODICAL COMPLEX OF DISCIPLINE**

**Organization and planning of scientific research**

**Specialty *"6M011200 Chemistry""6M070800 Oil and gas engineering",***

***"6M072000 CTIS", "6M072100 CTOS", "6M073400 Chemical technology of explosives and pyrotechnic facilities"***

**Full-time** form of education

**Almaty, 2016**

EMC of discipline is made by professor of department of chemistry and technology of organic substances, natural compounds and polymers, д.х.н. G. A. Mun on the basis of the standard curriculum and the catalog of elective disciplines of specialities "6M070800 Oil and gas engineering", "6M072000 CTIS", "6M072100 CTOS", "6M073400 Chemical technology of explosives and pyrotechnic facilities"

 Its considered and recommended at a faculty meeting of chemistry and technology of organic substances, natural compounds and polymers

June "23", 2016, protocol No. 43

Department chair \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ prof. G. A. Mun

Its recommended by methodical council (bureau) of faculty

June "25", 2016, protocol No. 12

Chairman \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ [Candidate of chemical sciences](http://www.multitran.ru/c/m.exe?t=4820719_1_2&s1=%EA%E0%ED%E4%E8%E4%E0%F2%20%F5%E8%EC%E8%F7%E5%F1%EA%E8%F5%20%ED%E0%F3%EA) Rakhmetullayeva R. K.

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| **Al-Farabi Kazakh National University****Syllabus****OPNI 5206 – "Organization and planning of scientific research"** **Autumn semester of 2016-2017** |
| **Code of discipline** | **Title of discipline** | **Type** | **Number of hours per week** | **Credits** | **ECTS** |
| **Lec** | **Sem** | **Lab** |
| **OPNI 5206** | Organization and planning of scientific research | ОК | 2 | 1 | 0 | 3 | 4,5 |
| **Prerequisites** | Inorganic chemistry, analytical chemistry, engineering chemistry, organic chemistry, physical chemistry, chemistry and physics of polymers, colloid chemistry, elective disciplines according to a specialization profile. |
| **Lecturer** | Mun G.A. PhD Chem., prof. | **Work.hours** | By schedule |
| **e-mail** | Grygoryy.Mun@kaznu.kz |
| **Phone numbers** | 8(727)3773331 вн.15-22 | **Auditorium**  | By schedule |
| **Discipline description** | Studying of a current trend of development of the organizations, schedulings and financings of scientific research, preparation of publications and receiving grants of various national and international funds, works with the international informational databases, experience of commercialization of scientific developments. |
| **Aims of the course** | To give the undergraduates the sum of knowledge of system of the organization, scheduling and financing of scientific research, preparation of publications and receiving grants of various national and international funds, work with the international informational databases, by experience of commercialization of scientific developments.  |
| **Studying results** | As a result of studying this course listeners have to know:1. Bases of scientific and engineering methods;2. Specifics of the organization of scientific research in the field of fundamental and applied sciences in the CIS countries and foreign countries;3. System of financial support of scientific research (international and national scientific grants, funds, programs, and so forth);4. System of certification of scientific shots of the top skills;5. System of licensing;6 International databases and systems of searching of scientific articles and other scientific and technical information;7. Ways of commercialization of scientific results. 8. Principles and regularities of the organization and carrying out scientific research, conferences, seminars, round tables; 9. Rules, ways and recommendations about writing, reviewing and submission of scientific articles for publication in magazines;10. Recommendations about preparation and submission of oral, bench and other scientific reports;11. Ethics of carrying out scientific research;12. Rules and recommendations about work in science team.Have to seize:1. Skills to look for the new problems and questions demanding obtaining new knowledge;2. To make a scientific hypothesis and to offer the experimental ways of its check;3. To use the leading international databases and systems of searching of scientific articles and other scientific and technical information;4. To organize and conduct a literary research (review), to systematize and prioritize collected information;5. To organize and make a scientific experiment, to process the received results;6. To prepare and submit the oral and bench scientific report to other scientists or society;7. To prepare the scientific project (grant) and to present it to interested persons;8 To use knowledge in the field of the organization and carrying out scientific research for realization of an art. |
| **Literature and references** | *Requirement literature:** + - 1. Hofmann A. Scientific writing and communication: Papers, Proposals, and Presentations, Oxford University Press, 2009, ISBN 01953-90059
			2. Carter M. Designing Science Presentations: A Visual Guide to Figures, Papers, Slides, Posters, and More, Academic Press, 2013, ISBN 01238-59697
			3. Carey S.S. A Beginner's Guide to Scientific Method. – Wadsworth Publishing, 2003. – 160 p.
			4. Gauch H.G. Scientific Method in Practice. - Cambridge University Press, 2002. - 456 p.
			5. Reardon D. Doing your undergraduate project. Sage Publications, 2006, ISBN 978-0761942078
			6. Закон Республики Казахстан о науке .- Алматы: Жеті жарғы, 2011.–40 с.
			7. Каудыров Т.Е. Право интеллектуальной собственности в Республике Казахстан, Алматы: Жетi жаргы, 1999 – 68с.

*Дополнительная:*Погостина Е.С., Погудин П.А., Ширяев Ю.Н. Экономика и организация научных исследований в химической промышленности - М.:Химия, 1078. – 176 с. **2.**Сборник нормативных и методических материалов VII.–Алматы: ВАК. 2004.–174с. **3.**Международные научные фонды в Казахстане–Алматы: КазгосИНТИ, 1999.–85 с. **4.** Патентоведение.–М: Наука, 1985.–327 с. **5.**Патентный закон Республики Казахстан.–Алматы: Данекер, 2001 – 31 с.**6.** [www.scopus.com](http://www.scopus.com)**7.** [www.sciensdirect.com](http://www.sciensdirect.com) **Available online:** A padding training material for realization of homeworks and projects, it will be accessible on your page on the website univer.kaznu.kz. in the section EMCD. |
| **The course organization** | It is an introduction course in which it will be carried out the common acquaintance to the large volume of theoretical material in the field of the most urgent scientific and technological problems, the bound to new approaches to registration of scientific work, article, theses and reports at scientific conferences. And also, work with the international informational databases. |
| **The course requirements** | 1. You have to be prepared for each classroom occupation in advance, according to the schedule given below. Preparation of a task has to be complete prior to classroom occupation at which the subject is discussed.2. Homeworks will be distributed during a semester, as shown in graphics of discipline.3. During a semester, you will use the studied material in the project in which you at your characteristic choice will develop flow diagrams after production of polymeric materials. 1. When performing homeworks the following rules have to be followed:

• Homeworks, have to be carried out in the specified terms. Later homeworks will not be accepted.• Abstracts of homework it has to be written down on an express notebook and pages have to be numbered. Issues (tasks) of each homework have to be resolved, and final answers have to be (in case of need) selected. (House the tasks which are not conforming to these standards will be returned with unsatisfactory assessment).• You can work together with other student when performing homeworks provided that each of you works on a single question (a separate task). |
| **Evaluation politic** | **Description of self-dependent work** | **%** | **Studying results** |
| Home work preparationSWMExaminationFinal | 40%20%40%100% | 1,2,3,4,5,6,7,8,9,10,111,2,3,4,5,6,7,8,9,10,111,2,3,4,5,6,7,8,9,10,11 |
| Your final score has been calculated by this formula$$Final score of discipline=\frac{CW1+CW2}{2}∙0,6+0,1МТ+0,3FC$$Minimum estimates as a percentage are given below: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 |
| **Discipline politis** | The corresponding terms of homeworks or projects can be prolonged in case of the softening circumstances (such as disease, emergencies, accident, unexpected circumstances, etc.) according to the Academic policy of university. Participation of the student in discussions and exercises on occupations will be considered in his common assessment for discipline. Design questions, dialogue, and feedback coupling regarding a question of discipline are welcomed and encouraged during the occupations, and the teacher at a conclusion of total assessment will take into consideration participation of each student on occupation. |
| **Schedule of discipline** |
| **Week** | **Title of theme** | **Hours** | **Maxim.point** |
| 1 | Lecture 1, 2. The modern system of the organization and management of scientific research in RK and in the world. | 2 |  |
| Seminar 1. Concept, essenсe, types of scientific research. Forms and research techniques. Classification of scientific research. Essence of basic and applied researches. Levels of researches. | 1 | 7 |
| 2 | Lecture 3, 4. Law of the Republic of Kazakhstan on science: its treatment and realization.  | 2 |  |
| Seminar 2. Searching of a problem and formulation of a hypothesis. | 1 | 7 |
| 1 SWML. Application of electronic resources as the instrument of self-advertisement and the international partnership. |  | 5 |
| 3 | Lecture 5, 6. System of certification of scientific shots. | 2 |  |
| Seminar 3. Research stages - planning, the organization and realization. Ways of carrying out theoretical and empirical researches.  | 1 | 7 |
| 1 SWM. Presentation of scientific results: theses of reports on scientific symposiums and conferences (the requirement to registration and contents).  |  | 5 |
| 4 | Lecture 7, 8. Bases of a scientific method. | 2 |  |
| Seminar 4. Representation of results of works. Mechanisms of introduction of results of scientific research. | 1 | 7 |
| 2 SWML. Collecting scientific information, work with literature. |  | 5 |
| 5 | Lecture 9, 10. Literary research. Systems of searching and database of scientific and technical information. | 2 |  |
| Seminar 5. Preparatory stage of research. Realizing of a subject of scientific research choice.  | 1 | 7 |
| 6 | Lecture 11, 12. Planning and realization of a scientific experiment. Protocol of an experiment. | 2 |  |
| Seminar 6. Research compiling of routine, methodological and procedural sections of a research. | 1 | 7 |
| 3 SWML. Submission of the oral report and answers to questions. |  | 5 |
| 7 | Lecture 13, 14. Preparation, writing, publication and reviewing of scientific articles. | 2 |  |
| Seminar 7. Acquisition of work skills with the international databases: Thomson Reuters, Scopus, etc. | 1 | 8 |
| 2 SWM. Bench report (requirement to registration and contents). Preparation of the report. |  | 10 |
| 1-Colloquium |  | **20** |
| **1- Midterm examination** |  | **100** |
|  | **Midterm** |  | **100** |
|  |
| 8 | Lecture 15, 16. Representation of a research results and ideas to scientific community. Recommendations about preparation of the presentations. | 2 |  |
| Seminar 8. Critical analysis of the scientific article. | 1 | 7 |
|  | 3 SWM. Submission of the bench report. |  | 5 |
| 9 | Lecture 17, 18. Preparation, writing, representation and reviewing of the scientific project. Implementation of scientific projects. | 2 |  |
| Seminar 9. Writing, registration and protection of scientific works. Structure of scientific work. Features of language and style of a statement of scientific research. | 1 | 7 |
| 4 SWML. Requirements to registration and contents of the project for participation in a competition of projects in the Program of basic researches. Preparation of the project. |  | 5 |
| 10 | Lecture 19, 20. Searching of sources of financing of scientific projects. The modern system of financing of scientific research in RK and the developed countries. | 2 |  |
| Seminar 10. Development of presentation skills. As it is necessary to do legiblly and laconically the report and to answer questions of audience. Types of the presentations.  | 1 | 7 |
| 11 | Lecture 21, 22. International scientific funds, main goals and tasks of funds, philosophy of functioning, priority activities. | 2 |  |
| Seminar 11. Analysis and ways of deduction of an attention of target audience. | 1 | 7 |
| 12 | Lecture 23, 24. Commercialization of scientific results. Protection of intellectual property.  | 2 |  |
| Seminar 12. Writing of the scientific article for magazines with an impakt-factor. | 1 | 7 |
| 5 SWML. Business correspondence and communication with scientists. |  | 5 |
| 13 | Lecture 25, 26. International patenting. Opening, inventions, improvement suggestions. Copyright certificates. License. | 2 |  |
| Seminar 13. Features of work of the editor or expert of the international magazine. | 1 | 7 |
| 14 | Lecture 27, 28. Ethics of scientific research. Responsibility for non-compliance with ethical principles. | 2 |  |
| Seminar 14. Summary of perspective researches. Requirements to registration and contents. Preparation of the summary. | 1 | 7 |
| 15 | Lecture 29, 30. Exchange of scientific information. | 2 |  |
| Seminar 15. Requirements to registration and contents of the project for participation in a competition of projects in CRDF. Preparation of separate points of the project. | 1 | 6 |
| **2-Colloquuium** |  | **20** |
| **2-Midterm examination**  |  | **100** |
| **Examination** |  | **100** |
| **Final** |  | **100** |

*Considered at the meeting of the department*

*Protocol № 43,"21" June 2016*

**Head of the Chair GA Moon**

**Lecturer GA Moon**