

AL-FARABI KAZAKH NATIONAL UNIVERSITY

Faculty of chemistry and chemical technology

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

Confirmed

On the Scientific Council Meeting Faculty

Protocol №_10_ from _28 May_ 2013

Dean of the faculty

_____ Ongarbayev E.K.

Approved by the University scientific-
methodical Council meeting

Protocol №_6_ from _21 June_ 2013

Vice-Rector for Academic Affairs

_____ Akhmed-Zaki D.Zh.

"_21_" "_____ June _____ 2013

Educational-methodical complex of the discipline

Organizing and planning of scientific researches

(discipline name)

Speciality Code 6M073900 -Petrochemistry

(code, speciality)

6M073900 Petrochemistry

Education Form full time

Educational-methodical complex of the discipline is compiled by Prof. Mun G.A. and associated prof., PhD Irmukhametova G.S. On the basis of experimental educational program and catalogue of elective disciplines of specialty **6M073900 -Petrochemistry**

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Considered and recommended at the chair meeting of Department of chemistry and chemical technology of organic substances, natural compounds and polymers

On “_14_” May 2013, Protocol №_40_

Head of the Chair _____prof. Abilov Zh.A.

Recommended at the methodical Council (bureau of the faculty)

On «_23_» May 2013, Protocol №_9_

Chairman_____ Syzdykova L.I.

Al-Farabi Kazakh National University
Chemistry Faculty
Department of chemistry and technology of organic substances,
natural compounds and polymers

Approved by the Academic Council
of Chemistry Faculty
Protocol №_10_ from “28”_May__ 2013
The Dean of Chemical Faculty
_____ Ongarbayev E.K.

Organizing and planning of scientific researches 3 credits
SYLLABUS

Speciality Code 6M073900 -Petrochemistry
(code, speciality)

INFORMATION about lecturers:

Professor of Department of chemical technology of organic substances, natural compounds Mun G.A.
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FOREWORD

1. Introduction

Organization and planning of scientific research in the former Soviet Union. State scientific institutions: academic, branch institutes. The Federal and Republican Academy of Sciences, branches and outlets, full members (academicians) and corresponding members of the system of financing of scientific research. The state Committee on science and technology. Scientific-technical program of SCST. The organization of scientific researches in system of the Russian Academy of Sciences. The national Academy of Sciences of the RK, the history of creation, the main achievements. The concept of scientific and scientific-technical policy of the RK. The socio-economic situation in Kazakhstan and its impact on the scientific-technical sphere. Scientific research in Universities and non-governmental institutions.. the Basic principles and objectives of the scientific and scientific-technical policy of Kazakhstan at the modern stage. Selection and promotion of priority directions of scientific and scientific-technical development in accordance with the national interests and the needs of the socio-economic development of the country, the state support of priority fundamental and applied research, promotion of financing from other sources, formation and accommodation of orders state orders for science technology on a competitive basis, integration of science, production and education, preservation and reproduction of personnel potential, support of competition and entrepreneurship in scientific-technical sphere, formation and protection of the domestic market of scientific and technical products, the legal protection of intellectual property. Program-target method of realization of the scientific and scientific-technical policy. Independent state scientific-technical examination of projects and scientific-technical programs. Innovation activities in scientific-technical sphere, the Concept of innovation activity in the Republic of Kazakhstan.

2. The main part.

The law of the Republic of Kazakhstan about science. General provisions of the Law, the basic concepts used in the law (state scientific-technical policy, the state authorized body, innovation activity, scientific, intellectual property, the main principles of state policy in the field of science). Subjects of scientific and scientific-technical activities, rights and duties of the scientific employee, scientific organizations and their rights, NAS RK, public Academy of Sciences, scientific centers, intellectual property right in the result of scientific and (or) scientific and technical activity, protection of copyrights. Management and organization of scientific and scientific-technical activity. Competence of the Government of the RK, the competence of the authorized state body and other Central Executive bodies. The accreditation of scientific organizations, accreditation of scientific organizations, the management of scientific organization. State scientific-technical expert examination. State support of the innovation activities in the field of science and technology. Integration of science and education. The financing of science. The privatization of public scientific organizations. The staffing of scientific research. Training of scientific and scientific-technical personnel, forms of increasing scientific qualification. International activities in the field of science and technology.

3. Exchange of scientific information.

Information support of scientific and scientific-technical activities. Scientific-research institutes of scientific-technical information. Abstract journals, reference books, modern system of exchange of scientific information, computer network, e-mail, Internet, information pages. The publication of research results. Theses of reports, materials of scientific conferences, deposition, and scientific articles. General requirements for the presentation and design. Rating of scientific journals. International специализированные scientific journals citation Index.

The process of developing new scientific knowledge, one of the types of cognitive activity. Scientific research is characterized by objectivity, reproducibility, de-monstrability, and exactness (the latter being understood in different ways in different fields of science). There are two interrelated levels of scientific research: empirical and theoretical. On the first level, new facts of science are established and empirical laws are formulated by generalizing on these facts. On the second level, laws general for the particular field are

formulated to permit explanation of previously discovered facts and empirical patterns and also to predict future events and facts.

The main components of scientific research are the statement of the problem; preliminary analysis of available information, conditions, and methods for solving problems of the given class; formulation of a working hypothesis; theoretical analysis of the hypothesis; planning and organization of an experiment; conduct of the experiment; analysis and generalization of results obtained; checking of the working hypothesis on the basis of the facts obtained; final formulation of new facts and laws; and development of explanations or scientific predictions. A further stage is added for applied science: introduction of the knowledge gained into production. The structure of scientific research is determined by various combinations of the stages listed, which may be carried out in various orders and with certain repetitions and modifications. In a number of cases, various stages may be absent (for example, when experimentally verifying previously advanced hypotheses).

Inasmuch as the results of scientific research should not repeat previously discovered facts and laws, the process of scientific research should be viewed as a function of the goal and the time available. Of two research processes relating to the same set of objects and solving the same task, that process is more effective which, other conditions being equal, leads to the intended goal in the shorter time.

Scientific research can be classified according to various principles. Among the most widespread is the division of scientific research into fundamental and applied research, quantitative and qualitative research, and unique and complex research. The reciprocal superposition and further segmentation of these classifications provide a multistep classificational hierarchy of scientific research.

The aim of discipline:

This module aims to:

- Promote students' critical reflection on professional practice and theory
- Develop students' understanding of the importance of research into professional practice and investigation and the way it supports the development of educational practice and theory
- Introduce students to models of research and ethical considerations and guidelines.
- Expand and make more systematic the students' repertoire of strategies for producing, investigating and recording data relating to professional practice
- Increase the students' confidence in their own professional expertise by enabling them to report upon and share their investigations with appropriate justification and interpretation

The purpose and tasks of the course: To give students knowledge in the system of organization and financing of scientific research in the countries of CIS and abroad advanced countries with highly developed science-based technology, for certification of the scientific staff of higher qualification, the preparation of publications and grant of various national and international funds, the experience of the patent, licensing and implementation of scientific developments.

Learning Outcomes

By the end of the module students should be able to:

- develop and defend an issue for investigation related to their own professional practice and the wider educational and/or community context
- justify their chosen mode of investigation in relation to their own professional needs and demonstrate how it has been shaped by reference to current research
- implement an investigation in an appropriately systematic manner, successfully employing a range of strategies for producing and recording data
- disseminate the results of their research drawing upon the evidence produced and demonstrating their ability to analyse and interpret their findings with appropriate attention.

Knowledge and skills after the course

The students should know: As a result of studying the discipline students should know the specifics of the organization of scientific research in the field of fundamental and applied Sciences in the countries of CIS and far abroad, the system of financial support for scientific research (international and national scientific grants, funds, programmes, etc.), a system of certification of the scientific staff of higher qualification, licensing.

Be able to: To be able to use the acquired knowledge and skills when writing projects, applications for participation in the competition according to the system of grants of different scientific foundations, the

preparation of the scientific article, the registration of an application for a patent, when writing a design of a thesis, etc.

Methodology of the course: To develop the mental ability, to teach students to use the acquired knowledge and skills when writing projects, applications for participation in the competition according to the system of grants of different scientific foundations, the preparation of the scientific article, the registration of an application for a patent, when writing a design of a thesis, etc.

Prerequisites: higher mathematics, physics, inorganic, analytical, physical, organic chemistry, macromolecular chemistry, chemical physics, structure of matter, quantum chemistry, advanced organic chemistry problem the theoretical foundations of catalytic processes hydrocarbon processing technology.

Postrequisites: general courses "Modern problems of physical chemistry of polymers and surface phenomena" and "Modern Problems of Chemistry and Technology of Polymers" special courses in various specializations.

STRUCTURE AND CONTENT OF DISCIPLINE

Week	Lectures title	Hours	MSS
1	Lecture 1, 2 «The modern ways of scientific research organizing. Access to information: literature search across many disciplines and sources» Seminar 1 Work with reference magazines. Writing theses of the report at the scientific conference on the results of the previously performed R & d activities.	2	MSS 1 Preparation of short presentation.
		1	
2	Lecture 3, 4 «Integration of Kazakh educational system into the international space. Comparison of educational systems of USSR, Kazakhstan and foreign countries. Postgraduate study's peculiarities» Seminar 2 Development of presentation skills.	2	MSS 2 General provisions of the Patent Law of the RK. Patentability of industrial property. Authors and patent holders.
		1	
3	Lecture 5, 6 «Introduction to Data Citation Index in Thomson Reuters informational database», «Article writing on the results of the previously performed research» Seminar 3 Writing a CV of prospective studies on the requirements of the ISTC.	2	MSS 3 Analysis of scientific activity of researcher by Thomson Reuters
		1	
4	Lecture 7, 8 «What is Citation Reporting and the H-Index in Thomson Reuters informational database for worldwide scientists?» Seminar 4 Writing the application and the project for participation in the competition on Fund of science of the Ministry of education and science of the RK on the results of the research conducted at the Department.	2	MSS 4 The exclusive right to use the industrial property.
		1	
5	Lecture 9, 10 «Web of Science Search Tips. Cited Reference Searching» Seminar 5 Preparation and writing sections Introduction and Conclusion to the author's abstract of candidate's dissertation	2	
		1	
6	Lecture 11, 12 «Fundamental Research Programs, Science Fund grants, scientific, technical, and search programs. Investment and innovation programs» Seminar 6 Using Advanced Search in the Web of Science. Refine and Analyze Search Results	2	
		1	
7	Lecture 13, 14 «Grant funding system, the evaluation criteria and selection process. International Science Foundation. Search and selection of partners. Advanced search and exchange of scientific information» Seminar 7 Using Advanced Search in the Web of Science.	2	
		1	

	Administrative Tools in the Web of Knowledge.		
8	Lecture 15, 16 «Basic requirements for the design of applications for participation in the competition for a grant to fund the INTAS, the IAEA, the ISTC. The content of the projects. The selection criteria for project appraisal» Seminar 8 Usage Reporting in the Web of Knowledge. Citation Sources in Web of Science.	2	MSS 5 The procedure for obtaining the title of protection.
		1	
9	Lecture 17, 18 «Research developing in advanced foreign countries, the system of practical implementation of scientific research, management and marketing system» Seminar 9 New Features Update in Web of Science.	2	MSS 6 Termination and restoration of the document.
		1	
10	Lecture 19, 20 «Scientific developments and marketing ideas. Relations between science and business. Business plan, the market and the market for raw materials, cash flow analysis, payback loan» Seminar 10 New scientific papers review. New methods: search and discussion	2	MSS 7 Analysis of scientific activity of researcher by Scopus and Google Scholar
		1	
11	Lecture 21, 22 «Scientific organization of labor. Modern high technologies, optimization of working time. Management and Marketing in the production of industrial goods and products of chemical plants» Seminar 11 Electron web pages as an instrument of scientists to declare about themselves.	2	MSS 8 Writing of abstract
		1	
12	Lecture 23, 24 «Requirements for the project proposals to participate in the design competition for the CRDF. Preparation of individual items of project» Seminar 12 Discussion and interpretation of experiments and results of master thesis	2	MSS 8 Writing of abstract
		1	
13	Lecture 25, 26 «Law about the science of the Republic of Kazakhstan. General provisions of the Law of the Republic of Kazakhstan on the science, the basic concepts used in the law» Seminar 13 If you are editor or reviewer of scientific journal...	2	MSS 8 Writing of abstract
		1	
14	Lecture 27, 28 «Право интеллектуальной собственности в РК, международные конвенции и договора по охране интеллектуальной собственности. Патент и патентное право. Открытия, изобретения, рационализаторские предложения» Seminar 14 Workshop on patents writing and submission.	2	MSS 8 Writing of abstract
		1	
15	Lecture 29, 30 «The Academy of Sciences in the USSR and the Union republics. State Committee on Science and Technology (SCST). Science and technology programs of the SCST» Seminar 15 The review of international fund granting scholarships for research and study. I want to apply for research grant of international fund.	2	MSS 8 Writing of abstract
		1	

Literature:

Required reading:

1. Pogostina E.S., Pogudin P.A. Shiryayev U.N. Economy and organization of scientific research in the chemical industry - M.:Chemistry, 1078. - 176 p.
2. Collection of normative and methodical materials III. - Almaty: VAK of Kazakhstan, 2002. - 152 p.
3. International scientific funds in Kazakhstan. - Almaty: КазгосИНТИ, 1999. - 85 with.

Recommended Reading:

1. Bulletin of HAC, 1999, - №№1-3
2. Finlay, L and Gough, B (2003) Reflexivity: A practical guide for researchers in health and social sciences) Oxford: Blackwell
3. http://thomsonreuters.com/products_services/science/training/wok/
4. <http://www.sciencedirect.com/>
5. www.google.com/?tbp=pts, scholar.google.com/

The policy of academic behavior and ethics

Be tolerant and respect other people's opinions. Objection must be formulated in the correct form. Plagiarism and other forms of cheating are not allowed. Prohibited copying and prompting during the delivery of CPM, interim monitoring and examination, copying, solved problems of others, passing the exam for another student. The student, caught in the rigging of any information of the course will receive a final grade «F».

Оценка по буквенной системе	Цифровой эквивалент баллов	%-ное содержание	Оценка по традиционной системе
A	4,0	95-100	Отлично
A-	3,67	90-94	
B+	3,33	85-89	Хорошо
B	3,0	80-84	
B-	2,67	75-79	Удовлетворительно
C+	2,33	70-74	
C	2,0	65-69	
C-	1,67	60-64	
D+	1,33	55-59	
D-	1,0	50-54	
F	0	0-49	Неудовлетворительно
I (Incomplete)	-	-	«Дисциплина не завершена» (не учитывается при вычислении GPA)
P (Pass)	-	-	«Зачтено» (не учитывается при вычислении GPA)
NP (No Pass)	-	-	«Не зачтено» (не учитывается при вычислении GPA)
W (Withdrawal)	-	-	«Отказ от дисциплины» (не учитывается при вычислении GPA)
AW (Academic Withdrawal)			Снятие с дисциплины по академическим причинам (не учитывается при вычислении GPA)
AU (Audit)	-	-	«Дисциплина прослушана» (не учитывается при вычислении GPA)
Att.		30-60 50-100	Аттестован
He att.		0-29 0-49	Не аттестован
R (Retake)	-	-	Повторное изучение дисциплины

The head of department of chemistry and technology of organic compounds, natural substances and polymers, prof.

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