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*В статье отражен опыт Новороссийского университета по отбору научно-педагогических кадров во второй половине XIX – начале XX века на юридический факультет. Установлено, что основным источником заполнения вакантных должностей на кафедрах юридического факультета стал институт приват-доцентуры. Акцентировано внимание на том, что приват-доцентские кадры были резервом для комплектования будущего профессорско-преподавательского состава. Выяснено, что имело место как объективное, так и необъективное отношение к кандидатам во время выборов на вакантные должности, в частности в оценке их научно-педагогического опыта и профессиональных качеств. Подчеркнуто, что нередко руководство учебного заведения отказывало соискателям в преподавательских должностях на основе идеолого-политических факторов. Отмечено, что на юридическом факультете не удалось создать систему преподавания приват-доцентами учебных курсов параллельных профессорским, которые могли бы составить конкуренцию.*

**Ключевые слова:** Новороссийский университет, научно-педагогические кадры, юридический факультет, приват-доценты.

*The development of the modern high legal education in Ukraine cannot happen without progressive, competitive scientific-pedagogical staff. Consequently, the deep analysis of the achievements and disadvantages of the scrutiny of the experience of pre-Revolutionary universities of Ukraine regarding the selection of scientific-pedagogical staff for the departments of Law Schools will have the significant contribution for the further modernization of the higher legal education. The author applied a method of archive materials research (reports of the academic council meetings and university reports, periodicals) and the theoretical methods of the pedagogical research (the analysis, generalization). The aim of the article is to reveal the experience of Novorossiysk University regarding the selection of scientific-pedagogical staff for the departments of Law Schools in the second half of the XIX – the beginning of the XX century. The experience of Novorossiysk University regarding the selection of scientific-pedagogical staff for the departments of Law Schools in the second half of the XIX – the beginning of the XX century is revealed in the article. It is defined that the main source of the filling vacancies at the departments of Law School was Privat-associate Professorship Institute. The attention is turned to the fact that the private-associate professor staff was the fund for the filling of the future teaching staff. It is found out that both objective and non-objective attitude to applicants during the selection for the vacant posts occurred, especially regarding the assessment of their scientific-pedagogical experience and professional skills. It is noticed that the administration of the establishment often refused applicants in getting teaching posts on the basis of ideological and political reasons. It is indicated that the organization of the private-associate professors teaching system of the courses parallel to professors' that could create competition failed. The carried out research gives the reason to prove that the problem of ensuring studying process at Law School by qualified scientific-pedagogical staff was solved through the engagement of private-associate professors to the teaching activity. The perspective for the further scientific research is the problem of scrutinizing human resource policies of Novorossiysk University at Medical School (1865 – 1917).*

**Key words:** Novorossiysk University, scientific and pedagogical staff, Law School, private-associate professors.

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#### INTERDISCIPLINARY APPROACH IN PROFESSIONAL TRAINING FOR FUTURE PETROLEUM ENGINEERS

*The paper deals with the training specialists in the field of petroleum engineering ready to work in interdisciplinary teams and projects. The interdisciplinary approach including globally conditioned interdisciplinarity has been discussed in the context of engineering education since the beginning of the 21st century. This approach contains a number of basic components, namely: structure, process, language, identity, and technologies. The efficiency of interdisciplinary training depends on the general dynamics of a team. The international community has not disputed on the significance of interdisciplinary approach for engineers, but the key issue remains – how to apply theory to practice in both curricula development and learning process itself. Interdisciplinarity in the petroleum education is considered as a basis for critically new competitive engineering solutions. The indicators proving the presence of interdisciplinary management system at a university are outlined. Based on the elaborated principles of interdisciplinary activities a set of required tools and elements to manage the interdisciplinary training of petroleum engineers is presented.*

**Key words:** an interdisciplinary approach, interdisciplinarity, petroleum education, petroleum engineer, indicators, principles, and elements of interdisciplinary activities, interdisciplinary teams and projects.

**Introduction.** The global economy in which petroleum engineers live is in constant change and evolution. The requirements for future petroleum experts today include not only solid technical knowledge but also make them know how to apply that knowledge to real world problems. For these reasons, engineering education must reach beyond the academic world and draw in industry. The real world experiences that future petroleum specialists must have to be effective come from industry and not the more research oriented university environment. Methodological training of engineering students is becoming more and

more important due to the shift from labor-intensive production to science-driven industries. However, there is no consistent development of future engineers' methodological competencies in modern technical universities.

The issues of the interdisciplinary approach as an important aspect of future engineers training for petroleum industry at higher technical educational institutions have been considered by R.L.Ackoff, A. Leine, E. McGrath, H. Jacobs, J. Th.Klein, R. Meeth, A. Repko and others. It is worth noting that representatives of Ukrainian High School

also paid significant attention to interdisciplinary activities. However, like foreign scholars, they concentrated on theoretical aspects rather than on methodological and practice-related issues.

The **objective** of the article consists in revealing such notions as “interdisciplinarity” and “interdisciplinary approach” which are connected with changes in the system of university petroleum training and continuing professional development. The most important methodological principle to ensure the efficiency of future engineers training petroleum industry system has been identified – the education system should be sensitive to the changes in science, technics and technologies, which, in turn, result in changes in engineer’s professional activities. Interdisciplinarity is considered as one of the effective tools to support enthusiasm of young generation for petroleum engineering; to increase motivation of future petroleum experts; and to enhance the efficiency of collaboration between professionals from different fields.

**Theoretical Framework.** Interdisciplinarity is a complicated notion which implies not only congregative character of activities performed to solve a particular task, but also the transfer of methods, ideas, and paradigms between different spheres (disciplines). Interdisciplinarity is essential when we use problem-based and practice-oriented approaches to solve scientific and engineering tasks, to overcome social, economic and political challenges. It is interdisciplinarity that makes it possible to obtain unique results, and even more, to set new goals, develop and implement competitive solutions, create and promote competitive products.

It should be noted that interdisciplinarity as a trend in engineering education has been developing over the past decades. Today, interdisciplinary, as well as fundamentalism, internationalization, social responsibility, and sustainable development, is an urgent issue for most of the developed countries. The case in point here is project-based learning.

As a term, interdisciplinarity is described in numerous reports and overviews but often fails to be implemented in real education system. That was the reason to organize a network international conference devoted to interdisciplinarity in engineering education.

The oil and gas sector takes a special place in the economy of modern Ukraine. This sector is the main source of fuel and energy resources. The petroleum industry exists because people have become accustomed to the benefits oil products and natural gas provide – benefits like convenient, affordable transportation, warm homes and thousand of synthetic materials. Ukraine’s oil and gas industry includes many kinds of businesses, from those that explore for petroleum to ones that sell oil and natural gas products to the consumer. Together, these businesses form Ukraine’s oil and gas industry. The industry and its products play an important role in Ukraine’s well-being and our daily lives. The production and use of petroleum have altered the way in which we live. The oil and gas industry has undergone radical changes in recent years. Geopolitics are rapidly changing; environmental concerns are rising; global demand for crude oil and natural gas is escalating.

The analysis of a great number of Ukrainian and foreign studies concerning the attributes and competencies a graduate petroleum engineer should acquire has revealed importance of interdisciplinary approach among the key factors that ensure competitiveness of oil and gas engineering graduates in labor market.

Petroleum engineers are vital to today’s economies. They make the drilling process safer for people, communities, wildlife, and the environment. They also make it more efficient, and prices more affordable for customers. They ensure compliance with best practices, industry standards, and environmental and safety regulations, and contribute to energy independence.

Traditionally, petroleum engineers should be familiar with both traditional and unconventional drilling techniques. They need broad knowledge of well drilling, management and completion practices. Some petroleum engineers must understand hydraulic fracturing and reservoir stimulation technologies. Petroleum engineers should be comfortable working in the field under challenging climate or weather conditions, but they must also be comfortable working long hours in an office analyzing large data sets and statistics to make conclusions and recommendations.

Moreover, petroleum engineers should have the ability to

effectively apply the fundamental concepts and procedures of petroleum engineering. They must continue their professional development of technical expertise and knowledge through seminars, training and formal education. Companies want petroleum engineers who are creative thinkers and problem solvers with the ability to find new ways to solve problems. Having a strong intellectual curiosity to explore better ways to make good investment decisions while protecting the environment will be appreciated. Finally, petroleum engineers should be highly-motivated team players who are willing to collaborate and go the extra mile to complete projects.

However, there are certain limitations in engineering evolution from a purely technical point of view [1]. When designing new engineering products, it is of absolute importance to consider consumers’ needs and interests. It is the needs analysis that allows creating more relevant and effective products, devices, and processes. Thus, interdisciplinary approach has been always considered a part of engineering activity. For example, microelectronics can hardly evolve without chemistry, physics, and other engineering disciplines. Such natural consumers’ needs and expectations as simplicity, safety, cost-efficiency, usability, etc. force designers to search for new ideas within various disciplines.

Professional knowledge is always highly concentrated. With the increasing amount of knowledge, this fact seems to be rather natural. It means that the problems related to highly-specialized knowledge would be solved by standing out them from a wider context, even by separating them from general context. It is obvious that such an approach would never lead to comprehensive solutions which rest on the interdisciplinary approach.

Interdisciplinary approach in engineering education can be termed as a combination or interrelation of various sciences that are embodied in engineering training process. In reality, interdisciplinary approach is very often confused with multidisciplinary when educators give students knowledge from various disciplines without making the link between them into a coordinated whole. Thus, interdisciplinary approach can be regarded as a natural training context in which boundaries between knowledge systems tend to be erased and new teaching paradigm is required.

In the 1970s the term interdisciplinarity or interdisciplinary approach was widely applied, however, the issue itself was not frequently addressed in the relevant research literature. The first work that provided definition of interdisciplinary approach was the article by Richard Meeth who defined “interdisciplinary” as “an attempt to integrate the contributions of several disciplines to a problem, issue, or theme from life” [5]. At about the same time, another American scholar Earl McGrath wrote: “the chief purpose of interdisciplinary work is to integrate relevant knowledge around a significant issue” [4, p. 7]. However, he also noted that “the largest percentage of interdisciplinary courses developed by the colleges involved no real merging of subject matter except in the catalog”.

The first serious methodological work to reflect discussions of interdisciplinary approach in higher education was “Handbook on the Undergraduate Curriculum” by Arthur Levine [3] where an entire chapter was devoted to interdisciplinary studies. Arthur Levine defined interdisciplinary approach as “a process of answering a question, solving a problem, or addressing a topic that is too broad or complex to be dealt with adequately by a single discipline or profession” [4].

Gradually, educators started the process of moving discussions from definitions to practice. Among the next publications, the works by Allen F. Repko are the most notable. He discussed interdisciplinarity not only within educational context, but also within scientific one [7, 8].

Modern engineers are professionals whose activity directly influences the technological infrastructure of a society. The description of a modern engineer is given in National Guidelines for Engineering Education written and approved by Norwegian National Council for Technological Education [6]: “As an engineer you are able to use both your analytical and creative skills to solve socially valuable technological problems. You will have to work innovatively, structurally, and diligently. You have to analyze, generate solutions, assess, determine,

execute, and report – be a good entrepreneur. In addition to natural science and technological subjects, your linguistic skills are important, both written and oral, both in Norwegian and in foreign languages. Interacting systems are essential to the modern society, and you must thus be skilled at working independently as well as in teams with engineers from your discipline and from others, professionals from other fields, and in interdisciplinary teams. As an engineer, you will work with people, you will have ethical and environmental responsibilities and you will have a significant impact on society”.

Petroleum engineering ensures that energy will continue to be a key component to societal functioning and people’s everyday lives. Petroleum engineers solve important challenges that contribute to energy security and national prosperity. The rewarding field of petroleum engineering requires knowledge of physics, geology, chemistry and mathematics [10]. Petroleum engineers often work on global oil and gas projects in developing areas in developing areas in Asia, Africa, South America and Eastern Europe. Under currently changing circumstances, professional success of alumni of technical higher education institutions is governed not only by the knowledge acquired, but also by the ability to conform to changes.

**Conclusion.** Therefore, it can be stated that interdisciplinary approach has taken many forms in various educational documents and frameworks. However, in reality interdisciplinarity is often confused with interdisciplinarity which could contribute to developing various graduates’ skills and competences, but could hardly integrate knowledge and insights from many disciplines into a coordinated and coherent whole. Recently, technical universities have developed a great number of various education programmes which attractiveness in labor market and quality of education itself increase due to introducing into curriculum such disciplines as English for Specific Purposes, Management, Ecology, etc.

The analysis of various educational initiatives has revealed that implementation of interdisciplinary approach in engineering programmes necessitates the development of such an educational framework that would provide educators with the relevant methods, tools, and models for design of interdisciplinary petroleum engineering curricula regarding specific learning outcomes and ensure support for faculty members to improve their own competence in the interdisciplinary issues. In any case, interdisciplinary tasks of petroleum industry boost intensive international collaboration and intercultural cooperation.

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*В статтє рассматривается проблема подготовки специалистов в нефтегазовой отрасли для работы в междисциплинарных командах и проектах. Междисциплинарный подход, который также включает в себя глобально обусловленную междисциплинарность, обсуждается в контексте инженерного образования с начала 21 века. Этот подход содержит несколько основных составляющих, в том числе: структуру, процесс, язык, идентичность и используемые технологии. Успех междисциплинарного обучения зависит от общей динамики команды. В мировом сообществе не ведется спор о важности междисциплинарного подхода для инженеров, основным вопросом остается как применить теорию на практике, как при разработке учебных планов образовательных программ, так и непосредственно в процессе обучения. Междисциплинарность в нефтегазовой подготовке представлена как база для получения принципиально новых конкурентоспособных инженерных решений. Рассмотрены признаки, указывающие на наличие системы управления междисциплинарностью в вузе. На основе сформулированных принципов междисциплинарной деятельности предложены инструменты и необходимый перечень элементов системы подготовки инженеров-нефтяников для работы в междисциплинарных командах и проектах.*

**Ключевые слова:** междисциплинарный подход, междисциплинарность, нефтегазовое образование, инженер-нефтяник, признаки, принципы и элементы междисциплинарной деятельности, междисциплинарные команды и проекты.

*У статті розглядається проблема підготовки спеціалістів нафтогазової галузі для роботи у міждисциплінарних командах і проектах. Міждисциплінарний підхід, який також включає глобально обумовлену міждисциплінарність, обговорюється в контексті інженерної освіти з початку 21 століття. Цей підхід містить декілька основних складових, у тому числі: структуру, процес, мову, ідентичність і використання технологій. Успіх міждисциплінарного навчання залежить від загальної динаміки команди. У світовому співтоваристві не ведуться суперечки стосовно важливості міждисциплінарного підходу для інженерів, основним питанням залишається як застосувати теорію на практиці, як у процесі розробки навчальних планів навчальних програм, так і безпосередньо протягом навчання. Міждисциплінарність у нафтогазовій підготовці подана як база для отримання принципово нових конкурентоспроможних інженерних рішень. Розглянуто ознаки, що вказують на наявність системи управління міждисциплінарністю у вищому технічному навчальному закладі. На основі сформульованих принципів міждисциплінарної діяльності запропоновано інструменти і необхідний перелік елементів системи підготовки інженерів-нафтовиків для роботи в міждисциплінарних командах і проектах.*

**Ключові слова:** міждисциплінарний підхід, міждисциплінарність, нафтогазова освіта, інженер-нафтовик, ознаки, принципи та елементи міждисциплінарної діяльності, міждисциплінарні команди і проекти.