

## ENHANCING THE ROLE OF UNIVERSITIES IN TRAINING SPECIALISTS FOR OIL AND GAS INDUSTRY: EVIDENCE FROM THE GUBKIN UNIVERSITY

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**Abstract:** The oil and gas industry remains one of the most strategically important sectors driving global economic development. As the industry undergoes digital transformation and transitions towards sustainability, the demand for highly qualified specialists with multidisciplinary knowledge has increased significantly. This article explores the role of universities in training professionals for the oil and gas sector, emphasizing the importance of integrating advanced educational technologies, research-based learning, and collaboration with industry partners. The paper also highlights current challenges faced by higher education institutions in aligning curricula with industry requirements and suggests strategies for fostering practical competencies, digital literacy, and environmental awareness among students. In addition, the article presents the evidence from the Gubkin University, one of the leading higher educational institutions training specialists for oil and gas industry of Uzbekistan. Drawing upon international and regional experiences, including practices in Uzbekistan, the study concludes that universities must adopt innovative approaches to education to ensure the sustainable development of the oil and gas industry.

**Keywords:** oil and gas education, professional training, higher education, industrial partnership, digital transformation, sustainability, Uzbekistan, curriculum development, university-industry collaboration.

The oil and gas industry continues to play a critical role in ensuring global energy security and economic stability. Universities, as the main providers of human capital, are responsible for preparing skilled specialists capable of addressing complex technological and environmental challenges. The growing demand for experts in drilling, production engineering, and reservoir management, combined with the need for sustainability-oriented professionals, highlights the strategic importance of higher education institutions in shaping the future of the industry.

Recent studies emphasize that professional education in the oil and gas field must evolve to meet modern industrial standards. According to global research (Almeida et al., 2021; Lee & Ahmed, 2023), effective training should combine technical expertise, soft skills, and environmental awareness. In Uzbekistan engineering universities have introduced updated programs integrating digital and ecological components to respond to global and national priorities.

This study employs a qualitative research approach based on literature analysis, review of educational programs, and evaluation of university-industry collaboration models. The research also includes comparative analysis of curricula and teaching strategies across leading institutions in oil and gas education.

The analysis reveals that universities worldwide increasingly prioritize practical and research-based learning. Collaboration between universities and industrial enterprises - such as internships, joint research projects, and laboratory training - significantly enhances students' professional competencies. However, many institutions still face challenges, including outdated curricula, limited access to modern technologies, and insufficient coordination with employers.

Digitalization has transformed traditional approaches to oil and gas education. The introduction of simulation software, remote monitoring systems, and digital twins allows students to develop technical proficiency in a risk-free environment. Moreover, the integration of sustainability

principles into education ensures that graduates are aware of environmental protection and responsible resource management.

In Uzbekistan, modernization of oil and gas education aligns with national priorities for industrial innovation and green energy transition. The implementation of international standards in education and the development of joint programs with global companies demonstrate positive progress. In this regard, the Branch of Russian State University of Oil and Gas (National Research University) named after I.M. Gubkin in Tashkent plays a pivotal role in training highly-qualified personnel for oil and gas industry of the Republic of Uzbekistan.

The Branch of Russian State University of Oil and Gas (National Research University) named after I.M. Gubkin in Tashkent city is one of the leading higher educational institutions training specialists for oil and gas industry of Uzbekistan. It was established in accordance with the Resolution of the President of the Republic of Uzbekistan №-564 dated January 12, 2007 “On the Organization of the Activities of the Branch of Russian State University of Oil and Gas (National Research University) named after I.M. Gubkin in Tashkent”. The Branch’s mission includes the following:

- training a new generation of competent and competitive specialists for the oil and gas industry of the Republic, taking into account advanced international requirements;
- formation, development and transfer of innovation-driven knowledge and technologies in the oil and gas sector by ensuring high quality educational processes, research and development, and high-tech developments.

Currently the Branch aims to become a flagship for innovative development in the oil and gas industry, building on the unity of the “education-research-production” triad. Over the past 18 years, the Branch’s student body has grown from 100 to 900, the number of academic curricula and profiles has increased from 2 to 12, and 2392 specialists for the national oil and gas industry have been trained. The number of faculty accounts for 113 people, who efficiently work in 13 departments, and the scientific potential of the faculty has reached 51 percent.

The academic curricula implemented by the Branch have the appropriate license from the Federal Service for Education and Science, and the quality of education at the Branch has been confirmed by external expert organizations.

The Branch regularly successfully confirms the quality of graduates’ training through an external independent assessment as part of the Federal Internet-based exam for bachelor’s and specialist’s degree graduates using certified pedagogical measurement materials.

The Branch’s classrooms are equipped with modern multimedia and laboratory equipment, ensuring high-quality lectures, practical classes, and laboratory sessions. The facilities are constantly updated to meet educational standards and the needs of the oil and gas industry, enabling the educational process to be conducted at the level of leading global universities. The Branch’s classrooms, equipped with modern equipment, are supported by “Uzbekneftegaz” JSC. Highly qualified academic staff from the parent university, as well as leading specialists from the Branch’s industrial partners, are annually involved in the academic process at the Branch.

In accordance with Resolution №4 of the Board of Directors of “Uzbekneftegaz” JSC dated January 28, 2021, “On the organization of field-trip classes for students of the Branch of Russian State University of Oil and Gas (National Research University) named after I.M. Gubkin in Tashkent, based at the subdivisions of “Uzbekneftegaz” JSC, dual education (vocational training) for students of the Branch has been implemented starting in the 2020/2021 academic year. During the period 2021-2025, 1 287 46 faculty members from the Branch completed on-site practical training at seven “Uzbekneftegaz” enterprises.

Every year, second-year students undergo participate in training in blue-collar jobs at the production facilities of industrial partners. During this training, they acquire professional skills, certified by certificates in five blue-collar jobs: “Assistant Driller”, “Oil and Gas Production Operator”, “Slinger-Rigger”, “Gas Welder”, and “Geophysical Engineer”.

Industrial partners' participation in the academic process is reflected in the organization of summer internships for students, the preparation of final qualifying theses, and the participation of faculty in state certification committees for the defense of final qualifying theses.

One of the Branch's key indicators is the 100% employment rate of its graduates. The Branch's network of employer partners expands annually, and by 2025, the number of employers reached 27 organizations and enterprises in the oil and gas industry. All of the Branch's graduates are employed and successfully continue their careers at production facilities of national companies and foreign operators.

To ensure that the Branch's student body consists of applicants who are most capable and prepared for higher education programs, a collaboration platform within the "School-University" system has been established, and collaboration has been established with 235 comprehensive schools from virtually all regions of the republic. In the 2025-2026 academic year, the Branch admitted students in 12 in-demand specialties and profiles for specialist and bachelor's degrees.

In April 2025, the first Gubkin Subject Olympiad 2025 was held in the republic in the subjects "Russian Language" and "Mathematics", with 840 students from comprehensive schools, lyceums, and colleges participating. Over 70 Olympiad winners and runners-up were admitted to the Branch without entrance examinations and are currently studying at the Branch on the public grant basis.

The Branch is particularly proud that its graduates are now successfully working in various university departments - in administrative management, the faculty, research laboratories, and departments supporting academic and innovation processes. This is clear evidence of the continuity of generations and the high level of training of the personnel trained in the Branch.

The faculty and students of the Branch are actively engaged in research. In 2024 alone, the faculty and students of the Branch published 63 articles in international peer-reviewed journals (including 18 articles in Scopus and Web of Science) and 45 articles in national journals. Moreover, they have published over 100 research papers in the proceedings of international and national conferences. The faculty of the Branch has published 33 monographs, 18 textbooks, and 53 teaching aids, developed 7 utility model patents, and received 30 copyright certificates

The faculty of the Branch actively participates in the national and international scientific conferences, symposia, and forums, presenting their research results and exchanging experiences with leading industry experts. The faculty and young scientists at the Branch have repeatedly won prizes and awards at prestigious research events, honorably representing not only the Branch but also the Republic of Uzbekistan in the international scientific arena.

The Branch has created all the necessary conditions for developing research potential, especially for young faculty, which facilitates their active involvement in Research and Development activities. A key component of this work is the system of regular professional development for research and teaching staff: in the 2024-2025 academic year alone, 10 employees received training at the Centers for Continuing Education under the Ministry of Higher Education, Science, and Innovation of the Republic of Uzbekistan, 8 at departments of the head university in Moscow, and 16 at the production facilities of "Uzbekneftegaz" JSC.

The Branch's students actively participate in student scientific conferences, demonstrating a high level of preparation and research culture. They represent the Branch with distinction at international venues, including the annual Oil and Gas Conference at the parent university in Moscow, where they have repeatedly won and placed first, confirming the Branch's high status as a center for training talented and competitive young professionals.

Talented students from the Branch annually become laureates of the State Scholarship of the President of the Republic of Uzbekistan and the Islam Karimov State Scholarship. One student also received the "Kelajak Bunyodkori" ("Creator of the Future") badge in 2022.

In order to stimulate talented youth, the Branch has established 6 scholarship programs for industrial partners and industry veterans: the scholarship of the Board of Trustees of the Branch, the scholarship of the Chairman of the Board of "Uzbekneftegaz" JSC, the scholarship of

“Uzbekistan GTL” LLC, the scholarship of the Council of the Branch, and the personal scholarships named after Kayum Jalilovich Khakkulov and Alimdjan Abdurakhimovich Zakirov. Furthermore, the Branch actively develops international cooperation and academic collaboration with leading national and international universities. Partnership programs facilitate the exchange of experience, joint research, and the organization of internships and academic mobility. Students of the Branch actively participate in international and national forums, Olympiads, and professional excellence competitions, winning prizes and awards. These achievements demonstrate the high level of preparation and competitiveness of the Branch's graduates in the international academic arena.

The Branch hosts prestigious international Olympiads and scientific conferences. In 2024, it simultaneously hosted two significant events: the 2nd Superfinal of the Open International Internet Olympiad in Mathematics and the 3rd International Conference “The Youth and Innovation – the Future of the Oil and Gas Industry”. The faculty members from the branch served on the Olympiad jury, demonstrating a high level of professional competence. They also actively participated in the conference, winning prizes and awards, confirming the team’s high research and teaching potential.

Extracurricular activities play a crucial role in the comprehensive development of young people and the development of their creative abilities. The Branch hosts 10 scientific and 5 subject-based clubs, as well as 4 student clubs. The Branch also houses a student section of the Society of Petroleum Engineers and a society for supporting youth social initiatives - the “Student Volunteer Initiative”.

In collaboration with the Uzbekistan Volleyball Federation, the Uzbekistan Basketball Federation, and the Uzbekistan Handball Federation, sports sections have been established in six sports, in which students from the Branch actively participate. The results of the students’ active sports activities are demonstrated by their participation in city and national sports competitions, and other sporting events.

In conclusion, it should be noted that the Branch is a modern, comfortable university for studying and working, with a close-knit team of highly qualified specialists, providing sought-after, high-quality educational and scientific services, utilizing cutting-edge technologies, and boasting a high level of youth self-organization and international activity. The Branch is recognized as a supplier of highly qualified personnel sought after by leading oil and gas companies in the Republic and abroad, a prestigious employer attracting top talent from scientific and educational organizations and industry companies, and a center of excellence in high-tech research for the oil and gas industry.

Universities play a vital role in shaping the next generation of oil and gas professionals. To meet future industry demands, higher education institutions must enhance their educational frameworks through digitalization, sustainability-oriented curricula, and closer collaboration with industry partners. Developing interdisciplinary programs that combine engineering, management, and environmental sciences will ensure that graduates are prepared to contribute effectively to the evolving oil and gas landscape.

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