
Requirements for General Vocational Training of Engineering Students

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Abstract: In this article, the modern specialist must not only have a large amount of technical knowledge, but also be technologically well-prepared, able to work creatively, methodologically literate, broad cultural outlook, successful management of complex socio-economic and political processes, a new system of social production should have social knowledge that is relevant, fully understands their professional knowledge and creative abilities.

Keywords: engineer, integration, technology, technical systems, mental labor, physical labor, engineering.

Introduction. 2018 of the President of the Republic of Uzbekistan PQ-3775 of June 5, 2017 "On additional measures to improve the quality of education in higher education institutions and ensure their active participation in the ongoing comprehensive reforms in the country", 20 This scientific article serves to a certain extent in the implementation of the tasks set out in the Resolution of the Government of the Republic of Uzbekistan No. PP-2909 of April 1 "On measures to further develop the system of higher education" and other regulations related to this activity.

The development of general training of future engineers should be considered not only in terms of continuity and integration of education, but also in a broader context.

A systematic approach to engineering education is a way of theoretically representing and replicating an object as a system. The systematic approach focuses on revealing the integrity of the research object and the mechanisms that support it, identifying the different types of complex objects and bringing them into a single theoretical picture. The concepts and principles of the systematic approach help to define the structural and typological features of these disciplines, to create new topics of study, as well as to formulate constructive research programs. Theories of the system approach have been studied by Y.K. Babansky, V.V. Krayevsky, I.Y. Lerner, M.N. Skatkin and others.

In modern conditions, the general professional training of future engineers changes during the entire career of the engineer and develops in accordance with the requirements of the modern engineer.

Traditionally, the definition of a concept begins with etymological research, which allows us to determine the origin of the term, its semantics, and some of its characteristics.

In the literature, the word "engineer" appears in documents from the mid-seventeenth century. According to etymologists, the word came from Poland, where it is derived from German and French - "ingenieur", Latin "ingenium" - "intelligence", "intelligence", "talent", "ability", Means "knowledge". In ancient times, the term "engineer" began to be used to describe the special training associated with the invention of military vehicles, as well as their

invention.

At present, the concept of "engineer" is interpreted differently. For example, in Ojegov's dictionary, the term "engineer" is interpreted as "a specialist with a higher technical education." In our view, such a definition does not adequately define the nature of an engineering activity, but rather outlines the specific training that a top technical engineer must receive.

The concept of "engineer" is considered in the work of GI Denisenko: Engineer - "a specialist who creates economically useful objects, various products, projects on the basis of theoretical concepts and material means." This definition provides some information about the essence of engineering activity, but, in our opinion, does not fully explain it, because it does not emphasize the essence of the theoretical requirements based on engineering activity.

SA Lebedev, VI Medvedov, OP Semenov consider the engineer as a subject of technical activity. Engineering activities are closely related to engineering and technology, the development and creation of technical systems, and their operation and management. Therefore, an engineer is a specialist who solves the problems of design, construction, operation, equipment and technology in practice on a scientific basis.

In *The Philosophy of the Computer Revolution*, AI Rakitov discusses the process of transforming engineering from its inception to the present day. By engineering, AI Rakitov means "analysis of individual and group work, continuous improvement and organization, production management, design of technological processes, products and tool systems."

With the advent of engineering and the separation of mental labor from physical labor. Therefore, from ancient times to the present day, the exclusive task of the engineer is to provide intellectual support to the process of creating equipment.

Literature review.

There are three types of engineering activities:

The first type is characterized by the focus on the creation and production of technical facilities, based on the capabilities of technical knowledge until the first half of the twentieth century. At this stage, science, social and technical activities are not interrelated and have radically different goals. According to VI Stryukovsky, the first stage of development of the "human-technical" system of production was the peak of its development, the period of its natural transition to the second stage. The historical significance of cooperation and production is that they are a material preparation for a radical change in the type of technological development of reality that determines the necessity and possibility of an organic link between scientific and technical activity.

The second type is characterized by an increasing interdependence of natural science and engineering activities: the results of the natural sciences depend on increasingly used devices, and the complexity of technical objects makes engineering knowledge dependent on the natural sciences.

In today's world, science, engineering and everyday components are closely intertwined: the high technologies used in production are consumer-oriented. This has led to a radical change in the professional practices of people, which are now based on technology and technology.

Despite the closeness of research and engineering activities, there is a fundamental difference between them: the purpose of scientific activity is to know, resulting in the formation of laws and principles; Kristanovskaya stressed that the purpose of engineering activities is to develop tools and methods of environmental change to create a technical structure. The dual

nature of this engineering activity, on the one hand, for the scientific study of natural phenomena, and on the other hand, for the production of its own idea, forces us to take a different approach to the results of the work of engineers and scientists. If the purpose of the technical activity is to directly identify and organize the production of the technical system, then the goal of the engineers is to determine the material conditions and artificial means, and only then, based on the acquired knowledge, the production methods and sequence indicates the sequence.

If we do not define what technology is as an object of engineering activity, the above analysis of engineering activity will not be complete, because the most important indicator of the level of development of scientific and technological progress is the level of technical means and material base of production.

According to S.A. Lebedev, the technique first appears in the form of material formations that change their appearance under the influence of man (mainly mechanical). This period is associated with the first type of engineering activity. With the development of technology, its materiality has also changed, and it is gradually becoming not only an object, but also the result of labor.

The transformation of technology as an object of engineering activity can also be seen in terms of the basic natural principles that are defined as “the basis for the creation of the productive forces of society at a certain historical stage”. It is known that one of the objective reasons for the transformation of production into a large industry was the invention and use of steam engines.

Subsequent needs of social development have led to the widespread use of electromagnetic phenomena and laws based on an entirely new natural science. Modern industry is based on the use of electricity and magnetism, electronics. The key challenges facing the electronics industry are the creation of electronic devices that can be used to receive, store, process, and present information flows of increasing size and complexity.

According to V.I. Stryukovsky, the development of production has aroused great interest in the natural sciences (physics, mathematics, chemistry, biology). In addition to the needs of emerging capitalist production, a wide wave of inventions that play no small role in the qualitative change of invention and technology and are one of the prerequisites for the emergence of technical creativity in the modern sense appeared. We summarize the results of the analysis of engineering activities and present it in Table 1.