IMPROVING THE METHODOLOGY OF TEACHING ELECTRICAL ENGINEERING AND ELECTRONICS IN HIGHER EDUCATION

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Abstract. *This article considers the current importance of the methodology of teaching the basics of electrical engineering and electronics, the role of modern scientific and technological developments in teaching the subject, as well as the importance of teaching in a higher military educational institution. It is also emphasized that it is necessary to use all its methods to organize teaching.*

Keywords: *electrical engineering, electronics, technology, methodology, element, specialist, imagination, experiment.*

Currently, one of the most important tasks in the education system is to prepare young specialists who are mature and competitive, with high thinking and imagination, in accordance with world standards. Therefore, the educational process is gaining special importance both in terms of content and method.

Like any other science, the science of electrical engineering and electronics has its own specific features, its own teaching methods and forms of organizing teaching.

The scientific and methodological work of foreign scientists is of great importance in the creation and improvement of the methodology of teaching electrical engineering. The authors of such a legacy include M.V. Lomonosov, V.V. Petrov, E. Kh. Lens, B.S. Jacobi, M.O. Dolivo-Dobrovolsky, P.N. Yablochkov, M. Faraday, G. Om, A. Ampere, and others. The source of development of the methodology of teaching electrical engineering is textbooks, manuals, laboratory instructions. The creative use of these manuals by the teacher increases the effectiveness of his methodological work.

How to teach the subject of fundamentals of electrical engineering and electronics, what methods to use, the content of the program, how to arouse interest in this subject in cadets and encourage them to work independently - these are the main questions of the methodology of teaching the subject. Like other subjects, in the process of teaching the subject of fundamentals of electrical engineering and electronics, along with providing the necessary knowledge to the cadets, their cognitive abilities are also developed.

When teaching the subject of fundamentals of electrical engineering and electronics, it is first of all necessary to achieve an interesting, understandable and simple presentation of the topics to be covered, because this subject is taught for future military specialists. It is necessary to work so that they have a clear idea and knowledge about this subject in a short time. The educational process will be effective and will give high-quality results only if it arouses in the cadet a desire for active action, knowledge and skills.

To organize teaching in this way, all its methods should be oral, demonstrative and practical, reproductive, search, inductive and deductive, as well as independent work methods should be used.

The main source of interest in teaching is, first of all, its content. In order for this content to have a strong motivating effect, a number of teaching principles should be met by students. To do this, first of all, it is necessary to introduce the content of creativity in situations of novelty and relevance, the most important discoveries in science and technology, the most important discoveries in modern culture, art, socio-political and international life events. Only then will the cadets clearly and deeply feel the importance of the issues being studied in the lessons and approach them with great interest.

According to the higher education curriculum, there are the following forms of study in the subject of fundamentals of electrical engineering and electronics: lectures, practical and laboratory exercises. Independent preparation hours include performing and submitting computational and graphical work (solving problems), as well as participating in scientific research (preparing abstracts on the prospects for the development of electrical engineering and electronics and their role in military equipment). In addition to general methods, teaching the basics of electrical engineering includes experiments, graphic depiction of processes, schematic representation of devices, use of vector diagrams, etc.

Choosing the most effective teaching method is one of the main issues in organizing the educational process, which causes some difficulties. Pedagogical research has shown that most teachers have difficulty choosing a teaching method. In order to have a methodology for choosing methods, it is necessary to know their types and the methods for effectively using each of them.

A separate methodology is not required to ensure knowledge of the educational material on electrical engineering. Based on the content of the

science, it is possible to see its specific features. First of all, the study of electromagnetic phenomena is carried out only through the use of various instruments. In alternating current circuits, electromagnetic instruments such as ammeters, voltmeters, and electric energy meters are most common. Electrical quantities are estimated according to the indicators of these instruments. Electrical measurements are the main method in the study of phenomena in electrical engineering. In electrical engineering, as in other general technical disciplines, various schemes of devices are used, because it is very difficult to study the structure of transformers, machines and various devices without schemes. The structure is analyzed, the principle of operation is considered, and then attention is paid to the real model. The study of processes in the device under consideration requires the derivation of formulas, the use of connection graphs, the construction of vector diagrams, and so on.

Real electromagnetic processes are complex, and their study requires a special methodology. An arbitrary electrical device consists of separate electrical circuits. Whenever possible, it is permissible to consider them as a simple model of an electrical device. The principle of modeling allows combining special cases and using a rational methodology for studying phenomena and processes.

The hours allocated for studying the basics of electrical engineering and electronics are very few. This places the teacher on the responsibility of developing and using effective methodologies for studying the subject. When studying electrical engineering, attention is paid to some basic devices only after a thorough study of electrical laws and processes. This approach leads to the knowledge of methods for analyzing processes based on electrical laws. The distribution of teaching hours is determined by the relevance of the topics.

The superiority of the theory of electrical circuits can be explained by the fact that, as mentioned above, it is a separate element of any electrical device. The study of circuits sometimes relies on methods that require a lot of time and calculations. According to modern computational methods, in order to save time, calculations can be performed using computational techniques, but logical analysis is not performed during the calculations, which does not develop thinking. Studying circuits in block diagrams is one of the methodological methods for studying the operation of electrical devices.

Any electrical device consists of a source and a consumer, which are part of the device. In addition, it contains elements that connect the source and consumer, as well as correspond to the operating mode of the circuit. In the simplest case, when energy is transmitted from two-wire lines of the source, consumers and their connecting elements can conditionally form separate blocks. Such a methodology shortens and simplifies the process of analyzing the principle of operation of the device.

When organizing classes in the subject of fundamentals of electrical engineering and electronics, methods are selected that increase the effectiveness of education, taking into account the characteristics of the educational material and the specificity of the specialty being taught. In this case, the principles and methods of practical use of well-known methods of education are introduced into the educational process, their features that contribute to the formation of creative qualities, and set a didactic goal.

It is a requirement of the time for higher educational institutions to develop improved content for classes in the fundamentals of electrical engineering and electronics, prepare textbooks, scientific and methodological recommendations, lesson plans, and electronic solutions that ensure effective

teaching. The improved content of the subject, the methodology of its teaching, as well as the created textbooks and electronic materials serve to form deep and solid knowledge in the subject of fundamentals of electrical engineering and electronics in the training of future officers. This, in turn, completely eliminates the traditional and inefficient method of training.

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