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IMPROVEMENT IN TEACHING OF THE DISCIPLINE OF ELECTRICAL ENGINEERING AND THE BASIS OF ELECTRONICS IN HIGHER EDUCATIONAL INSTITUTIONS BASED ON INFORMATION TECHNOLOGIES

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ABSTRACT
This article reveals the objectives of training based on modern information technology in the study of the disciplines of electrical engineering and the basics of electronics in military schools. And also, the article presents fascinating organizational tasks with the help of this layout board in practical and laboratory exercises, their application, its practicality, the place of the Project Board layout board. In the board of the Project Board mock-up, the use of radio electronics means the basis of integrated circuits, in addition, the privilege of this board over a universal laboratory bench and sharing with the ARDUINO program is given.

KEYWORDS: integrated circuit (IC), Project Board breadboard, universal laboratory stand (ULS), decoder, combinational circuit, ARDUINO program.

INTRODUCTION
Radical improvement of the higher education system, based on the priorities of socio-economic development of the country, ... each higher education institution to establish close cooperation with leading scientific and educational institutions of the world, advanced pedagogical technologies based on international standards, curricula and Tasks such as the introduction of teaching materials, ... the organization of retraining and advanced training of teachers "Higher education "On measures for further development of the system of m dated April 20, 2017, reflected in Resolution No. 2909 [1].
The use of modern information technology in the educational process has a positive impact on increasing the effectiveness of teaching methods, changes in the work of teachers, improving their pedagogical skills, structural changes in pedagogical systems. This puts specific tasks in the organization and management of informatization of pedagogical processes.
Effective organization of pedagogical educational processes on the basis of modern information technologies:
- Team teachers, computer programmers, relevant specialists working together to create distance learning courses and electronic literature;
- Proper distribution of tasks among teachers;
- provides an opportunity to improve the organization of the educational process and monitor the effectiveness of pedagogical activities [2,206].
Why is it necessary to create a theoretical basis for the introduction of information technology in education today and put it into practice? First, it can be noted that the teacher is becoming one of the sources of knowledge acquisition rather than the organizer of the learning process.
Second, at the evolving stage of scientific and technological progress, the rapid increase of information and the limited time for its use in the teaching process, as well as the requirements for perfect preparation of students for professional activities require the introduction of modern technologies in education [2,220].
In the informatization of education, along with the mastery of information and communication technologies by future personnel, it is necessary to accelerate the training of personnel in the field of science with the help of information and communication technologies. In this regard, the organization of theoretical and practical training on "Fundamentals of Electrical Engineering and Electronics" in higher military education leads to a broader understanding of the subject, the strengthening of knowledge, skills and abilities using modern information technology and interactive methods. The role of the science of the basics of electrical engineering and electronics in the study of modern weapons, the components of their structure by our future officers is great. In addition to theoretical classes, there are laboratory and practical classes, in which cadets consolidate their theoretical knowledge in practical and laboratory classes.

Today, most of all radio electronic devices in the world are based on digital logic integrated circuits (IMS). Chips vary in appearance, structure, operating principle, and performance [3,3].

In laboratory classes, cadets learn the principle of operation of the chip, how to signal the input of the chip, how to get a signal at its output by assembling the circuits from which the IMS is taken on special stands. During the completion and submission of laboratory work, cadets fill in the validity table, draw time diagrams. The use of non-traditional methods in the laboratory and practical training in the learning process is very important in improving the quality of education. One way to meet today's requirements is to use Project Board layout boards [4,55]. This method provides a wide range of opportunities for professors and teachers to conduct lessons more effectively.

Project Board is a special board, which allows the user to quickly and easily assemble and test circuits of various complexity related to electronics and circuitry.

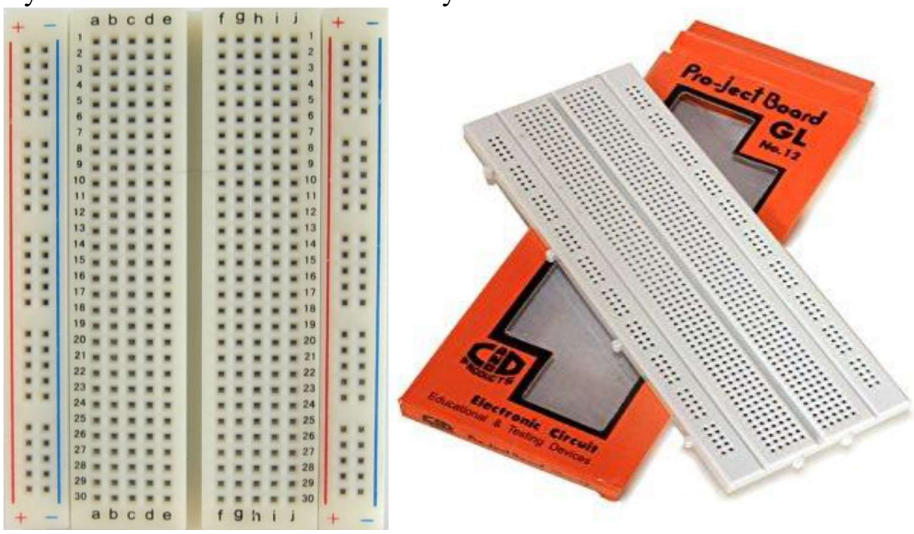

Figure 1. Project Board layout boards

Advantages of the Project Board mock-up over the universal laboratory stand (ULS):

1. Provides the opportunity to work in small groups (2-3 people). At least 3-4 cadets must complete the work at ULS.
2. It is possible to assemble basic elements, combinatorial and serial devices.
3. Several types of IMS can operate simultaneously, which cannot be done in ULS. The ULS can handle up to 24 feet of IMS.
4. The board has the ability to assemble different circuits powered from a single source at the same time.
5. It is much easier for cadets to learn the Project Board layout.
6. Increases the trainees' interest in science because the trainee is able to practice schemes of varying complexity. (Figure 2)
7. The cadet is able to perform the tasks assigned to him independently, not only in class but also in his free time, using the board.
8. The plate is not as expensive as ULS, the body price is cheap, the dimensions are small, the portable view is compact. It has the ability to expand the board as needed by connecting the pieces.
9. It doesn't take much to work on a board. These are: source, IMS, connecting wires, emitting diodes, resistors and more.
10. By learning programming, the Project Board allows you to create ARDUINO subroutines on a layout board. (Figure 3)

The advantage of teaching the basics of electrical engineering and electronics on the basis of Project Board layouts is that cadets are much more comfortable in laboratory classes than traditional methods of studying the combination scheme not only in ULS, but also on Project Board layouts.

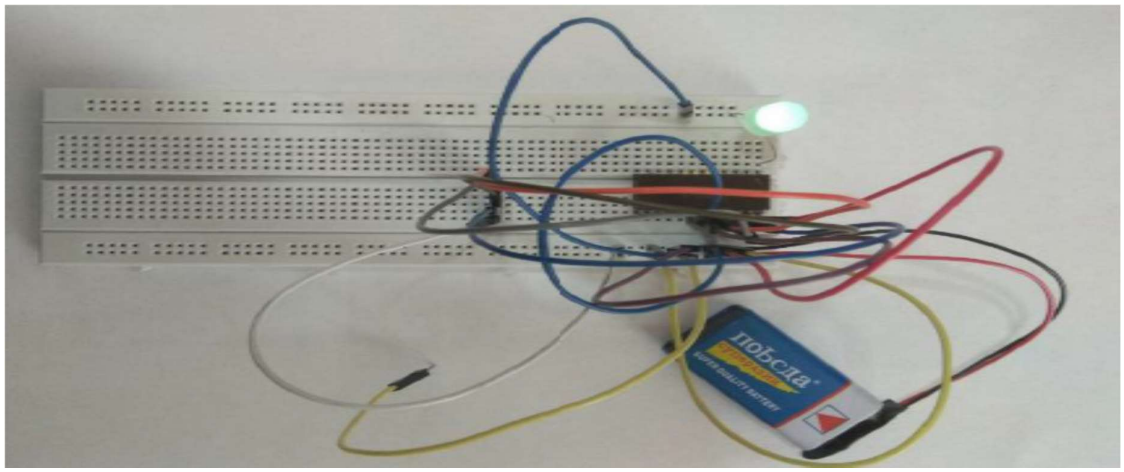

Figure 2. К115ИД3 ИМС 4x16 decoder circuit using Project Board layout

The advantages of the Project Board layout are that it allows students to accelerate the learning process, to think independently, to work with practical projects, to use methods aimed at increasing their intelligence. The Project Board layout can be used not only in "Fundamentals of Electrical Engineering and Electronics" but also in "Electronics and Circuit Engineering", "Electronics", "Design of Radioelectronic Means", "Theory of Electric Circuits", "Discrete Mathematics" and many other disciplines.

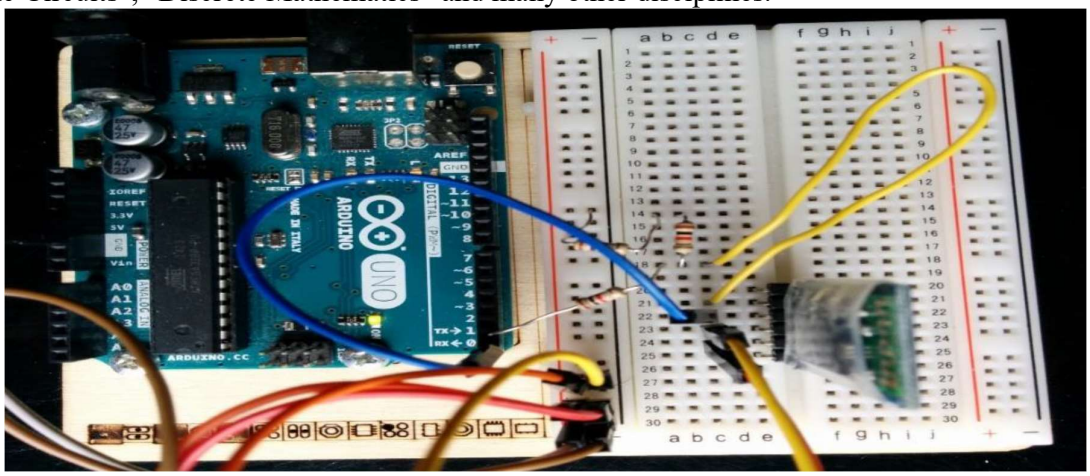

Figure 3. Creating ARDUINO subroutines on the Project Board layout board

In conclusion, today it can be said that innovative technologies, information technologies serve as the main tools of teaching. These boards allow you to study the elements, devices, schemes of science in accordance with foreign standards.

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