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Teaching Methodology of Electronics and Circuits Subject Based on Digital Technologies

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Abstract
The article on "Teaching Methodology of Electronics and Circuits Subject Based on Digital Technologies" aims to enhance the teaching process in the field of electronics and circuits. These methodologies facilitate identifying teaching objectives, organizing teaching materials, utilizing interactive teaching methods, practical exercises, group work, individual guidance, and involvement in scientific activities in real life. This series of activities supports theoretical and practical knowledge enhancement and their integration with the field.
Keywords: Electronics, circuits, group work, individual guidance, engineering fields, advanced technologies

Introduction

The significance of electronics courses today is not limited to just electrical engineers. Nowadays, in all aspects of our daily lives, as well as in professional activities, communication, medicine, industry, and other fields, advanced electronic devices are being used. In recent decades, the rapid development of electronics has been changing our lives in a globalized world. The integration of electronic devices into various fields such as daily life, industry, communication, transportation, medicine, and others demands the teaching of electronics in the educational sector. However, in many cases, the teaching systems neglect the essential point of electronics from an interdisciplinary perspective. For example, modern robotics, which is rapidly evolving today, is undoubtedly one of the most promising fields in many engineering disciplines, and knowing electronics based on mathematics and advanced technologies is essential for mastering this field.

Robotics, which is developing rapidly, is considered a part of mechanical engineering courses, where the control electronics elements, communication architecture, and programming environment are integrated into a comprehensive course. Electronics, mechatronics, and computation are the foundation of robotics. Electronics is evolving rapidly and expanding into various interdisciplinary connections. Nowadays, electronics is penetrating into every field of study, for example, electronics and circuit subjects are taught in higher education institutions.

Main Section

The methodology of teaching the subject of Electronics and Circuits based on digital technologies is comprised of strategies utilized to teach the aforementioned topic to learners and provide them with theoretical and practical knowledge. These methodologies are developed in collaboration with technological advancements and changes in educational technologies. The following steps are crucial in forming the teaching methodology:

1. Objective of Teaching: Educators need to understand the primary objectives of teaching. These objectives aim to enhance students' understanding of concepts, general knowledge, and theoretical and practical skills in the field of electronics and circuits.
2. Organizing Teaching Materials: Educators engage in preparing interesting and important teaching materials to stimulate the learning process for students. These materials may include teaching basic concepts in electronics and circuits, applications, problem-solving, and other abilities.
3. Interactive Teaching Methods: Digital technologies can be effectively utilized to provide interactive learning experiences for students. Virtual laboratories, simulations, videos, interactive textbooks, and online platforms serve as powerful tools for teaching concepts and enhancing understanding.

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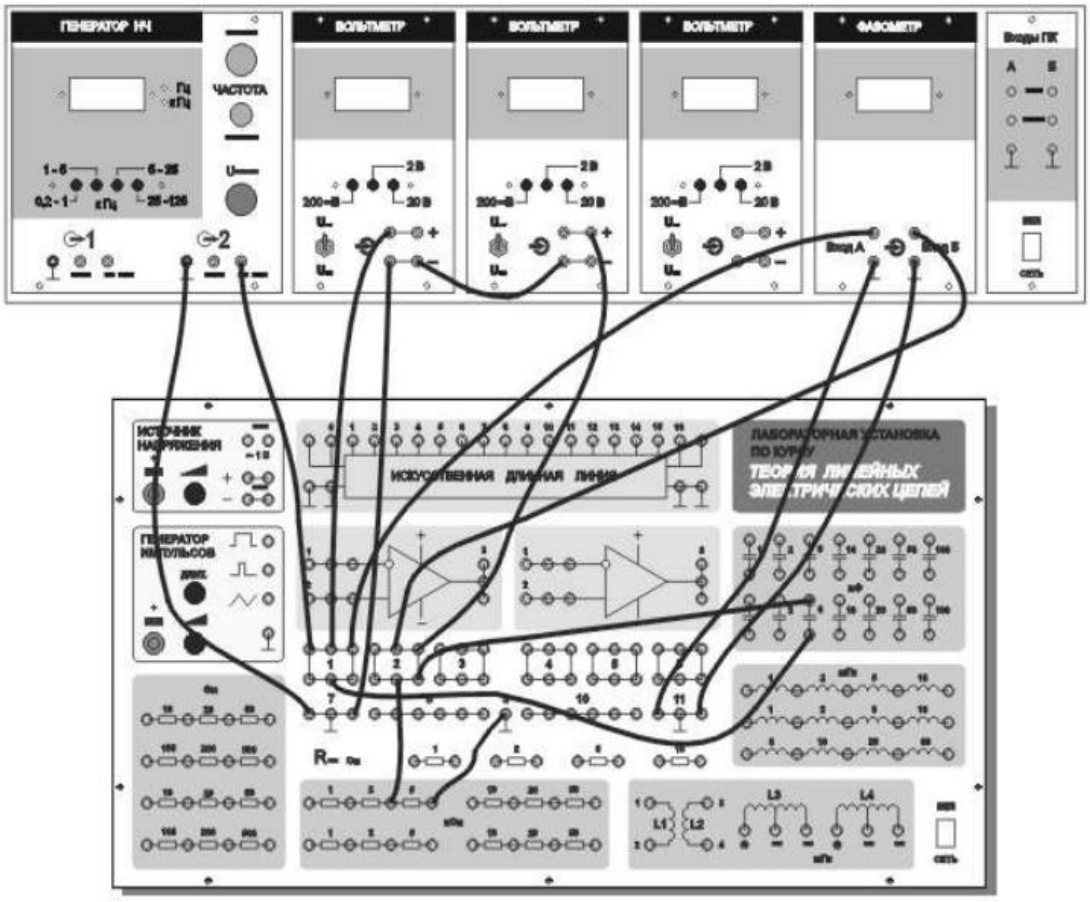
4. Practical Exercises: Practical exercises in teaching electronics and circuits are highly important. Students are recommended to utilize laboratory environments to learn about electronic devices, test sensors and circuits, design circuits, and solve problems.
5. Group Work: Group work assists in evaluating students' skills and understanding and enhances their collective confidence. Group activities are important for demonstrating teamwork, finding compromises, and learning to work with others.
6. Individual Guidance: Customized teaching methods and guidance are required for all students. Educators need to be prepared to provide individual assistance, support, and allocate time to improve students' confidence.
7. Participation in the Scientific Field in Real Life: Lessons related to real-world examples, visits to relevant industries, and staying informed about industry-related news help increase students' interest. Providing information about existing technologies and devices, discussions with field experts, and vocational training programs can strengthen students' understanding.



1. Diagram.

1. Diagram of the circuit with elements connected in series.
Connect PV1 voltmeter to 20 V AC. Also connect PV2 voltmeter to 20 V (it is possible to change to another during the measurement process). Adjust the voltmeter switch to measure variable excitation (U). Attach the negative terminal of the output excitation generator (rotor) to the end opposite the hour hand. Show the assembled circuit to the instructor. Follow the assembled circuit after the instructor's check.
When the output excitation of the generator is adjusted to UG = 3 V. This value remains constant until the end.
Place a diode across the output excitation of the generator so that it opposes the direction of rotation of the hour hand when measuring excitation at the end.
To obtain the excitation value Uc on the capacitor, it is necessary to change the measurement scheme according to the diagram 1. This does not change the circuit mode, but the PV2 voltmeter indicates

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the excitation on the capacitor, while the phase meter shows the phase difference between the excitation on the generator and the excitation on the capacitor.

Conclusion

It can be concluded that electronic circuits and schematics consist of sections such as physical electronics, technical electronics, and the technology of electronic circuit diagrams. Physical electronic circuits deal with the movement of atomic particles, ions, and neutral atoms in various environments such as vacuum, electromagnetic fields, etc., and the physical laws associated with them, the principles of creating electronic devices, apparatus, obtaining, transmitting, and utilizing electromagnetic energy using electronic devices and equipment, studying theoretical and practical aspects of atomic particle flows, ions, quanta, the effect of electromagnetic fields on materials, and schemes used therein; it also studies electron emission circuits, ionization, energy levels, tunneling effects in semiconductors, and electron flows.

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