

DEVELOPMENT OF STUDENT'S ECOLOGICAL COMPETENCE IN TEACHING THE SUBJECT OF ELECTROMAGNETIC RADIATION

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Abstract. *The article analyzes the magnetic field, electromagnetic waves and vibrations, the essence of electromagnetic radiation during operation and their negative impact on human health in the physics program for students of the Academic Lyceum of Internal Affairs.*

Keywords: *Bologna declaration, competence, electromagnetic field, interdisciplinary education, electromagnetic waves and vibrations, electric motor, transformer, electric generator, electric motor, electric arc.*

The sharp evolutionary-gradual changes taking place in our society today have their impact on education as well as on all spheres of the national economy, and at the same time, they set certain urgent tasks for specialists working in this direction.

One of the tasks in the field of education is to improve the quality of physics education for students studying at “Academic Lyceums of Internal Affairs” and to train competitive personnel who can meet the requirements of the present time.

The urgency of these issues is directly related to the issue of the Bologna process - the Bologna Declaration, which is currently being discussed at the international level. It is known that the certificates and diplomas of higher education institutions that are compatible with the Bologna process and the level of education recognized for this process are recognized all over the world, and a specialist with this document has the right to work in his field in any country of the world. One of the main requirements for the compliance of the trained specialist with the Bologna process is the compliance of the general competence of the specialist with the requirements of the process.

The Academic Lyceum of Internal Affairs teaches students the topics “Quantities describing the magnetic field”, “Electromagnetic induction phenomenon”, “Magnetic properties of substances”, “Free electromagnetic vibrations” in “Physics”, together with the development of abilities and skills that they should acquire in their professional activities and personal life the demand for competence development is increasing.

Explaining the environmental problems of energy to students in the teaching of the above topics not only increases their interest in physics, but also educates them in a conscious attitude towards the environment, and develops their knowledge, skills and competences related to the rational use of energy reserves.

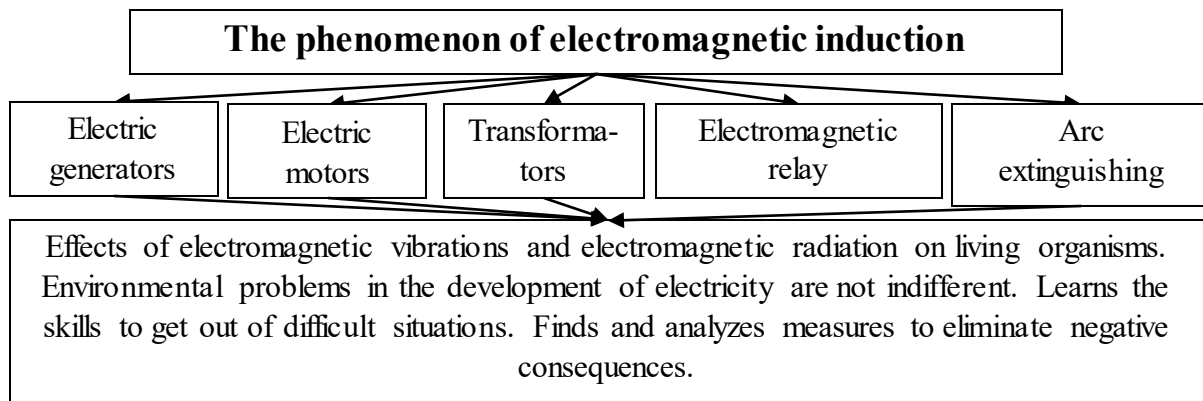


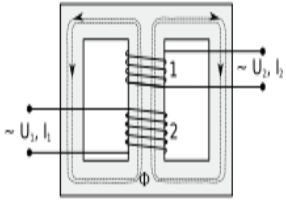



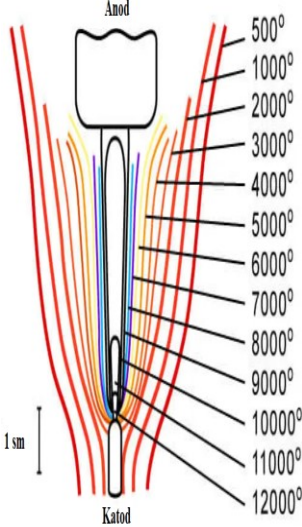
Figure 1. Model of development of environmental competence of the student in the educational process.

- a model for the development of the student's ecological competence in the interdisciplinary teaching of topics within the physics curriculum was developed. It serves to strengthen the theoretical knowledge that students have acquired during the course of the lesson.

Based on the above analysis, in the development of the student's ecological competence in the interdisciplinary teaching of physics, it is necessary to implement the following tasks in order to solve the energy problem facing humanity today.

#	Device name		Brief description
1.	Electric generators	 <p style="text-align: center;">Automatic generator</p>	<p>An electric generator is a device that converts the mechanical energy of rotations into direct or alternating current. Mechanical energy is obtained from the prime mover. Sometimes, an electric motor is used to turn the shaft of an electric generator. In this case, together with the electric motor, the electric generator is supplied by changing the type of current, converting alternating current into direct current or converting electric current of the same frequency into an electric current of a different frequency.</p>

2.	Electric motors	 <p style="text-align: center;">Electric motor</p>	<p>An electric motor is a machine that converts electrical energy into mechanical energy. According to the type of current they consume, they are divided into direct current and alternating current Electric motors. It is possible to smoothly adjust the frequency (number) of rotations of the shaft in constant current E. d. Therefore, such engines are used in cases where it is necessary to quickly change the frequency of rotation of the shaft. The constant current E.d was produced with three types of circuits: parallel excitation, series excitation and mixed excitation (see the picture). Alternating current Electric motor includes asynchronous electric motor, synchronous and commutator motors (see Commutator machine).</p>
3.	Transformers	 <p style="text-align: center;">Scheme of transformator</p>	<p>A transformer is an electrostatic device that converts low voltage to high voltage, high voltage to low voltage. In technique —. a device designed to change energy or some important property of objects. A transformer is an electromagnetic device used as an electrical energy converter. Its task is to increase or decrease voltage values in electrical networks, and then it can be used in all areas of human life and economic activity.</p>

4.	Electromagnetic relay	 <p style="text-align: center;">Electromagnetic relay</p>	<p>Relay is an electrically controlled switching device (switch). It consists of a set of input terminals for one or more control signals and a set of operating contact terminals. Relay is a widely used device for control, protection, control, signaling, adjustment and other discrete operations in automatic systems. When the input signal to the relay changes continuously and has a certain value, an output signal with a jump characteristic is generated. when the value of the input signal decreases to a certain amount, the output signal disappears in a jump-like manner and returns to the previous state.</p>
5.	Electric arc	 <p style="text-align: center;">Electric arc</p>	<p>Electric arc and methods of extinguishing it - an electric discharge formed in the air between the electrodes. In this case, a clear illumination occurs and a high temperature appears. If the current is high and the gas flow is strong, the temperature can reach up to 5000°K. When the electrodes are placed horizontally, the light takes the form of an arc under the influence of the gas streams heated by the electric discharge. In this case, overheating of the electrodes (contacts) occurs, where cathode and anode spots are formed. The glow of the cathode is concentrated in a small bright spot, and the glowing part of the opposite electrode forms the anode spot.</p>

The general competence of a specialist is a complex characteristic that includes his professional, psychological, and social individual competence. Different definitions of such competence and ways of its development have been studied and discussed by experts in different fields for almost half a century in different countries.

This article analyzes the main factors of the formation of students' competence in the teaching of physics at academic lyceums of internal affairs. As shown above, since competence is a complex process, the methods of its formation also appear as a very complex process as a result of various objective and subjective reasons. That is why this process takes place differently in different groups, in the activities of different pedagogues, and it is difficult to give a specific guide

or instruction for this. Nevertheless, it is possible to indicate general directions regarding the formation of professional competence.

Today, humanity lives in the electromagnetic field, ultraviolet and infrared radiation, X-ray radiation, laser light and radiation currents. These processes have a slow effect on humans and living organisms in general. Most of these cannot be perceived by the senses. Also, the mechanisms and norms of their influence on living organisms have not been studied. However, the main source of their origin is global technical progress. It is desirable to implement these problems organically in the process of physics, biology, and chemistry education at all stages of the continuous education system.

Short-wave gamma rays, X-rays, and ultraviolet rays are taught to students in this interdisciplinary teaching on the topics “Electromagnetic Waves and Vibrations”, “Electromagnetic Radiations” when watching color televisions closely, working on computers for a long time, talking on tablets and smartphones for a long time. That these short-wave frequencies vibrate the atoms and molecules in the cells of the human body, the blood circulation structure is damaged as a result of the vibrations, it weakens the brain, it causes various diseases that are dangerous to human life, the waves are dangerous to life, its biological - in interdisciplinary teaching of the concepts of hygienic effects in biology, it is explained that watching color televisions, working on computers for a long time, talking on tablets and smartphones for a long time can worsen memory and thinking and cause various diseases.

Energy plays an important role in the life of society. It allows you to multiply the possibilities of meeting various needs. The development of human civilization is closely related to the amount and types of energy used. However, today's development of the national and world economy is causing excessive use of energy resources and, as a result, their volume is decreasing. This, in turn, causes a shortage of resources and ecological problems. In such conditions, it is of urgent importance to create the understanding of people, including schoolchildren, about the rational use of energy.

The results of the research on the organization of the development of the student's ecological competence in the interdisciplinary teaching of physics in the academic lyceums of internal affairs showed that as a result of the theoretical knowledge of the students, the ability to identify the environmental problems encountered in their daily activities and the competence to eliminate them was significantly developed. It plays an especially important role in the lives of high school students. The teacher should organize lessons that develop the student's ecological competence without making changes to the topics included in the physics textbook of academic lyceums. For this purpose, the teacher organized the reinforcement of students' theoretical knowledge during the presentation of new material as follows.

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