Tarasyuk Vasily Andreyevich - graduate student of the National University of Life and Environmental Sciences of Ukraine

USE CAD systems in teaching ELECTRICAL discipline.

Today, information technology has become an integral part of the modern world, they largely determine the future economic and social development of mankind. These conditions require revolutionary changes and training system . Hence we can say that the urgency of the issue takes place in a modern educational environment , because today quality teaching subjects can not be implemented without the use of tools and features that provide computer technology and the Internet. They allow the teacher to better apply the material to make it more interesting , quickly check students' knowledge and increase their interest in learning. Teachers can receive the latest information and actively communicate with colleagues, students and parents. This increases the authority of the teacher, it can really be a carrier of culture , knowledge, all progressive.

Since the old techniques and training methods do not meet the current requirements of today's lesson and are not subject to the trend of rapid development of science and technology , it encourages teachers to implement innovative teaching methods and the use and adaptation of these technologies in the learning process. This problem is particularly acute in the formation of professional skills and abilities as effectively for their learning, the learning process requires a large amount of visual materials and interactive tools, which in turn positively contribute to improving the educational attainment of the goal.

Current production is characterized by a sharp complication of products, causing a significant increase in the design and development work. In modern enterprises aerospace , electronics, biotechnology and other high-tech construction department states account for a significant share of total state workers. In addition, the design work involved in special institutions : design institutes, design bureaus and so special.

The purpose of the article - describe the main software used in teaching electrical engineering courses .

Technological progress and competition are forcing to reduce development time of new products. The winner of this fight the one who first begins to produce a new product or a new model : a computer , airplane, car, etc. .

Application of computer and information technologies in design and construction makes it possible to significantly increase the productivity of the designer, to significantly reduce development time .

In some areas , such as in the electronics industry during the development of integrated circuits a high degree of integration can not be performed at all design and design development without the use of computers.

To automate the design work in different areas of production developed and successfully used computer-aided design (CAD) (English abbreviation CAD - Computer Aided Design).

The architecture for the design of various structures for industrial and civil use , a system ArchiCAD.

In engineering and instrumentation for the design of various machines , devices, and manufacturing drawings and other technical documentation used computer-aided design AutoCAD.

The most common computer-aided design found in the electronics industry for the design of digital, analog and digital-to- analog electronic devices.

The rapid development of electronics, including computer hardware, a steady increase in performance microprocessors due largely widely used computer and information technology to automate the design.

To automate the design of electronic devices developed and successfully used a variety of CAD systems of different levels : MicroCAP, Electronic Workbench, OrCAD, MicroSIM, P-CAD.

Computer-aided design of electronic devices P-CAD is one of the most advanced , widely used in manufacturing, has all the necessary tools for computer-aided design , as further examined this system .

Modern electronic devices are manufactured mainly in the form of multi-layer printed circuit board on which electronic components are mounted . Apply the following electronic components:

□ circuits of varying degrees of integration;

□ semiconductors (bipolar and field tranzystors , diodes , thyristors);

□ discrete electrical components : resistors , capacitors , inductive components (transformers, inductors, solenoids , etc.).

Design and manufacture of multilayer printed circuit boards is a significant fraction of the total work and is difficult and time-consuming process , so automation design is very important.

System CAD P-CAD is designed for the design of multilayer printed circuit boards of electronic devices in the environment of Windows. It consists of the following modules:

□ Library Manager P-CAD Library Manager;

□ graphics editor with electronic circuit diagrams ¬ tunings P-CAD Schematic;

□ graphics editor multilayer PCB P -CAD PCB ;

□ program trace printed conductors Quick Route, Shape-Based Router, SPECCTRA;

□ program simulation of analog and analog-to- digital electronic devices Protel Advanted Sim;

□ EMC analysis program P-CAD Signal Integrity;

□ support programs : program automates creation of graphics and text documents P-CAD Document Toolbox, program completion reticles CAMtastic.

Design of electronic devices using P-CAD system begins with creating schematic diagrams using a graphical editor for the P-CAD Schematic. Create schematic diagrams is to transfer conventional graphics electronic components from the library on a worksheet and connection terminals components electrical conductors.

Conventional images (Symbol) electronic components are stored in the database of P-CAD. In the database is stored as an image buildings (structures)

electronic component (Pattern) and their parameters. Databases in P-CAD libraries named (Library). To use user libraries designed a special program P-CAD Library Manager.

Established schematic diagram of an electronic device is transferred to the environment editor PCB P-CAD PCB . After transferring scheme implemented placing towers component on the PCB , editing scheme validation compounds.

The next important step in designing a trace conductors, ie accommodation on board electrical conductors connecting pins component. Trace conductors is performed using special software Quick Route, Shape-Based Router, SPECCTRA.

Of electrical devices can be simulated at the design stage using Protel. With this program you can calculate the mode DC transients , to spectral analysis to analyze signals with variation of one or two parameters , investigate the effect of temperature and noise on the characteristics of the electronic device .

To analyze the signaling conductors PCB mutual laying and other parasitic effects of signal transmission lines , electromagnetic compatibility check electronic components PCB appointed a program P-CAD Signal Integrity.

Technology for manufacturing multilayer printed wiring boards provides photomask fabrication drawings printed wiring. Masks are made in photoplotters high accuracy. To control the executive bodies photoplotter need to build management software. Such programs can be created on the basis of the developed PCB using the application CAMtastic.

At the present stage of information society becoming increasingly common in various areas of life become computer technology, they act as one of the tools of knowledge. So one of the tasks of modern education is to prepare teachers who freely oriented in the global information space, which has the knowledge and skills for searching , processing and storage of information using modern computer technology. This area is considered to be promising , because the whole education system is characterized as a large , high-quality operation of which is impossible without the use of modern means of telecommunication and computer storage , processing , transmission, presentation of information .

Intensification of study , characterized by an increase in the amount of educational material and decreasing time mastering requires finding effective teaching methods, controls learning, which greatly improved the quality of education would be.

The increase in computer technology and further expands the possibilities for improvement of teachers to use computer technology not only in the study of science, but a combination of teaching other subjects , using computer technology. Recent developments in information technology are changing the way their application in the study of various disciplines of learning. The Concept of Informatization of secondary schools, vocational schools computerization noted that computerization of the educational process involves , first of all , the widespread use in the study of relevant disciplines of computer - oriented learning tools based on modern computer and telecommunication networks.

Today there is an active implementation of ICT in the educational process , including multimedia and interactive technologies. The use of ICT in the learning process allows for the idea of individualization and differentiation , which are the main tasks of the modern education system in Ukraine.

During the research it has been proved and tested in practice that ICT is an effective means of forming training and skills. The results showed that the use of ICT not only has a positive impact on the process of learning , but also promotes the interest and commitment of the students to the subject and learning in general. Didactic properties of ICT suggest their effective educational tool and a tool to create professional skills.

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