

NEWS

OF THE NATIONAL ACADEMY OF SCIENCES OF THE REPUBLIC OF KAZAKHSTAN

SERIES OF SOCIAL AND HUMAN SCIENCES

ISSN 2224-5294

Volume 2, Number 318 (2018), 201 – 206

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TRAINING OF SPECIALISTS OF TECHNICAL SPECIALTIES ON TECHNICAL DISCIPLINES ON THE BASIS OF INFORMATIONAL TECHNOLOGIES

Abstract. In article the methodologically bound education system and tutoring is considered when the content of the disciplines having in the relations and communications with each other, leads to a particular didactic wholeness of system. Before future experts of technical specialties a number of tasks is created which are set in educational process for users of informational technologies - it is an intensification of educational process, automation of engineering calculations and problem solving, the bound to searching of optimal variants of the decision, using as the training and information system.

Keywords: quality, system, educational process, integration, information, the training program, automation, methodology.

Introduction. In the modern conditions of an acceleration of scientific and technical progress of sharp increase in volume of the scientific and technical information and appearance of the new directions of science and technology quite strict requirements are imposed the content of education, methods and forms of education.

The main reorganization of educational process of the higher school are the training computerization, activation of independent retrieval operation of students, broad application of the means stimulating their cognitive activity.

Basic function of computer training – control of educational activities of students which are implemented through learning programs in case of various organizational forms.

Select the following grade levels:

- determination of the next and perspective purposes of training in the course of carrying out all types of occupations at this course;

- splitting of a training material into subjects, sections;

- development of educational tasks;

- adaptation of educational tasks in relation to type of information technologies and training activity script writing;

- program implementation, debugging and start of system.

During creation of learning systems in higher education institutions types of learning programs are developed:

- information;

- control - learning;

- control;

- decision of standard tasks.

It is possible to reveal a row of technical disciplines which, possessing structural logical relationship, would be connected by the general methodology of education and training at a basis of information technologies. At the same time any changes or innovations in curricula and programs shall be oriented on training of the expert.

Materials and methods. Requirements to efficiency to quality of the decision of tasks of design using technical means all increase and have exponential character. In this regard in case of a study of all-engineering disciplines preference needs to be given to the integrated system of training at a basis of computer-aided educational design.

Automation of preparation of production is carried out with a line item of an integrated approach, however creation of the end-to-end automated system of preparation of production (ETEASPP) is very labor-intensive and multi-stage process of an automated design engineering system (CAD) of different function. Automated control systems for production preparation, program complexes of obtaining designer and technological documents represent elements of end-to-end automated system of preparation of production.

As a rule, now they are developed by different organizations, for their implementation are used the most various systems of coding of information, programming languages and computer aids.

In this regard in educational process those fundamental concepts shall be selected, provisions and modules of the automated system (AS) which save invariants regardless of the changing environment of automated systems. Some scientists insist that application of information technologies is one of means of improvement of quality of training of specialists. At the same time the greatest effect of use of information technologies is reached in case of execution course and theses by use of the systems of an automated educational system design of computer-aided educational design (SAUPR) providing multiple and multivolume calculations.

The systems of computer-aided educational design unlike industrial automated design engineering systems possess a row of the features promoting fast adaptation of the student to operation in the conditions of computer-aided design. Such features are:

- dialogue principle of operation;
- existence of the developed service minimizing operation on preparation of the initial information and design of results of calculation;
- computer-assisted retrieval of errors in basic data;
- existence of own flexible information basis;
- output of necessary comments upon completion of each stage of calculations;
- a possibility of extension of system by switching on of new modules of application programs.

Главная задача системы автоматизированного учебного проектирования состоит в подготовке студента к активному использованию информационных технологий в своей будущей профессиональной деятельности.

Results and their discussions. Creation structurally - the logic diagram of communications of disciplines of an all-engineering cycle when training the expert ("Mechanical engineering") is provided in a figure 1 where a final link in this circuit is the unit of a constructioning of details of machines. In case of development of the system of computer-aided educational design it is necessary to realize selection of educational jobs so that all complex of educational design upon transition from discipline to discipline was based on a specific engineering object. It will demand a certain integration of departments by development of curricula, working programs and subjects course and theses. The unit of the disciplines integrated by the systems of an automated design engineering system, an automated control system of technological preparation of production (ASTPP), the automated control system of technological process (ACSTP) (figure 2), or if to be restricted to educational tasks - the systems of computer-aided educational design, an educational automated control system of technological preparation of production (UASTP), an educational automated control system of technological process (UAUTP) will be another, and, perhaps, the main unit. Implementation of didactic tasks of engineering education on program material of disciplines assumes an output on the following level of integration of intercathedral and interobject communications.

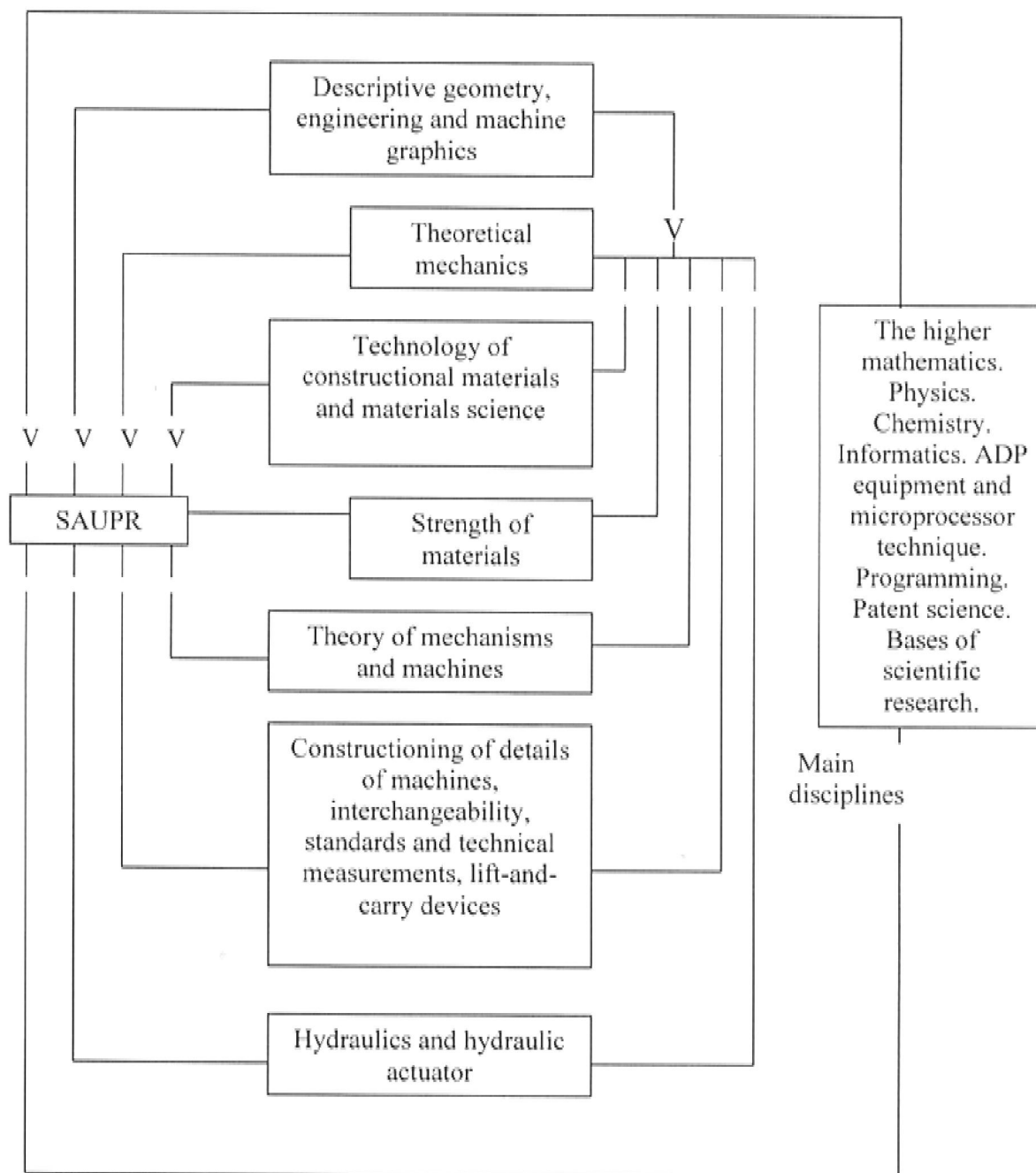


Figure 1 - Structural logical circuit of communications of all-technical disciplines

Thus, it is possible to select two levels of the integrated engineering education on the basis of information technologies:

- all-engineering training – the 1st level;
- the oriented engineering training-2 level.

The similar structure of creation of the integrated systems of the 1st and 2nd levels of engineering education on the basis of information technologies can be offered for other specializations (figure 3).

It is obvious that require determination specification the system of computer-aided educational design, an educational automated control system of technological preparation of production, an educational automated control system of technological process. As a basis it is possible to assume the developed concepts of systems.

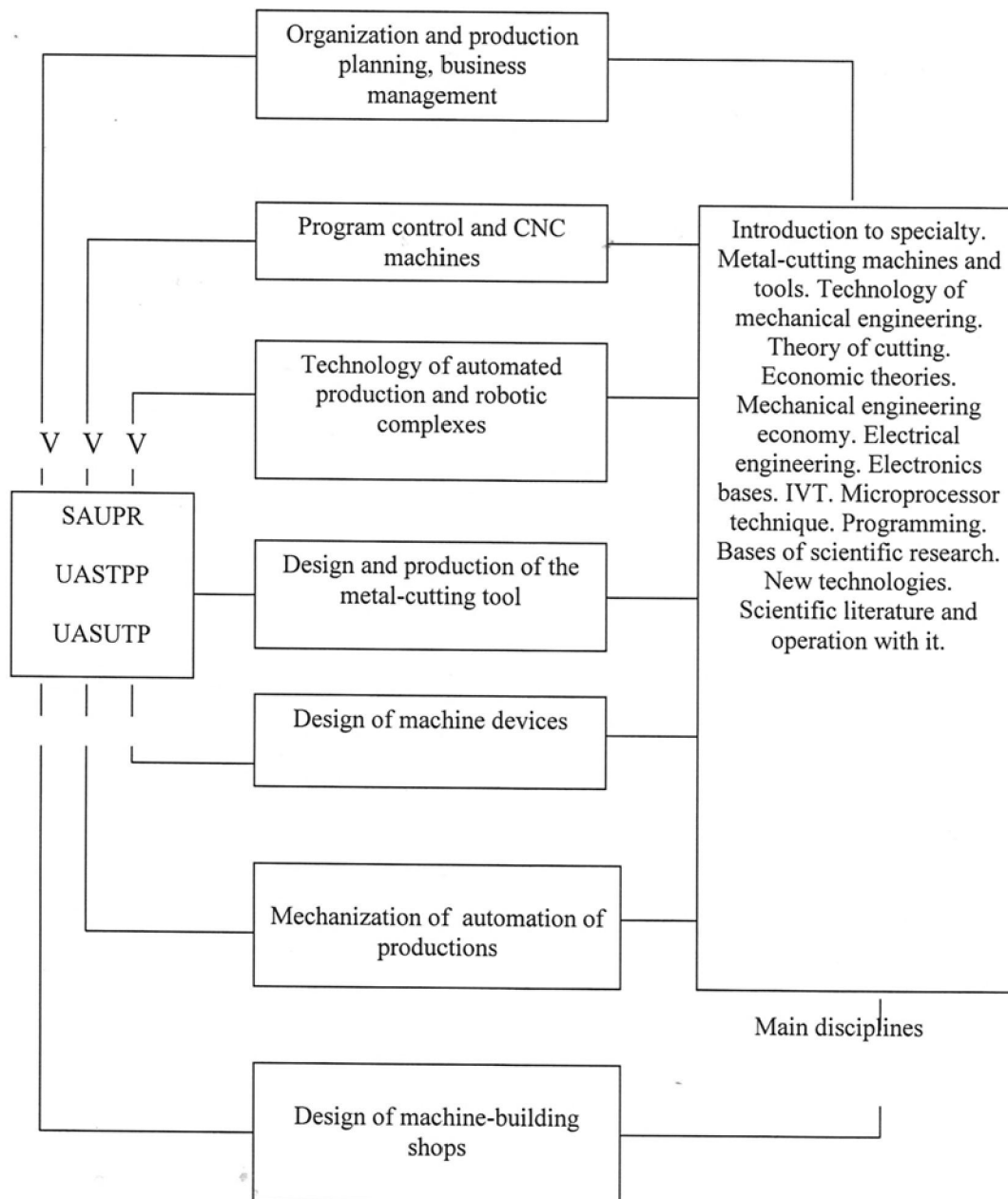


Figure 2 - A structural logical circuit of communications of the special oriented disciplines (specialty "Mechanical engineering")

The system of computer-aided educational design - a complex of the mathematical and technical means intended for automation of processes of educational design with an involvement of trained (students) and learning (teachers). The automated system of educational design contains invariants of industrial automated design engineering systems and consists of software of disciplines (subjects, sections) and hardware (offices, laboratories of system of computer-aided educational design). External software envelops software of communication of the student – the designer with system: languages of submission of the initial information, means of addition of an information system the equation languages operation of automated system of design allowing to conduct the person system dialogue.

Internal software consists of an operating system, the software of procedures of the decision of the main educational objectives of design and an information system. The central calculator and means by means of which not only the user - the student, but also the teacher influences design process is a part of hardware of automated system of educational design.

The educational automated system of technological preparation of production - system in which are solved problems of educational design of technological processes, equipment's, the tool and a special technology equipment, includes information technologies with the developed system of peripheral devices, including devices of graphic input-output of information. The central link in the educational automated system of technological preparation of production is the subsystem of computer-aided educational design of technological processes.

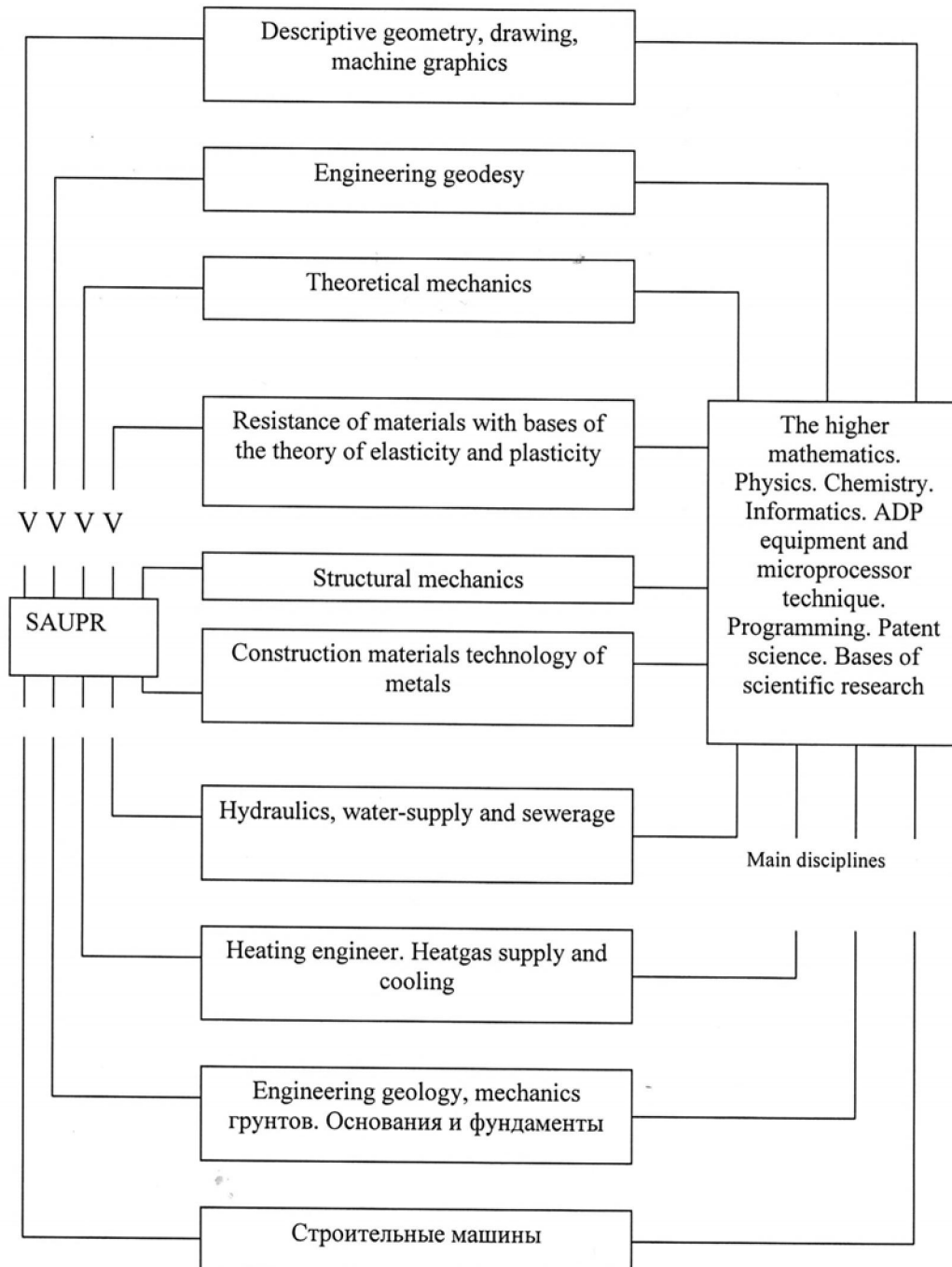


Figure 3 - Structural logic circuit of communications all-technical Disciplines

Inference and outputs. An educational industrial control system - the management system intended for the decision of the educational tasks connected to support of a standard duty of functioning of a technology equipment (as the main, and auxiliary) and optimum execution of all AND operations of

processes of a fabrication cycle from its initial stage to completing with monitoring of products on each operation or on each manufacturing stage (processing).

AOS - the automated learning system set of functionally connected educational and methodical, program, mathematical and technical means in whole or in part replacing the teacher in training activity, framings of necessary response, an independent study of disciplines, acquisitions of practical skills and abilities. In training activity, the system allows to select by constant communication with the trainee not clear to it questions and to pay additional attention to them, to control digestion of the passable material, to prompt or repeat situations before their complete assimilation. Fixed assets of difficult modern learning systems – information technologies of the device of a machine graphics, developed information and the software.

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АҚПАРАТТЫҚ ТЕХНОЛОГИЯ НЕГІЗІНДЕ ИНЖЕНЕРЛІК-ТЕХНИКАЛЫҚ ПӘНДЕР БОЙЫНША ТЕХНИКАЛЫҚ МАМАНДЫҚТЫҢ МАМАНДАРЫН ДАЙЫНДАУ

Аннотация. Мақалада оқу жүйесі және оқытудың әдістемелік байланысы қарастырылған, ол, пәндердің мазмұны бір-біріне қатысты және байланыста болған кезде жүйені белгілі бір дидактикалық тұтастыққа әкеледі. Болашақ техникалық мамандықтардың игерлерінің алдында тұрған бірнеше белес-мақсатты айқындап беру-ол ақпараттық технологияны оқу процессінде пайдаланушылар алдында қойылған бағдар болады, -ол оқу процессін интенсификациялау, инженерлік есептеуді автоматтандыру, есептерді шешудегі оптималды жолдарды іздестіру, ақпаратты жүйенің оқыту функциясын пайдалану болып табылады.

Түйін сөздер: сапа, жүйе, оқу процесі, интеграция, ақпарат, оқу бағдарламасы, автоматтандыру, әдістеме.

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ПОДГОТОВКА СПЕЦИАЛИСТОВ ТЕХНИЧЕСКИХ СПЕЦИАЛЬНОСТЕЙ ПО ИНЖЕНЕРНО- ТЕХНИЧЕСКИМ ДИСЦИПЛИНАМ НА БАЗЕ ИНФОРМАЦИОННЫХ ТЕХНОЛОГИЙ

Аннотация. В статье рассмотрена методологически связанная система образования и обучения, когда содержание дисциплин приходящихся в отношениях и связях друг с другом, приводит к определенной дидактической целостности системы. Перед будущими специалистами технических специальностей сформирован ряд задач, которые ставятся в учебном процессе перед пользователями информационных технологий – это интенсификация учебного процесса, автоматизация инженерных расчетов и решение задач, связанных с поиском оптимальных вариантов решения, использование в функции обучающей и информационной системы.

Ключевые слова: качество, система, учебный процесс, интеграция, информация, обучающая программа, автоматизация, методология.

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