

THE CURRENT STATE AND CONTENT OF THE COURSE "METHODS OF CALCULATION"

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Abstract: *in this article, it is aimed to create an educational portal for the students of the mathematics direction of higher educational institutions and to develop a method of teaching the course "methods of calculation" using it and improving the effectiveness of student's mastering.*

Key words: *higher education, education portal, student, mastering.*

1. INTRODUCTION:

One of the priority tasks of our time is the training of highly qualified specialists capable of effectively working in various spheres of economic and social and economic life, both physically and mentally capable. Mathematical research and pedagogical personnel must be experienced specialists with the use of a wide range of numerical, numerical, analytical and analytical methods so that they can apply their acquired knowledge in mathematics, physics, computer science, mathematical programming and optimization. it is today. The future specialist will be able to apply pedagogical, psychological and methodological knowledge, as well as apply numerical, numerical, approximation and analytical methods to solve mathematical models representing the processes of various practical problems, develop algorithms for solving problems and create modular programs based on high-level programming languages. , to create applications for solving practical problems of different classes and to develop systems for their practical use to be able to teach at the highest level, based on new pedagogical and modern information technologies in the system of secondary special and vocational education, to be able to work effectively in various spheres of social and economic life.

2. LITERATURE REVIEW:

If we analyze the teaching situation of the course "Computational methods", which are taught by universities in the direction of mathematics, we can conclude that the course "Computational methods" (Computational Mathematics) was first introduced in 1943 year by academician L.V. Kontorovich wrote in his famous article "Funktsionalny analiz i vichislitel'naya matematika", about the generalization of the Newtonian method, pro-choice methods for approximate solution of operator equations. The science of "Computational methods" (Computational Mathematics) in universities began to pass in 1960 years. For the first time textbooks of I. S. Berezin, N. P. Zhidkov, V. P. Demidovich, I. A. Maron were used.

The creation and development of computational techniques in the last 50-60 years is explained by the fact that mathematics is a branch of science. In the second half of the XX century, the emergence of the course "methods of calculation" of the matematization of knowledge, which became an important factor in the training of specialists in mathematics, teachers of future mathematics. This course has been included in the curriculum either as a separate science or as a programming science.

In higher educational institutions, the purpose of preparation in the subjects was formulated as follows: electronic computation machine calculations and methods of estimating errors in arithmetic operations; mathematical analysis and methods of calculating linear algebra, methods of processing experimental results, as well as acquaintance with the elements of linear programming.

Elements of the course " methods of calculation " were introduced into the computer science program in the secondary school and began to be taught as a separate course in a separate department or pedagogical Institutes of this science. In the first textbooks on Computer Science, Scientific and technical calculations in solving practical problems are included in the topics devoted to the use of electronic computing machines, the basics of approximate computing, simple methods of computational solutions of non-linear equations, calculations of the area face of individual integrals and geometrical figures are covered. These topics were presented as the basis of school Informatics science, the development of programming and algorithms, as well as as a tool for modeling an electronic computing machine, as well as computing experience.

In the 60-70 yrs, the hours in the curriculum gradually increased in universities. Usually the course " methods of calculation " is taught for three semesters. There were no qualitative educational programs, no working training

programs. If in one university one science is studied by two or three famous scientists, they are taught according to different plans. For example, the course "Methods of calculation" in Moscow State University academics G.I. Marchuk, N.N. Yanenko, professors A.N. Kononov, A.A. Samarsky, I.I. Babenkos taught. They taught the course "methods of calculation" on the basis of their books. By the years of 1980-1990, new generations of textbooks began to be created.

3. MATERIALS AND METHODS.

Created monographs, textbooks, manuals on updating computer technology of use of computer systems for solving mathematical problems. Among them we can especially note the manual of M.P. Lapchik.

R.Kh. Kadyrov has elaborated on the methodological bases of introduction of the system of computer support, providing effective training of "Numerical methods" course for formation of independent skills of students of pedagogical higher educational institutions. He identified the possibility of using electronic computing machines for conducting laboratory and practical classes on the course, created software tools for use in the language of programmatic programming [1].

A. Sushentsov has described in his research work the use of software and methodical complexes in the course "Computational Methods" [2], A.V. Ryabukhina [3] proposed the creation of methodical systems for separate technical departments of the course "Computational Mathematics" giving.

V.K. Mokshina has conducted research work on teaching methods of the Elements of Computational Mathematics section of the secondary school computer science course [4]. T.A. Stepanova [5] proposes that information and communication technologies be taught when teaching a course "Computational Methods" in her research work. While the author has developed an electronic textbook, an electronic practice with examples in the Excel table, and computer-based methods for current and final control, a compilation of the course "Computational Methods" was developed by G.F. Fedchenko [6]. methods of teaching ”.

However, there are examples of higher education institutions of the Commonwealth of Independent States that have been teaching mathematics based on a new methodology, which have been actively using computer technology at all levels of education and the education system has been radically updated. For example: O.V. Zimina [7], T.A. Stepanova [5], Yu Yu. Tarasevich [8], C.V. Porshnev [9], V.I. Priklonsky [10], C.A. Radionov, N.B. Voznesensky, V.M. Domnenko [11], Yu.Y. Gromov The first-generation electronic textbooks are available on the web-sites of the authors. and a wealth of practical learning materials.

According to A.V. Mogilyov [12], the model of the methodological system of education, which will be transformed as a result of computerization and informatization of education, should meet the following principles:

1. **Modeling of the model.** Educational models of different disciplines may include different components, which may be specific to the subject, which means that the structure of the educational and methodological system of different disciplines may vary. Our study aims to develop a comprehensive approach to the use of distance learning in the implementation of the learning process as part of the preparation of future mathematics majors in universities, and to create learning content for the course "Computational Methods".

Curriculum content is the content of the course, which covers all course materials, manuals, documents, tasks, tests and control materials.

Integrated use of distance learning is a pedagogical use of a variety of distance learning tools aimed at addressing didactic issues that enable them to achieve their learning objectives, taking into account the content, methods, and specifics of their organizational forms.

The peculiarity of the course is that it cannot be imagined without the active use of computers and software. In recent years, various specialized mathematical packages (Derive, MathCad, Mathematica, Maple) and instrumental (Excel spreadsheet) packages have been leading the way in teaching Computational courses. Therefore, when such courses are used in distance learning, there is an opinion that they do not need to develop a methodological system. However, in any subject, especially in the "Methods of Computing" course, different tools for distance learning are required. Unfortunately, in institutions of higher education, the tools of distance learning are hardly introduced into the traditional system of education. Inadequate use of them, on the one hand, unpreparedness of teachers, inadequate electronic learning tools, their departure from the nature of the learning process, teaching methodology, overload of teachers, achievement in "Computational methods", distance learning the didactic capabilities of the tools are sufficient to develop a methodological approach that takes into account the role of the course in the training of future professionals. This can be explained by the fact that it does not give up.

2. **Locality of the model.** The model should take into account not only the differences in teaching different disciplines, but also the particular characteristics of teaching a particular subject in a particular higher education institution.

When creating an educational portal, we took into account the level of computerization and informatization of the university, as well as the conditions and peculiarities of the educational process at the institution, envisaging continuous and future introduction of distance learning in the educational process at Namangan State University. The structure of the information-educational environment should correspond to the structure of the HEI information space, which includes the information flow between the objects identified in the university and the information exchange between them.

3. **Model mobility.** The components of the methodological system are usually in development and interaction, and the relationship between the components changes. The methodological system involves the development of educational practice as a model of education, the inclusion of components that can develop content and transform structural relationships. Indeed, the model's mobility is determined by its influence on components of various internal and external factors. Adherence to these principles is very important to our portal.

In our view, our educational portal allows us to identify ways to develop a methodological system of learning in the context of using distance learning, consistent with the above principles and not rejecting traditional approaches to designing and implementing the learning process.

Methodology of the course "Calculus methods" influences:

- social requirements for professional training of graduates of higher educational institutions;
- social order for training of specialists with certain qualifications established by the state educational standard (state educational standard);
- Contents of "computational methods" as a system of scientific knowledge;
- Continuity of the course "Methods of computing" related to higher mathematics, algebra, geometry, mathematical analysis, computer science, computer modeling;
- student's ability to learn independently;
- formation of motivation of educational and educational activities.

Of course, the impact of established learning objectives on the content of education, methods, tools, and organizational forms of education will remain.

Changes in the content and objectives of education can be seen in the updated State Education Standard. The methodological system of education is related not only to the external environment, but also to the process, ie to the internal environment. It interacts with the use of distance learning, the formation of an information and educational environment in higher education, and the willingness of teachers to use distance learning tools at various stages of the educational process.

Internal factors may also include motivation for the use of distance learning in students. This is because the younger generation can quickly absorb the benefits of information and communication technologies and use them in their daily lives. It is desirable for students to use the modern means of information and communication technologies in learning the content of science.

Thus, the purpose of education, which is an important component of the dynamic (moving) development of the methodological system, is changing and renewing under the influence of internal and external factors.

The peculiarity of the course "Computational Methods" is reflected in the educational objectives established by the State Educational Standard for Science, as well as the content of education in science, the use of computers as a basic tool for conducting computational experiments and algorithms of computational methods.

It is well known that the course "Computational methods" is closely related to other subjects: "Algebra", "Programming languages", "Mathematical analysis", "Differential equations", "Information technology". A student who does not know these disciplines cannot understand the course "Computational methods". When solving practical tasks for the course, Pascal and Delphi will create programs in programming languages, which will provide examples of answers, which means that the student should be proficient in programming. Most students have difficulty programming. Suppose a student can use ready-to-use software, but in order to get results in solving a system of equations, one must know how to program and use the program. This means he must have computer literacy as well. The distance learning, which includes all of this, teaches students to master the course independently, use mathematical programs, and improve computer literacy.

The standard curriculum of the course "Computational Methods" taught by the University in the field of mathematics and lectures, topics covered in practical exercises, and independent work presented to them. When designing a work program, the teacher spends hours on the topics revised by the standard program and the National Education Standard. It seeks to convey the content of science to students.

When a teacher develops a model program and a work program in accordance with the state educational standards, the purpose of the course is to determine the objectives and objectives of the course.

4. ANALYSIS AND RESULTS.:

It is well-known that effective use of modern computing and software in all areas of human activity is important. One of the main challenges of the 21st century is the ability to use modern computers in practical work and teaching. For this reason, students studying mathematics should thoroughly study the theory of numerical methods and algorithms for calculating complex practical processes, automatic program management of various technological processes, and various data operations, as well as for high-level courses in the education system.

The aim of the course "Computational methods" is to give students the ability to solve various mathematical problems, analyze the quality and capabilities of the algorithms, and the ability to create new algorithms. The course "Computational Methods" is designed to give students the basic concepts and practical skills of approximate solutions to problems that cannot be solved in the theoretical departments of mathematics. The purpose of this course is to familiarize students with linear and nonlinear problems, such as linear algebra, linear equations and their systems, modern methods for solving integral and differential equations. The course "Computational methods" ends with the creation of computer programs and obtaining results.

The objectives of the course are: to identify the type of problems and properly apply certain algorithms, to determine the stability of certain methods, to solve problems on the personal computers using programming languages, and to analyze the computational results. Algorithms for methods, programs in Pascal and Delphi programming environments, learn how to build applications. They use MathCAD, Maple, Math programming to solve problems and graphically.

Currently, the curriculum, the hourly lecture in the work program, and the hours allocated for independent work are more devoted to the work. That is, students will have to master this subject more independently.

Given that more and more students are now attracted to computers and related issues, a new form of education is the most appropriate way to use distance learning, such as computers. Therefore, the use of modern techniques and technology in organizing an effective learning process, as well as enhancing the effectiveness of students' "Computational Methods" through the creation of electronic textbooks, learning content and distance learning that is meaningful, comprehensive, convenient for students, with graphics, multimedia and interactive features. It is necessary to develop the methodology.

Computer is an important tool in teaching the course "Computational Methods" because the computer acts as a traditional tool for conducting computational experiments. However, it is necessary to design and introduce a methodical system to use various opportunities of modern information and communication technologies in the learning process. It is necessary to take into account the specifics of the future professional activity of the student, the impact of the specific means of science.

An analysis of textbooks of higher education institutions published in recent years shows that the methodological system of teaching the methods of computing has not changed much.

As the "Computational" course is a complex subject, it is difficult to explain each topic and the teacher will need to explain it again, since students cannot understand it at once. This can be time consuming. In practice, there are misunderstandings in the approximate solution of the system of equations, the system of equations. Most students attend lectures and workshops as "observers," while some students often work on examples and some of them fall behind. Accordingly, it was found that the evaluation of students was also unjust and that the assessment was based on group students.

5. CONCLUSION:

In the context of our research, T. Stepanova's work was of interest to distance learning of the methods of computing in the information and educational environment. Based on the analysis of the main directions of informatization of higher education institutions, the author recommends that one of the ways to improve the quality of teaching the course "Computational methods" is to create an information and educational environment for the course [5].

In our view, it should be noted that the creation of an information-learning environment and the use of the educational portal in the course of the course "Computational Methods" are not reflected in this study.

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