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FEATURES OF TEACHING MATHEMATICAL ANALYSIS IN HIGHER EDUCATIONAL INSTITUTIONS

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A R T I C L E I N F O.

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Annotatsiya

The current state of science and technology, the production of the latest technical objects places high demands on the professional training of bachelors to the learning process. Formal theory in the teaching of mathematics dominated the teaching of mathematics in engineering and technical specialties for many decades. The formality of the presentation of the material also affected the compilation of textbooks, problem books, manuals in higher mathematics. The formal logic of learning was set as one of the most important tasks of learning. At the present stage, mathematical methods have become universal, used in all spheres of human existence, in which the mathematical education of the student acquires a leading role. Because how a first-year student learns the discipline "Higher Mathematics", including the section of mathematical analysis of the discipline, depends on his progress in subsequent courses in the process of studying special disciplines, and then on his viability and demand as a specialist in the future. This article highlights some issues of teaching calculus for students enrolled in the credit system at a university.

INTRODUCTION

The fact that mathematical analysis is one of the most important branches of mathematics requires no explanation. The main task in studying this discipline, as well as the entire course of mathematics in general, is to teach engineering students how to solve engineering and management problems with the help of mathematical research, modeling, design, preparing them for the effective use of mathematical methods in their future professional activities. To accomplish this task, a first-year student must be able to independently work with educational and scientific literature.

Many questions of differential and integral calculus are encountered by the student twice - at school and at the university. Repeated study of the same material by students can weaken interest in the discipline being studied. In this regard, from a variety of topics, one can single out those that were previously studied by students, and give them for independent work with mandatory notes. Then the students' notes should be reviewed by the teacher during practical classes or consultations, and, of course, evaluated.

MATERIALS AND METHODS

Let's go directly to the main issue of this article. In the school course of mathematics, the concept of functions, the definition of graphs of functions, the concept of linear, power, exponential, logarithmic, trigonometric and their inverse functions are studied quite well. All these are materials for independent work of the student. At the lecture, the teacher gives a classification of functions, establishing their division into explicit and implicit, algebraic and transcendental, single-valued and multi-valued. When considering the basic elementary functions independently, the student must take notes and submit everything to the teacher for verification.

The continuity of functions is studied very thoroughly at school. New for the student in the program on mathematical analysis is: the classification of discontinuity points of a function of a real variable, theorems on the continuity of functions on a segment, the continuity of the inverse function. Such topics as the continuity of the sum, product and quotient, the continuity of a complex function can be considered as a subject of independent study according to the literature recommended by the university.

RESULTS AND DISCUSSION

A school graduate receives a lot of knowledge about the derivative and its application to the study of functions. However, substantiating the theoretical provisions of these studies remains the task of the university. The central place here is occupied by Lagrange's theorem; the proof of theorems on monotonicity and constancy of functions known from the school can be considered as a simple application of Lagrange's theorem.

Integral calculus is a field for creative work of a first-year student. The concept of an antiderivative, the properties of indefinite and definite integrals, the integral mean value theorem, etc., at the discretion of the teacher, the student is able to study independently. Also, the former schoolboy knows the calculation of the area of a curvilinear trapezoid. Other applications of the definite integral are given by the teacher in lectures, consolidating what the student has learned in practical classes.

I would like to dwell on one more important, in our opinion, aspect of teaching. Most often, when distributing the teaching load, it turns out that lectures in the same group are read by one teacher, and practical classes and consultations are conducted by another. There is nothing reprehensible in this, but there should be a clear agreement between the lecturer and his assistant about the material that the first one asks for the IWS, and about the individual assessment for each topic independently considered by the student. Our task is to give the student a coherent system of knowledge, and therefore the inconsistency between the lecturer and his assistant can harm the student. Also, the teacher runs the risk of "overdoing it", loading the student with independent work and shifting part of his task to him. Therefore, the additional work of the lecturer will be to give students some purposeful settings for independent work. For example:

1. providing a list of references (which should be in each syllabus);
2. highlighting the main topics;
3. a list of specific questions that must be announced in advance by the teacher;
4. assessment of each student according to the point system.

Credit technology is only gaining momentum, so the above is only a recommendation so far. Nevertheless, every teacher who teaches classes in the first years should strive to involve students in research work, and independent work is a huge field for realizing the creative potential that every student undoubtedly possesses.

Among the requirements for the teaching of mathematical analysis in the engineering and technical specialties of the university, the requirement for its applied orientation, its direct connection with the professional training of the student, is noticeably distinguished by its significance and relevance [1].

Many researchers have written about the benefits of assignments with technical content, but their use becomes a necessity in the engineering and specialties of the university. The course of mathematical analysis, which does not go beyond the general mandatory standard in the thematic plan, with a technically oriented set of tasks, will show students the significance of the subject, allow them to maintain interest in it and initiate the formation of primary professional knowledge. Tasks should contain a description of the principles of operation of real objects, be supplied with drawings, explanations, and have an accepted system for the accuracy of incoming data.

The use of applied and professional problems in teaching mathematics, including mathematical analysis in

engineering and specialties, is an indispensable condition for the implementation of the principle of professional orientation, which determines the specifics of university education [2].

The dynamic development of objective reality at the stage of the country's development strongly encourages educational structures to change. This necessitated the development of a set of professionally oriented tasks for students of engineering specialties, taking into account the following objective factors:

- a new state strategy in the field of education emerged;
- the requirements for the content and quality of education have changed;
- the education system becomes multi-level and more flexible;
- there has been an integration of the country's education system into the global educational space;
- there is a need for a higher level of informatization of higher education;
- more attention is paid to the introduction of new learning technologies;
- created state education standards;
- it is required to take into account the level of development of science and technology in the field of the student's future activities.

The most effective method of improving the quality of mathematical education and the process of teaching mathematical analysis, as most researchers of the problem of applied mathematics believe, is teaching to solve problems with professional content. The lack of a qualitative aspect of mathematics reduces the level of quality of education training. The qualitative aspect of mathematics does not require calculations, derivations of various formulas, solving equations, proving theorems, etc. [3].

First, the qualitative aspect of mathematics answers the following questions: does a given problem have a solution; what are the "necessary", "sufficient", "necessary and sufficient" conditions; Is the solution of this problem “sustainable”; what are the initial conditions, etc.

Secondly, the qualitative aspect of mathematics requires a deep assimilation of the essence and content of mathematical concepts, such as: "definition", "axiom", "lemma", "theorem", "consequence", "proof".

Thirdly, the qualitative aspect of mathematics includes the methods of mathematics themselves: analysis, synthesis, the method of complete mathematical induction, the logical method, analogy, mathematical modeling, etc.

CONCLUSION

The mathematical model of an applied problem reflects the real situation that arises in reality, through mathematical symbols, signs and relationships between them. In the process of constructing a mathematical model, real objects of reality are replaced by their mathematical equivalents.

To implement this provision, the university should first of all revise the content of the mathematical course. In order to fulfill the needs of general scientific and special disciplines, it is necessary to form the content of the course of mathematical analysis accordingly, that is, to provide students with a mandatory system of mathematical knowledge (a system of concepts, methods of research and analysis), on which the special training of students of engineering and is based.

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