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## SOME QUESTIONS OF THE ORGANIZATION OF INDIVIDUAL WORKS OF STUDENTS IN MATHEMATICS IN THE CONDITIONS OF CREDIT TRAINING

**Abstract:** The current stage of construction and reform of higher education in Uzbekistan imposes qualitatively new requirements for the organization, content and methodology of the learning process in higher educational institutions, its individualization and differentiation. The rapid social changes taking place in society form the need for high-class specialists. In this regard, the process of introducing credit education in the country becomes relevant. The article considers some problems of the education sector, in particular, the actual problems of organizing individual works in mathematics in the context of the implementation of credit training. The analysis revealed that the methodology of teaching mathematics faced the task of improving the theory and practice of training a specialist who meets the entire complex of modern requirements. The authors prove that the disclosure and improvement of students' individuality occurs in the process of mastering the knowledge of the basics of higher mathematics at the university, so the individualization of learning does not free students from learning tasks that are difficult for them.

**Key words:** credit training, competitiveness, mathematics, teaching methods, quality of knowledge, skills, professionalism, training, innovative technologies.

**Language:** English

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### Introduction

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Over the years of Independence, structural and substantive reforms have been implemented in Uzbekistan, affecting all levels and components of the education system, which were aimed at ensuring its compliance with the long-term objectives and interests of the country, the requirements of the time. In particular, the relevant legal framework for the reform of this sphere was created, which identified as a priority the growth of investments and investments in human capital, the training of an educated and intellectually developed generation, which is the most important value and decisive force in achieving the goals of democratic development, modernization and renewal, stable and sustainable economic growth [1,2,3,4,5].

The current stage of construction and reform of higher education in Uzbekistan imposes qualitatively new requirements for the organization, content and methodology of the learning process in higher educational institutions, its individualization and differentiation. The rapid social changes taking place in society form the need for high-class specialists [1,5,6]. In recent years, new approaches and mathematical methods based on probability theory and mathematical statistics have been intensively developed. This is the development of the mathematical apparatus of such applied disciplines as reliability and repair of machines, maintenance of equipment, collection, accounting, processing and statistical analysis of data that characterize the process of functioning of real equipment systems in order to develop measures to improve their efficiency and quality of work. The use of tasks with engineering and technical content when conducting classes in engineering specialties helps to increase the level of assimilation of the material, increase interest in the study of this subject. Knowledge in mathematical disciplines will be more consciously and more firmly assimilated by students if they apply tasks with professionally directed content in the learning process [7,8].

The study shows that by the beginning of the XXI century, the system of training students of universities in Uzbekistan is gradually entering the credit form of training, which requires a new approach to the training of students. This is especially important when independent activity and, in this regard, individualization of students' learning are in paramount importance. In this regard, the methodology of teaching mathematics was faced with

the task of improving the theory and practice of training a specialist who meets the entire complex of modern requirements [7,8,9]. When using the concept of "individualization of learning" or "differentiation of learning", it should be born in mind that in its practical use, it is not about absolute, but about relative individualization (Fig.1.).

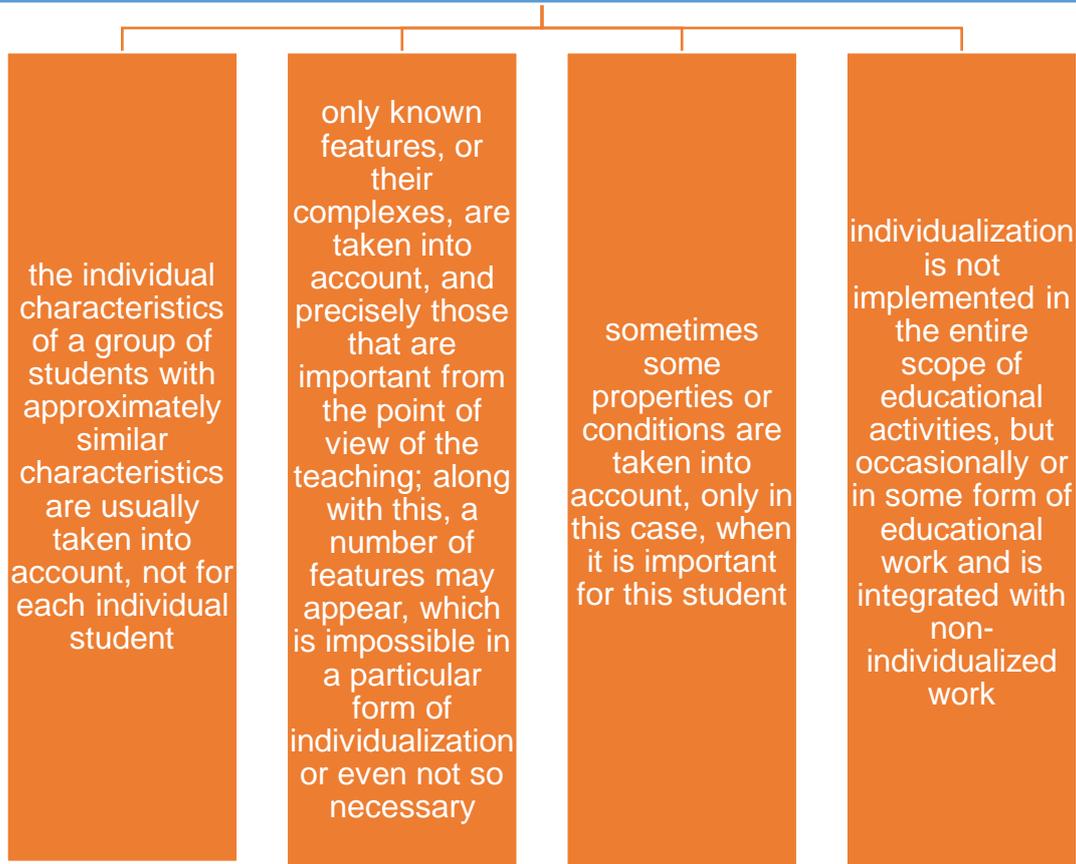
In recent years, the interest of university teachers to the problem of a differentiated approach in the preparation of students in higher mathematics at various levels of mathematical education has significantly increased. Such an organization of teaching mathematics is required by the current state of our society, when in a market economy, each person requires a high level of professionalism and such business qualities like: enterprise, the ability to navigate in a particular situation, quickly and accurately making a decision.

Higher mathematics is objectively the most complex subject, requiring more intensive mental work, a higher level of generalization and abstracting activity. Therefore, it is impossible to achieve the assimilation of mathematical material by all students at the same high level [13,14]. Even focusing on the "average" student in teaching mathematics leads to a decrease in academic performance in the group.

The analysis of the scientific and theoretical literature and the accumulated experience shows some positive results of the introduction of individualization and differentiation in the modern educational process of higher education: at present, there are a sufficient number of scientific and applied developments to improve the effectiveness of individualization and differentiation of training. However, the analysis showed that the majority of teachers still uses traditional teaching methods, without taking into account the changes taking place with students, their individual characteristics and personal qualities. This imposes a situational character on the process of individualization of student training at the university. On the other hand, the transition from traditional training in universities to a credit system of training provides for certain research developments on this problem, because according to this system, students are given more independence in the curriculum than in traditional training. The credit system of student training is an educational system aimed at increasing the level of self-education and creative development of knowledge on the basis of individualization, electability of the educational trajectory within the framework of regulating the educational process and taking into account the amount of knowledge in the form of loans.

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## IN HIGHER EDUCATION INDIVIDUALIZATION IS ALWAYS RELATIVE FOR THE FOLLOWING REASONS



**Fig.1. In higher education individualization is always relative for the following reasons [10,11,12].**

The concept of «credit», according to the Bologna Process, means a quantitative characteristic issued to a student for one course attended, the volume of which is usually one academic hour per week during the semester. To obtain a certificate of completion of a course in an educational institution in a particular specialty, you must obtain a certain minimum number of «credits». As a rule, it is several tens or even more than a hundred. The essence of the Bologna system is that it takes into account not only the traditional grades obtained on exams, but also credits (special credits, Carnegie credits), which reflect the time spent by the student on attending lectures, seminars, as well as completing various projects and works in each subject or not related to it.

The solution to the question of individualization of the process of preparing students cannot be understood by reducing the educational material or solving mathematical problems for some students and modifying it for others. The term «module» in relation to higher education implies a documental completed part of the educational and professional program of each academic discipline [4,15,16,17].

The purpose of introducing a credit system for training students in Uzbekistan is to integrate the higher education system into the world educational system, to create conditions that meet international standards of the educational process in accordance with the requirements of society for high-profile specialists (Fig.2).

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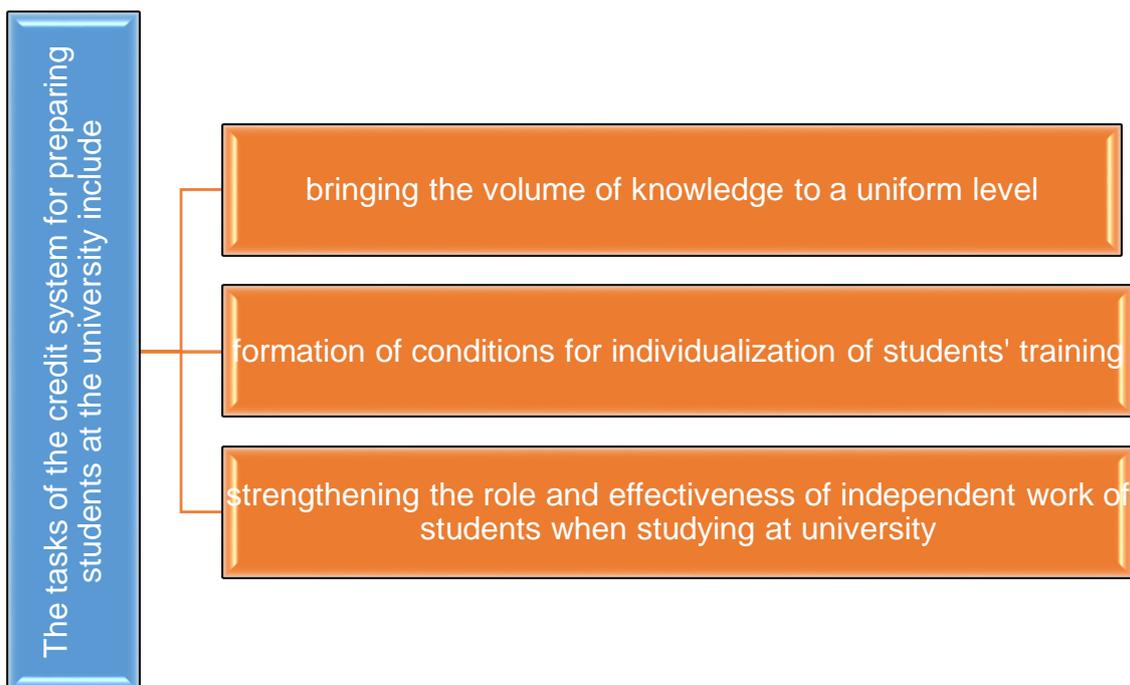


Fig.2. The tasks of the credit system for preparing students at the university include.

### For the credit system of training, there are characteristic features:

- the credit system is a way of organizing the educational process, in which, students have the opportunity to individually plan the sequence of the educational process;
- introduction of a credit system to assess the labor costs of students and teachers in each discipline;
- the time for studying the discipline is based on State Educational Standards and curricula;
- students freely choose a discipline from among the elective disciplines that are included in the working curriculum when drawing up an individual curriculum, as well as the teacher [18,19];
- students directly participate in the formation of their individual curriculum;
- advisors, assist students in choosing the educational process;
- the university has broad powers in the organization of the educational process, in determining and accounting for the types of workload of teachers;
- the educational process is provided with the necessary educational and methodological complexes in printed and electronic forms.

When evaluating students' academic achievements, a modular rating system is used for each academic discipline. A significant role in the preparation of students in the conditions of the credit system of education belongs to the compilation of a syllabus for each subject studied, including higher mathematics at university.

In the context of individualization of learning, the concept of «differentiation» comes from the

characteristics of the individual, his personal qualities. However, it should be borne in mind that the concept of «differentiation» is also used in a broader sense: when forming the content of education and organizing educational work, we are faced with differentiation by age, gender, regional-economic, nation and other characteristics. We will try to clarify how we characterize the concept of "individual approach" and the concept of «differentiation». In the first case, we are dealing with the principle of learning, in the second, with the implementation of this principle, which has its own forms and methods. In the same sense, the ratio of the principle of individual approach and individualization of training is presented. This principle is also the most widely considered in the work. When we use the concept of «individualization of learning» or «differentiation of learning», it must be borne in mind that in its practical use, we are not talking about absolute, but about relative individualization.

### In higher education, in practice, individualization is always relative for the following reasons:

1) usually the individual characteristics are not taken into account for each individual student, but in a group of students with approximately similar characteristics;

2) only known features or their complexes are taken into account, and precisely those, who are important from the point of view of the teaching (for example, general mental abilities); along with this, a number of features may be considered, which in a particular form of individualization is impossible or even not so necessary;

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3) sometimes some properties or conditions are taken into account only if it is important for this student (for example, talent in a particular field, health disorders);

4) individualization is not implemented in the entire scope of educational activities, but occasionally or in some form of educational work and is integrated with non-individualized work.

In recent years, the interest of university teachers to the problem of a differentiated approach in teaching students in higher mathematics at various levels of mathematical education has significantly increased. This interest is large due to the desire to organizing the educational process in such a way that each student is optimally engaged with educational activities in the classroom and at home, taking into account his mathematical abilities and intellectual development, in order to avoid gaps in the knowledge and skills of students, and ultimately, to provide a full-fledged basic mathematical training to students of the usual group [16,19].

It should be noted that "Higher Mathematics" is objectively the most complex subject, requiring more intensive and mental work, a higher level of generalization and abstracting activity. Therefore, it is impossible to achieve the assimilation of mathematical material by all students at the same high level. Even focusing on the "average" student in teaching mathematics leads to a decrease in academic performance in the group with the differentiation and individualization of teaching higher mathematics, an important role belongs to technology and especially information technology, which in each case provide a special product that develops the students' competence for further mastering the new material being studied.

The need to introduce information technologies in the educational process, especially in the teaching of subjects of the natural-mathematical cycle, today no one doubts. The use of information technologies allows students to familiarize themselves with the basics of computer modeling of processes and phenomena. Integration of information technologies of higher mathematics makes it possible to create a single subject under the conditional name "Higher Mathematics and Computer Science". We can say that the integration of information technologies in education allows an individual approach to students and thus helps to differentiate education, and the integration of information technologies in natural and mathematical subjects in general, and in higher mathematics, in particular, makes it possible to make the educational process most effective both from the point of view of the teacher and from the point of view of the student.

One of the main factors that affect professionalism in the future is targeted quality education.

The specific meaning depends on the meaning in which the term «independent» is used. Basically, there are 3 meanings of this word:

- the student must do the work himself, without the direct participation of the teacher;
- students are required to perform independent mental operations, independent orientation in the educational material;
- the performance of the work is not strictly regulated, the student is given the freedom to choose the content and methods of completing the task.

Independent work in higher education is a specific means of organizing and managing the independent activity of students in the educational process, a means of self-organization and self-discipline of students in mastering the necessary knowledge, skills and abilities [8,15,19]. As you know, with credit technology training, reducing the amount of classroom work directly increases the value and status of independent work of the student (IWS). If in the traditional system of training, independent work takes up one-third of the total labor intensity of the studied course of study, then in the credit system of training it is two-thirds of the part. Therefore, in the conditions of credit technology, the IWS becomes one of the main reserves for improving the quality of education and training of future specialists. In our opinion, the following conditions are of great importance for the correct and effective organization of the IWS:

- readiness of teachers to effectively organize independent work on the credit system of training;
- availability of an educational and methodological complex for each discipline, including a description of the course in printed and electronic form, forms and means of monitoring the level of independent development of the IWS by the student, indicating the content and timing of their conduct, a reference guide for the student for the entire period of study;
- availability of computer and telecommunications equipment;
- individualization of tasks, as well as taking into account the level of readiness and aptitude of each student;
- the use of innovative technologies (a set of technical means that provide students with free access to various sources of information and create optimal conditions for the use of electronic learning tools);
- optimal workload of students in the field of independent work.

As practice shows, in most universities there are two forms of independent work:

- traditional, i.e. the actual independent work of students, performed independently in an arbitrary mode and time, at convenient hours for the student, often outside the classroom.

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▪ classroom independent work under the supervision of a teacher, who can be consulted during the assignment.

To date, the third option of independent work is being developed, and at the same time, the intermediate one is being used. This type provides for greater independence of students, greater individualization of tasks, the presence of consultation points and a number of psychological and pedagogical innovations concerning both the content of the tasks and the nature of consultations and control. All types of independent work perform their functions and are equally important for the future specialist.

The pedagogical literature also presents the conditions that ensure the successful implementation of independent work:

1. Clear statement of cognitive tasks.
2. The algorithm, the method of performing the work, the student's knowledge of how to perform it. The teacher clearly defines the forms of reporting, the scope of work, and the deadlines for its submission.
3. Definitions of types of consulting assistance (consultations – installation, thematic, problematic).
4. Definition of evaluation and reporting criteria.
5. Definition of types and forms of control (workshop, control works, tests, seminar, etc.).

In order to successfully implement this, you should apply a certain system of test exercises aimed at checking:

- level of learning ability;
- ability to work independently;
- the ability to read with understanding and the right speed of the training text;
- ability to be quick-witted;
- the level of development of a particular component of mathematical thinking;
- educational interests etc [20,21].

The Fergana Polytechnic Institute has adopted several types of independent work: regular and long-

term. Regular independent work is carried out by students in accordance with the tasks proposed in the syllabus (working curriculum) for each lesson. Their implementation is monitored and evaluated by the teacher in consultation classes. As the experience of leading experts in the field of teaching mathematics, as well as the experience of teachers of the department, shows, the most effective forms and types of regular independent work of students are the following: performing individual tasks with three levels of complexity, proving theorems and formulas, writing reports and abstracts, answering theoretical questions etc. Individualization of student training in the credit form of education does not exclude, but also assumes collective, frontal and group forms of activity, strengthening of the teacher-student and student-student relationships in training, with a great emphasis on independence in the cognitive activity of students.

In conclusion, it should be noted that the individualization of higher education in credit training is to see the features of the psychophysiological development of students and build the educational process based on their capabilities and abilities. In our example, the disclosure and improvement of students' individuality occurs in the process of mastering the basics of higher mathematics at the university, so individualization of learning does not free students from learning tasks that are difficult for them. The goal of individualization is to provide all students with a system of mathematical knowledge as a means of their development and competence. The solution to the question of individualization of the process of preparing students cannot be understood by reducing the educational material or solving mathematical problems for some students and modifying it for others.

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