

FEATURES OF STUDYING THE COURSE «DISCRETE MATHEMATICS» AT THE UNIVERSITY

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The course «Discrete Mathematics» is essential for most majors at the Faculty of Mathematics and Information Technologies, because it integrates the knowledge required by students, summarizes this knowledge, and demonstrates the interconnection between different chapters of the same discipline, as well as between various disciplines.

Teaching this academic discipline at all educational stage involves several challenges. One such challenge is selecting teaching materials that fully align with the syllabus. Since the chapters of discrete mathematics are closely interconnected, it is challenging to determine which chapter to begin with and the sequence in which to continue teaching while maintaining a cohesive narrative style.

The purpose of the work is to study the peculiarities of studying the «Discrete Mathematics» course to students at the Faculty of Mathematics and Information Technologies at Vitebsk State University named after P.M. Masharov.

Material and methods. The material for the study is the curricula for the specialty 6-05-0612-01 «Software Engineering» and the standard curriculum for the «Discrete Mathematics» course. Research methods: analysis of sources, study and generalization of information.

Results and their discussion. Discrete mathematics provides the basic concepts and methods required to understand and solve problems in various mathematical fields and computer science. It covers topics such as sets and mappings, binary relations, combinatorics, propositional algebra and predicate logic, Boolean functions, graph theory, and more. Therefore, this subject serves as the foundation for more complex mathematical disciplines.

Studying discrete mathematics enhances students' logical and analytical thinking skills. Throughout the learning process, students develop the ability to construct mathematical proofs, analyze structures, and solve problems that demand a systematic approach. This subject plays a crucial role in informatics and programming. Knowledge of discrete mathematics is applied in algorithm development, data analysis, network construction, and process optimization. The concepts taught in a discrete mathematics course form the foundation for understanding how computers function and for designing efficient software solutions.

The primary methods of teaching discrete mathematics in university include lectures, seminars, practical sessions, and laboratory classes. Independent learning is equally important, encompassing activities such as completing assignments, reading supplementary materials, and studying academic articles. Employing a variety of teaching methods enables students to gain a deeper understanding of the material, develop logical thinking, and improve problem-solving skills. Laboratory classes, in particular, provide students with the opportunity to apply theoretical knowledge in practice and enhance their independent learning abilities. During laboratory sessions, teachers also have more opportunities to engage with each student individually and discuss specific knowledge points.

Students will encounter the following main difficulties when studying discrete mathematics courses:

- **Abstract concepts:** many topics in discrete mathematics, such as graph theory, sets, combinatorial mathematics, and algorithms, require abstract thinking, which may be difficult for students who are not accustomed to this way of thinking.

– **Mathematical rigor:** discrete mathematics requires precise proofs and logical reasoning to support the problem-solving process. This may be challenging for students who are not accustomed to rigorous mathematical arguments.

– **Lack of practice:** learning this course well, a lot of practice and independent learning are required. However, not all students have enough time and opportunities to do a lot of practice questions.

– **Challenges in Theory and Application:** students may have difficulty understanding how theoretical concepts can be applied in practice, especially when they lack experience working on real-world problems and projects.

– **Language Barrier:** for students studying this course in a foreign language, understanding and grasping the course content may be more challenging due to language difficulties.

– These difficulties can be overcome through active participation in lectures and seminars, regular independent learning, asking teachers for advice, and utilizing additional educational resources.

Conclusion. Studying discrete mathematics fosters critical thinking and analytical skills, which are essential in various fields. It also enriches the career competencies of future professionals.

1. Levin, O. Discrete mathematics. An Open Introduction / O. Levin – School of Mathematical Science University of Northern Colorado Greeley, 2022. – 394 p.

2. Rosen, K. Discrete Mathematics and Its Applications / K. Rosen – McGraw-Hill Education, 2018. – 2240 p.