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ON MODIFICATION OF MATHEMATICS COURSE FOR MODERN-DAY ENGINEERS

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Live as if you were to die tomorrow.
Learn as if you were to live forever.
Mahatma Gandhi

The question of the necessity for a foundational education for engineers of the "digital era" seems obvious [1–3]. Consequently, the primary goal of technical universities is to create a system of education that would ensure and develop the educational needs of every student. However, unfortunately, as the Republic of Belarus began to approach the level of universal higher education, the prestige of engineering specialties has clearly declined.

Little competition is left between the enrollees for the right to be a student. Instead, a notable competition for such applicants between universities is apparent now. Expectedly, there are many students, especially in the first years of technical specialties, whose abilities to ingest educational material of fundamental sciences may appear to be quite modest. The reasons for the above are at least twofold. Firstly, one may note significant shortcomings in teaching mathematics and physics in secondary school, and secondly, a universal spread of testing as a form of student knowledge validation. It should be noted, that mathematics teachers in technical universities spend a considerable amount of time teaching students lacking fundamental knowledge which was meant to be part of the high school curriculum. University staff ends up pulling them up to at least an average level. For many, it appears necessary to repeat the basic concepts and formulas of elementary mathematics, to achieve at least some understanding of such material [4].

The foundational nature of higher technical education requires special attention to the teaching and use of mathematical disciplines. These disciplines form the basis for the study and understanding of many specialized subjects in technical universities. This is especially true for specialties directly related to modern technical progress, such as automation of technological processes and manufacturing, production of goods using three-dimensional technologies, information technology, and information security of mobile systems. Unfortunately, the authors of specialty standards and curricula sometimes do not sufficiently consider the interconnection of fundamental subjects. For example, specialists in certain information technologies tend to offer a full course of physics in the first semester of study. Understandably, it is only possible to assimilate this course well when

sufficient mathematical skills have been acquired already. It proves to be unrealistic to provide the basic concepts of higher mathematics in the first months of university study.

One of the features of higher mathematics education for engineers at a technical university is not just the competent and accessible presentation of the mathematics course, but also the fostering interest of students in a deep, independent self-study of various sections of modern applied mathematics [5]. In this context, the main course of higher mathematics should be modified to reflect modern needs the current realities of understanding mathematical methods [4], and the necessity of certain approaches in the present situation. Taking integrals as an example - it is hardly necessary to require knowledge of numerous methods of integrating different classes of functions. Such information can be easily found on relevant websites. It is not necessary to master methods of analytical solutions and sufficiently complex theorems on the existence and uniqueness of solutions when studying ordinary differential equations. In practice, such equations are very rare, and real differential equations are solved either by approximate or numerical methods. However, particular attention should be paid to the concepts of solution stability and criteria for its determination. Similarly, for partial differential equations, where the primary focus is on setting initial and boundary problems and grid methods of their solution. In probability theory, of course, the basic concepts and distribution laws are important. Still, in practice, mathematical statistics is used, where an engineer needs to be able to work with measurement results, criteria for testing various hypotheses and identifying the nature and strength of relationships between statistical variables or groups of variables.

It is clear that, due to the objective necessity of transitioning to a system of continuous education, the role of distance education will increase [6, 7]. As noted in the epigraph, in the context of an ever-increasing flow of information, education must become a lifestyle rather than a one-off event. In this situation, it is important to lay a solid foundation of knowledge and provide the opportunity to replenish it as needed within the system of continuous education. Leo Tolstoy noted, "The importance lies not in the quantity of knowledge, but in its quality. One can know a great deal without knowing what is most necessary."

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