



## EXTRA-CURRICULUM STUDENTS' INDEPENDENT TASKS ON THE DISCIPLINE "METROLOGY"

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### Abstract

The article discusses some specific types of extracurricular independent work of students studying the discipline "Metrology", in the direction of "Transport Engineering", at the Tashkent Transport University. The authors considered the main didactic principles of the bachelor's independent work organization. Conclusions are drawn on the importance of extracurricular tasks for expanding the volume and improving the quality of knowledge of future specialists, as well as for acquiring the skills of responsibility and self-discipline.

**Keywords:** metrological support, pedagogical principles, metrology, independent work, extracurricular independent work, motivation, standardization, certification, teaching methods.





## **Introduction**

Independent work of students is a mandatory component of the educational process. It is necessary to consolidate the knowledge gained in the classroom, as well as to prepare for the upcoming lectures, practical and laboratory classes. Another task of the type of training under consideration is the expansion of both knowledge and skills in the discipline being studied. Let's consider several specific types of tasks for self-fulfillment in "Metrology", which is one of the mandatory disciplines at the Transport University. The safety of any type of transport depends on metrological support and control. The basis of the discipline "Metrology" is the State and International regulatory framework. In order to cover all the necessary material, most of the hours allocated for this subject are extracurricular independent work of students.

## **Methods**

Any form of organization of the educational process has a didactic basis. Let's use some pedagogical principles for the effective organization of extracurricular work of bachelors. The first of the principles is the logical connection between classroom and extracurricular tasks. More precisely, homework should be a continuation and expansion of the knowledge gained in the classroom. The second principle is individualization, which means that each student should have his own version of the task, different from the others. The third principle is a differential approach that takes into account the different levels of the preparedness of students. The fourth principle is the selection of real production examples. Fifth is motivation. The sixth principle is the allocation of real, sufficient time to complete the task. The seventh principle is the possibility of obtaining the necessary advice and a democratic style of communication. The eighth principle is timely monitoring and assessment of the performance of independent work.

## **Main Part**

First of all, starting the study of the discipline "Metrology", students must independently learn the laws of the Republic of Uzbekistan "On consumer rights", "On standardization", "On metrology", "On certification of products and services". In order to streamline the study of a huge amount of material, students are given a list of questions that need to be answered in writing in a lecture book. For students who can answer all questions orally, this work is optional. Each of the students should receive an individual approach, however, as the final tests show, the implementation of written notes increases academic performance by 30%. If the audience is not numerous, then each lecture can begin not only with a repetition of the material





covered, but also with an oral survey based on the given extracurricular material. Independent study of regulatory documents is not limited only to the above laws. Each lecture topic on the discipline under consideration contains a normative document. For example, when studying the issue of the unity of measurement, students study the Decree of the Cabinet of Ministers of the Republic of Uzbekistan No. 440 of 05/28/2019. "On approval of the concept of development and improvement of the national system for ensuring the uniformity of measurements for the period 2019 - 2023". One of the main objectives of the course "Metrology and standardization" at a technical university is not only to give the basic concepts of interchangeability, but also to teach how to calculate dimensional chains, assign tolerances and fit in typical vehicle connections during design, operation and repair of the vehicle, so each practical lesson contains a solution not only of the general example for all students on the blackboard, but also of individual tasks. To implement independent work in practice sessions, teachers of the department "Materials Science and Engineering" use modern methods of individual and team work [1, 2, 3]. As mentioned above, one of the grounds of the effectiveness of independent work is the motivation of students, explaining to them the expediency of the tasks performed. For example, the importance of standardization can be reinforced by inviting bachelors to make an essay about their interests in their favorite area of life, but be sure to indicate the standards used there. Students are happy to find information about Tiffany diamond clarity standards or Michelin stars, but many students, focused on their studies, choose topics with a professional focus, talking about the technical regulations of Formula 1, the transition of Uzbekistan Airways and the railway company "Uzbekiston temir yullari" to ISO-9000 standards. The students later present the best of the prepared materials in the classroom [4].

## Conclusion

Extracurricular independent work of students on the discipline "Metrology" expands the horizons and outlook of the future specialist. If properly motivated and clearly organized, then bachelors quickly and with pleasure perform tasks. The effectiveness of residual knowledge will increase the application of pedagogical principles, such as the direct connection of extracurricular work with the classroom, active reading using modern methods of activating the thought process, the availability of a teacher for consultations, a democratic style of communication, and strict control. Working without a teacher, students, in addition to knowledge, acquire the skills of self-discipline and responsibility for their own decisions. "Development and education cannot be given or communicated to any person. Anyone who wants to gain them





must achieve this by his/her own activity, his/her own strength, his/her own tension  
”(Diesterweg A.)[7]

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