Role of microcontrollers in teaching physics

Abstract: Technical and technological innovations are increasingly finding their application in modern education, making it more attractive and economically accessible. Namely, especially in nuclear physics, instruments can be extremely expensive and very sensitive, which makes it significantly difficult for schools to use them [1]. Also, schools cannot own radioactive sources, which is an additional aggravating circumstance for conducting nuclear physics experiments in schools. As physics is based on empirical tests of theoretical laws, experiments occupy a crucial place in the teaching of physics. In order to bridge the gap between the theoretical study of abstract concepts caused by the lack of equipment, which is especially present in nuclear physics, and the application of those concepts in the real world, microcontrollers have begun to be used in the teaching process. Microcontrollers with appropriate sensors can replace very expensive and sophisticated instruments, while fully displaying the corresponding physical phenomenon or process. Thus, in paper [2], an example of how students can get acquainted with gamma spectroscopy in an inexpensive way is given. Depending on the student's ability and the complexity of the laboratory exercise, the application of microcontrollers in teaching, as a student-centered approach, can promote the development of critical thinking in students, creativity and fostering problem-solving skills. In this way, through the interdisciplinary approach provided by microcontrollers, the student develops higher levels of thinking and prepares more thoroughly for future technological challenges. Also, as a student-centered approach, the use of microcontrollers can create an environment for the fuller development of potentially gifted students [3], who are often neglected in heterogeneous classrooms. Therefore, by placing the student in the active role of researcher, microcontrollers are an important tool for teaching physics.

Key words: microcontrollers, physics teaching, teaching nuclear physics. Acknowledge

The paper was created within the framework of the Development of interactive multimedia educational and outreach projects for supporting the development of JINR-Republic Serbia collaboration. The authors grate-fully acknowledge the financial support of the Ministry of Science, Technological Development and Innovation of the Republic of Serbia (Grants No. 451-03-137/2025-03/ 200125 & 451-03-136/2025-03/ 200125). Reference:

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