



**THE ROLE OF PHYSICS COURSES IN THE TRAINING OF FUTURE CIVIL ENGINEERS**

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<b>A B S T R A C T</b>	<b>KEY WORDS</b>
<p>The article examines the role of the physics course in the training of future civil engineers studying in the field of architectural and construction education at technical universities, the conditions for training future civil engineers in the course of general physics, the tasks of teaching physics in technical universities, as well as the stages of ensuring interdisciplinary.</p>	<p>General engineering sciences, civil engineer, architectural and construction direction, physics, integration, higher education institutions, specialist, qualification, skill and qualification.</p>

**Introduction**

Nowadays, when economic systems are being created based on market relations, there is a growing demand for individuals who are broad, deeply educated and able to put knowledge into practice. A knowledgeable and entrepreneurial, socially active person finds his place in the life of society, in labor. To do this, in the process of organizing education, it is necessary to assess the abilities, needs and specific aspects of the student's specialty. Theoretical issues of teaching physics in the preparation of specialists in the field of architecture and construction are a key issue.

In recent years, great progress has been made in the construction sector in our country, among other areas. Our republic is becoming more beautiful than it is known Day by day. In different parts of our country, mindless creative work is being carried out. Numerous luxury buildings, sports palaces, indoor markets, modern streets and squares, alleys and parks, residential buildings, objects of the social sphere are also indicative of the scale of work in other construction and architecture.

Even in the recent past, a person, usually an architect(architect), was engaged in the issue of design, construction of buildings and structures. As science and technology developed, buildings grew in size, and constructive solutions and equipment in it became more complex, it became impossible for one person to solve the various architectural and engineering issues associated with the design and construction of buildings. Now, the design and construction of buildings and structures is attended by teams of qualified specialists—architects and constructors—as well as engineers with different specialties. In the process of design, the architect will draw up a plan of the future building and structure, its volumetric—spatial composition, create an architectural, artistic, if necessary socio—political image of the building and structure. A modern builder, on the other hand, issues a volumetric—plan solution of a building or structure created by an architect, with the help of building materials and structures,

calculates the strength, construction, stability, earthquake resistance and other requirements for the process of use. In the implementation of these requirements, the architect is required to thoroughly master the subjects of universal education. In this case, the physics course performs one of the main fundamental tasks.

According to the decree of the president of the Republic of Uzbekistan dated March 19, 2021 “On measures to improve the quality of Education in the field of Physics and the development of scientific research”, the issue of establishing the teaching of Physical Sciences in the higher education system in a field-specific manner is established. Therefore, we consider that it is necessary to pay great attention to the implementation of topics in the lecture, practical and laboratory classes, which are organized in Physics in order to interpret the implementation of the tasks set out in the above decision, directly into the fields of architecture and construction. In this, these aspects are taken into account when developing the science program and working programs(syllabuses)of physical science. It is also required to adapt the academic literature in physics to the fields of architecture and construction.

Physical concepts and laws help to more accurately understand the stability, strength and rigidity of the structure of buildings and structures. Even without knowing the simplest laws of physics, it is impossible to explain the internal and external lighting systems of buildings and structures. Buildings and structures study methods for calculating the strength, rigidity and stability of a structure-the science of material resistance. This science is also based on the laws of physics:

- robustness is the ability of a structural element to resist failure under tension;
- stiffness is the ability of a structural axial element to resist deformation;
- stability is the ability to resist the deviation of the moment from the equilibrium situation.

The science of physics is one of the most important fundamental disciplines in the successful training of specialists in the field of architecture and construction. It is impossible to thoroughly master the Universal Sciences and special Sciences in the specialty necessary to grow up to be a mature specialist who can meet the demand of the times without having deep knowledge of physics. For example, mastering the subjects of construction mechanics, resistance of materials, mechanics of grunts, earthquake activity of buildings and structures, power supply in construction, hydraulics, Building Physics and other general sciences without sufficient knowledge of physics is a difficult task. In addition, the knowledge gained in the science of physics will be directly applied in its labor activity in the future. Buildings built specifically for residential or industrial enterprises should be showy, plush, withstand snow-rains on sunny hot summer days and cold winter days, and ensure that each room in the premises is warm in winter and cool in summer, evenly lit, clearly audible the necessary sounds and unnecessary voices are lost as much as possible, etc. Solving these issues requires knowledge of the basic laws and laws of physics and the ability to apply them in practice. Therefore, the purpose of teaching physics to future builders-engineers is to create a sufficient basis for a thorough mastery of the necessary universal subjects in the way of students to become mature specialists, to ensure their independent thinking and direct implementation of the achievements of physics and the formation of knowledge, training and skills to the extent that it is necessary for them to correctly

Taking into account the above, we consider it necessary to include the following conditions for training future builders-engineers in a general physics course:

- 1) comparison of stages of engineering activity and stages of solving physical problems to realize the professional orientation of training;

- 2) systematization and compilation of the problem area in order to improve the quality of mastering theoretical data, practical skills and create positive motivation for the educational process in the course of General Physics;
- 3) creation of a general classification of problems in a general physics course, taking into account their tasks in order to form important professional qualities and personality characteristics of future builder-engineers;
- 4) development of educational and methodological support for the optimal organization of professionally oriented training and independent work of students.

The tasks of teaching physics in technical higher education institutions include:

- explaining to students that the science of physics is the main fundamental science in the preparation of future builders-engineers;
- lightening the essence of physical science, explaining on the basis of its place in the field of architecture and construction;
- to explain the interdisciplinary connection between the science of physics and the science of universal education using examples;
- to provide information on the application of the modern achievements of physics to the fields of architecture and construction;
- to reveal information about the importance of physics in the development of technology and the contribution of physics to the development of technology, as well as the contribution of our ancestors-great scholars, foreign scientists and contemporary scientists-to the development of physics;
- the fact that the method of research of physical science is an experiment, the generalization of the data obtained in the experiment leads to the emergence of hypotheses and the fact that these, in turn, determine the physical laws of the observed phenomenon, the careful appropriation of laws make it possible to create a physical theory, and physical theory, in turn, form scientific systems;
- teaching to work independently with educational literature, to receive independent knowledge, to independently solve physical problems;
- using physical equipment, conducting experiments; developing skills such as developing the information obtained, achieving the appropriate conclusions, maintaining the safety of the technique to the fullest.

When studying fundamental training in technical higher education institutions, the psychological and age characteristics of Small-year students should not be overlooked, since the cycle of Natural Sciences is mainly studied in the first year of study at a higher educational institution. Ya.V.Fedorova emphasizes that this period of Student Life is important for further self-identification, not only professionalism, but also for the formation of personality.

Scientist S.O.Kasyarum notes that on the one hand, the teacher of fundamental sciences must carry out a professional orientation during classes that are new to students, and on the other hand, the activities of the teacher are complicated by the focus of most of the student's intellectual potential on the adaptation process. But, in our opinion, students study the main part of the Natural Science cycle in high school, so in elementary courses they fall into a familiar environment associated with the learning process itself, which contributes to the emergence of positive motivation.

According to the decision of the president of the Republic of Uzbekistan No. 416 of PQ-08.11.2022 "On measures to further improve the system of Personnel Training in the field of Architecture and construction:

the issue of broad implementation of research results in the areas of Civil Engineering, Architecture, Design and urban planning into practice, implementation of scientific projects and commercialization of developments, ensuring a solid integration of Education, Science and production has been outlined.

Ways to implement interdisciplinary engagement are as follows:

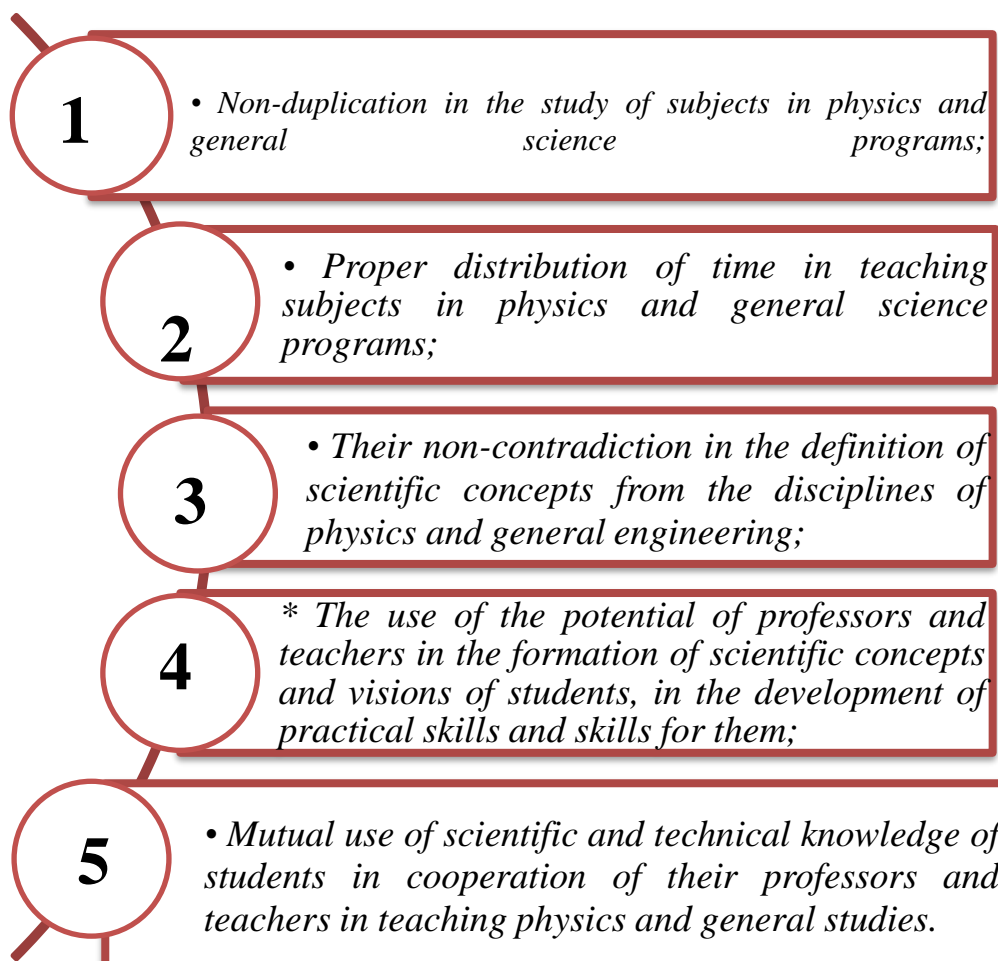
-it is necessary to choose the sequence and sequence of studies of various disciplines in such a way that the study of one of them contributes to the study of the other;

- ensure the same approach to the development of general understanding, skills and competencies;

- to ensure the unity of knowledge acquisition and requirements for the acquisition of skills and competencies;

- extensive use of knowledge, skills and competencies related to other disciplines in the study of knowledge, skills and competencies related to one academic discipline. Taking into account the above, the sequence of stages for ensuring interdisciplinary integration between the physical and Universal Sciences in the preparation of specialists in the fields of architecture and construction is presented in Figure 1:

- 1) in the programs of the physical and Universal sciences, subjects should not repeat each other rather, they should complement each other;
- 2) in the programs of physical and Universal Sciences, the hours allocated to the subjects should be correctly distributed;
- 3) Laws and regulations in the physical and Universal Sciences, definitions should not differ sharply from each other in terms of content;



**Figure 1.** Stages of ensuring interdisciplinary integration of the physical and Universal Sciences.

4) the use of the scientific soloism of professors and teachers of physical and Universal Sciences in the development of practical skills, skills of students together;

5) the scientific and technical knowledge of students should be used among themselves in the cooperation of their professors and teachers in teaching physics and architecture and construction.

The effective implementation of the above steps ensures the integration of the physical and Universal Sciences.

Therefore, the purpose of teaching physics is to create a sufficient basis for a thorough mastery of the necessary universal subjects in order for students to become mature specialists in their field, to provide them with independent thinking and direct implementation of the achievements of physics and the formation of knowledge, skills and skills necessary for them to properly understand nature and phenomena occurring in nature.

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