ISSN NO: 2770-2367
Date of Publication: 14-08-2023

# Methodology Of Preparing Students To Solve General Technical Problems Directed From Physics To Profession

**Urinov Shukhrat Suyunovich**
Jizzakh Polytechnic Institute
*shuhraturinov1980@gmail.com*

**Annotation.** In this article, scientific-theoretical bases for guiding students to the profession and recommendations on the use of professionally meaningful issues aimed at forming their concepts of the profession in the process of physics education are given.
**Key words**: empirical method, theoretical method, theoretical core, deductive result, empirical basis, reproductive, practice, production practice, thermodynamics, thermal engineering.

The system of scientific knowledge, the system of scientific and educational methods of knowledge forms a dialectical common unity, that is, in the future engineer, the method forms a system of scientific and educational knowledge, the results of knowledge are used as a means of knowledge, that is, the theory becomes a method. A set of empirical, theoretical and general knowledge methods is used in the study of physical systems, including thermodynamic systems. General logical methods include analysis and synthesis, generalization methods, abstraction, deduction and induction methods. Empirical methods include observational methods, experimental-testing methods, for example, calorimetric method, measurements, that is, methods that ensure the transfer of physical experimental and observational data to their quantitative description. Theoretical methods include: hypothetical, that is, hypothetical deductive method, a system of basic physical theoretical laws and methods that form deductive results arising from these laws; method of mathematical formalization of properties, relationships and connections in a physical system; a method of theoretical modeling of properties and relationships in a physical system; the method of imaginary experiment, i.e. such methods as performing actions with vital theoretical objects and processes under one or another external conditions are relevant. The use of various empirical and theoretical methods during the presentation of the educational material allows the formation of meaningful systematic knowledge about the studied physical system [2].

Practical training - serves to teach students to deepen, expand and apply their knowledge of physics during lectures and independent work. The organization of solving general physics problems on the basis of modern pedagogical technologies has a good effect on the assessment of students' knowledge in practical training in the module system1. Because it has been proven several times in experiments that the quality of education will be raised to a higher level, and the students' interest in learning will increase even more if each lesson type and hour is organized using modern innovative technologies.

Fundamental physical theories are considered the leading main form of modern knowledge, and knowledge forms its basis. Applied physical theories are created on the basis of fundamental physical theories, which are known to us from human civilization. In the scientific research work of M. Dzhorayev, fundamental theories can be divided according to the concept as follows [1]:

- basic concepts and quantities specific to this fundamental theory (state functions for molecular, thermodynamic, optical, electrodynamic processes);

- to have specific types and forms of events and processes, to have its own subject area of research;

- the existence of a system of its own special principles and independent postulates (ideal and real gas laws, the state of thermodynamic equilibrium of microscopic systems, Clausius' inequality, the Carnot cycle, the idea of equivalence, etc.).

ISSN NO: 2770-2367
Date of Publication: 14-08-2023

Fundamental physical theories are generally connected with each other by the system of scientific knowledge. As a result of the analysis of fundamental physical theories on the basis of scientific-philosophical, psychological ideas, from the point of view of the epistemological (science of knowledge) chain of knowledge, it can be concluded that the system consists of elements in the form of unity-generality-boundary generality, empirical basis, theoretical conceptual core, and finally the result. (Figure 1) [3].

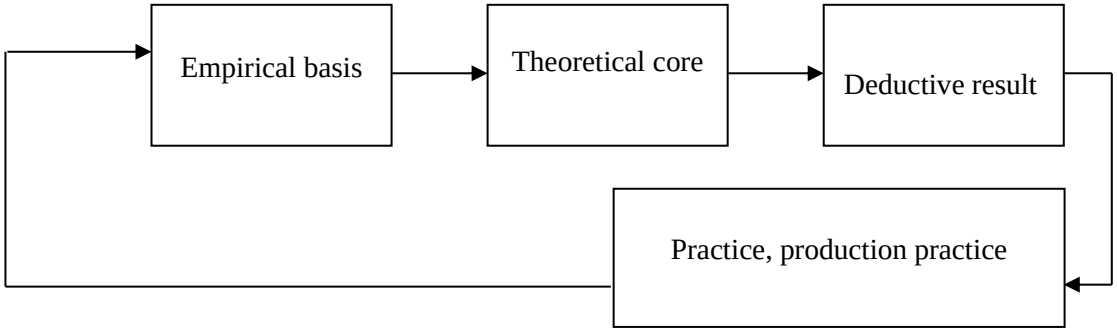


**Figure 1. The organizational and content structure of teaching physics** We will analyze the content structure of "Physics" in the above sense, that is, based on scientific and educational methods of knowledge:

1. Empirical basis - this is based on empirical scientific evidence and is carried out through the method of inductive generalization of experimental data. The laws of physics based on experiments include Y. Mayer, Dulong and Pti's law, and Joule's generalizations and other empirical laws.

2. Theoretical core - the core of physical theories consists of the basic laws of physics. The fundamental laws of physical theory describe connections of relations that are not empirically observed in real physical processes, in which only theoretical objects are studied. The core of the theory develops within the framework of the application of predictive and explanatory-illustrative functions.

3. Application of the theory - the theoretical core of thermodynamic systems is formed using the deductive method of scientific knowledge. An example of the deductive result of the theoretical core of general and specialized sciences known as "Heat engineering", "Thermodynamics" and "Heat exchange processes". In the study of internal combustion engines, the fuel composition, properties, air volume, specific combustion heat and other physical parameters of the working body are determined.

In the teaching of physics, the methodology of preparing students to solve general technical problems oriented to the profession is carried out as follows:

IN LECTURE LESSONS (METHODOLOGICAL (Theoretical core)):

REPRODUCTIVE – is divided into parts based on the assessment of the level of creative activity in knowledge of new concepts, phenomena and laws. It is used in order to ensure that students remember educational materials more firmly, to directly manage cognitive activities, and to form practical skills and competencies to quickly identify deficiencies.

IN PRACTICAL EXERCISES (METHODOLOGICAL (Empirical basis)):

PROBLEM STATEMENT METHOD – It involves the activation of students' scientific knowledge during the educational process and teaching them to use their intellectual capabilities at a high level.

The general physics course at the Technical Higher Education Institution is aimed at forming a system of scientific knowledge, skills and their use in future engineers, it allows students not only to apply the acquired knowledge in practice, but also to acquire scientific methods of scientific knowledge, for example, experiment, practicum or laboratory, to acquire new knowledge independently. enables acquisition, processing and storage [4]. It is in physical education that the preparation of the future engineer for professional activity is based on conducting experiments using scientific methods of scientific knowledge in laboratory and practical production conditions.

ISSN NO: 2770-2367
Date of Publication: 14-08-2023

The following tasks are solved in the course of practical exercises in physics:

1) to determine the location of the structure of the fundamentals of thermodynamics as a system of laws of physics and proven scientific knowledge;

2) to reveal the logical interconnections of the elements of the foundations of thermodynamics as a fundamental physical theory;

In general, based on the above ideas, the methods of learning through reading are the main goal of achieving an empirical basis, a theoretical core, and a dialectical result. If from physics, performing actions such as conducting experiments, observing, and synthesizing, formalizing, and modeling in practical training form an empirical basis, moving from it to the theoretical core means applying the laws of physics instead. includes. Achieving a dialectical outcome involves developing the necessary professional competencies of future engineers through interdisciplinary integrated education.

## Conclusions

If conducting experiments, observing, synthesizing, formalizing and modeling in practical training form an empirical basis, moving from it to the theoretical core involves applying the laws of physics instead. takes Achieving a dialectical result implies the development of the necessary professional competencies of future engineers through interdisciplinary integrated education. Based on these, a methodology for solving problems related to the basics of molecular physics and thermodynamics was developed; In our research, we have improved the methodology of preparing undergraduate students to solve general technical problems from physics to profession. In the process of solving such problems, engineers think, observe and try to make the right decision. All this encourages the formation of creative feelings in students and ultimately ensures effective education. These methods serve to form professional competencies of future engineers.

## References

1. Джораев М. Вероятностно-статистические идеи в преподавании физики. Монография. -Т.: Фан. 1992
2. Горин Ю.В., Землянский В.В. Создание новых технических решений на основе использования физических эффектов и явлений. - Пенза, ПГТА, 2005, 60 с
3. O‘rinov Sh.S. Vibrations of Impurity Iron Ions in Fluorides // In Volume 6 of The Peerian Journal ISSN (E): 2788-0303, May 2022.
4. O‘rinov Sh.S. Talabalarni fizikadan kasbga yo‘naltirilgan umumtexnik masalalarni yechishga tayyorlash // TA’LIM, FAN VA INNOVATSIYA ma’naviy-ma’rifiy, ilmiy-uslubiy jurnal 2023-yil 3-son. 304-b.
5. O‘rinov Sh.S. General didactic principles of preparation for solving general technical problems from physics to profession // “Raqamli energetika tizimini yaratishning istiqbollari, muqobil energiya olishning muammolari va yechimlari-2023” Xalqaro ilmiy-amaliy konferensiyasining ilmiy maqola va tezislari to‘plami. Jizzax, 2023 yil 19-20 may 513-518 bet.
6. O‘rinov Sh.S. Texnika yo‘nalishidagi oliy o‘quv yurtlarida fizikani o‘qitishda ta’lim klasteri metodidan foydalanishga doir ba’zi tavsiyalar // “Boshlsng’ich ta’limning zamonaviy tendentsiyalari: ta’lim va tarbiya integratsiyasi” III Xalqaro amaliy konferentsiyasi Jizzx shahri, 2023 yil 4 may 289-292 betlar