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ON TEACHING "MATERIAL SCIENCE AND TECHNOLOGY OF STRUCTURAL MATERIALS" ENGINEERING DISCIPLINE

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Summary: here we discuss some of the keen aspects of teaching the "Material Science and Technology of Structural Materials" discipline in the era of market economy.

Keywords: engineering discipline, Material Science, educational process, the market economy

НЕКОТОРЫЕ ВОПРОСЫ ПРЕПОДАВАНИЯ ИНЖЕНЕРНОЙ ДИСЦИПЛИНЫ МАТЕРИАЛОВЕДЕНИЕ И ТЕХНОЛОГИЯ КОНСТРУКЦИОННЫХ МАТЕРИАЛОВ

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Аннотация: рассмотрены некоторые аспекты преподавания дисциплины материаловедение и технология конструкционных материалов в условиях рыночной экономики

Ключевые слова: технические дисциплины, материаловедение, образовательный процесс, рыночная экономика.

Until now, the issue of training the university students in "Material Science and Technology of Structural Materials" discipline has been treated that of general education. More attention has been given to technological issues.

At the same time, the material science was defined as more theoretical and complex for both teaching and perception. Most importantly, this used to be a training that would a future specialist would not use in the future, except for a number of issues. Therefore, when teaching the "Materials Science and Technology of Structural Materials" discipline, the main attention is paid to technological sections,

and when teaching materials science, the practical issues are emphasized, such as: materials marking, specific modes of heat treatment of the most common alloys and methods of measuring mechanical properties [1]. This attitude had an objective basis.

First of all, the "material science" section is rather difficult for understanding, because it is a set of empirical data on the connections between the composition, structure and properties of materials. These data are often individual for each kind of material. This state of material science determines in practice the availability of individual technologies for the manufacture of parts for specific working conditions and poses quite complex tasks for professionals who deal with these parts [2].

It should also be noted that such an attitude to "Materials Science and Technology of Structural Materials" discipline has been formed taking into account the structure of the country's economy in the conditions of state-owned enterprises [3].

Under such conditions, manufacturing technologies were basically unified not only within one branch of industry, but also for other branches. Indeed, in such case, specialists did not meet with material science tasks, because there were enough centralized industry and intersectoral organizations (research, design, design institutes, etc.), which had materials scientists. Therefore, for example, for a mechanical engineer it was enough to have only the above knowledge.

However, the situation is completely different in today's market economy. Private enterprises, to ensure their livelihood and profit growth, must constantly solve the problem of developing new or improving existing technologies for the manufacture of their products, as the purchase of technology is possible only at the stage of enterprise formation and is very unprofitable in its development. It is known that the basis for the development or improvement of manufacturing technologies is material science [4].

At the same time, the private enterprise can solve the specified technological problem by forces of those experts which it has. Therefore, these specialists must have knowledge in the field of material science so that at the required level to be able to independently solve material science problems. This, in turn, requires higher education institutions in terms of allocating the section "Material Science" as a special discipline, as is the case in similar institutions in all countries with market economies. In this case, the discipline "Material Science" in the general

structure of education should occupy a certain place, namely: for engineering specialties material science must be studied after obtaining knowledge about structures, requirements for them and existing technologies for their manufacture; and for other specialties - after general engineering disciplines. At the same time, it is expedient to divide the whole discipline "Materials Science" into two parts.

In the first part to place the following questions: the structure and properties of materials, including the physical basis of the formation of substances and the relationship of their structure with properties; deformation and processes that occur when heating deformed materials; phase transformations including the physical basis of the crystallization process, state diagrams and heat treatment (theory and practice); classification and marking of alloys of ferrous and non-ferrous metals and non-metallic materials [5]. This part of material science is intended for all specialties.

The second part should include: analysis of the operating conditions of the structure, machines and their parts with the definition of the properties they need; classification of materials by purpose and methods of selection of materials for specific parts and mechanisms; setting modes of processing of manufacturing of selected materials (thermal, casting, welding, pressure and cutting); construction of the entire technological cycle of manufacturing parts and mechanisms. This part of "Material Science" is intended for engineering specialties.

According to the form of education, the first part of "Materials Science" consists of lecture material and laboratory work, and the second part, in addition to lecture material, should include practical classes and course work, so that students have the opportunity to master practical skills for specific manufacturing technologies.

The second part of "Material Science" is studied on specific materials and structures that are relevant to the specialty that the student is studying, i.e. the second part of "Material Science" is differentiated by specialties.

Thus, the market economy requires education in the field of engineering discipline "Materials Science and Technology of Structural Materials" in order to to change its general nature to a narrow specialization.

This, in turn, necessitates an increase in the amount of educational materials within a university, since each specialty require a course of

lectures dedicated to the topic, its own set of laboratory work, practical classes, term papers and more.

Higher education institutions that have to work in market conditions and hence should start reconfiguring their educational structures in order to develop the private enterprise training courses.

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