TEACHING THEORETICAL MECHANICS IN A FOREIGN LANGUAGE BY DIFFERENT METHODOLOGES

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Annotation

A student studying theoretical mechanics must know the following functions: find the projection of the force vector on the axes and plane and determine the forces relative to the point and axis, find the connection reactions and coordinates of the center of gravity of the body, must be able to analyze the kinematic properties of the body and the movement of a material point.

Keywords. Theoretical, mechanics, force vector, kinematic property, movement.

Theoretical mechanics is one of the fundamental subjects that a future engineer needs to know. The purpose of this subject is to create a foundation for studying general and specialized subjects. In accordance with the requirements of the state educational standard, the student must learn the following from the subject "Theoretical Mechanics": basic concepts and axioms of mechanics; equilibrium conditions of various power structures; methods of determining bond reactions and the center of gravity of solid bodies; methods of determining the kinematic characteristics of a material point and solid body with different types of movement; characteristics of the motion dynamics of a material point in inertial and non-inertial information systems; methods of constructing and solving differential equations of motion of a material point and solid body; general dynamics theorems and elements of analytical mechanics; elements of vibration theory of mechanical system; the foundations of the theory of influence.

A student who studied theoretical mechanics should have the following skills: to find the projection of the force vector on the axis and the plane and to determine the moments of the forces relative to the point and the axis, to find the reactions of the connections and the coordinates of the center of gravity of the bodies, the kinematic properties of the body and various movements of the material point; creating and solving equilibrium equations of bodies and systems of bodies, creating and solving differential equations of motion of a material point and rigid body, solving general theorems of dynamics and principles of analytical mechanics, solving mechanical system dynamics problems, creating and solving differential equations of vibrations of a system with one degree of freedom, oscillating motion identify the main characteristics.

The organization of the lecture material was carried out taking into account the principles of minimization, comprehensibility of the language material, the use of methods of dividing the material into semantic blocks, and the principles of repetition. Identification of newly introduced concepts was done on the basis of concepts already known to students in English. At the same time, the Uzbek equivalents of the new English words were explained in a specially designated section of the board.

As an example, if we cite a fragment of a lecture on "D'Alembert's Principle - Dalamber's principle", the selection and presentation of language tools, the use of logically complete semantic

blocks, the use of previously learned material and the repetition of typical grammatical constructions are shown.

As a rule, indicators assigned to semantic blocks are implemented in an imprecise form, that is, the teacher follows this order of presentation, but does not allocate points for writing to students. When discussing complex topics involving a large number of special cases, such as "Simplifying Inertia Forces Acting on a Rigid Body," it is necessary to divide the material into points. In the analysis of only one rotational motion of a body, it is necessary to consider at least five special cases in which the body and its geometry differ in the steady state.

Despite the fact that theoretical mechanics studies the same physical phenomena and laws, the method of presenting information, the sequence and methods of solving problems, and the determination of quantities in domestic and foreign courses differ. During the integrative classes, the presentation of materials was conducted in a traditional form, but the students were given information about adults in a foreign language. In mechanics, there are concepts that are similar in meaning, but have different uses, showing different shades of this meaning. Such situations were discussed separately in the report and practical exercises. It has been shown that there is a difference in the use of related concepts such as Speed and Velocity in the first case, we are mainly talking about the modulus of the velocity with a certain value; in the second case, it is a vector quantity that also differs in direction in addition to the modulus). Another obvious example is the translation of the term "(rotating) torque": if torque must be used in a two-dimensional coordinate system, but causes the object to rotate around an axis located in the drawing plane (in three-dimensional space), torque is preferred. Both of these English words are translated as "moment". Using such examples, students gained experience in analytical work with the dictionary when it is necessary to choose the most appropriate words to describe a certain situation. In the study of theoretical mechanics, traditionally, many hours are allocated to independent work of students, and the amount of homework is also very large. Therefore, during the bilingual integrative learning project, the teacher conducts consultations for the students, as well as the traditional learning of the subject in the mother tongue. Consultations are mainly conducted in Uzbek, if necessary, English words are also repeated.

The examination for the full course of theoretical mechanics was written and presented only for solving problems. The teaching science lacks basic theoretical principles and the derivation of the equations is very complicated (the derivation of the Lagrange equation of the second type takes up two pages in a small print textbook and is accompanied by a large number of complex mathematical transformations). For an engineer, we believe it is important to use learned methods to solve specific problems. If the student does not know the theory, he will not be able to solve the problem. Thus, the control of knowledge within the framework of the integrative teaching project in theoretical mechanics was carried out at multiple levels.

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