

Summary

“Coursework in Analytical Mechanics” for students of all forms of education

Credit module « Coursework in Analytical Mechanics» is part of a cycle independent choice of students in the direction of preparation Mechanical Engineering speciality Equipment of Pharmaceutical and Biotechnological Productions for students 4 course (7 semester).

The discipline of the department realized Department of Bioengineering and Biotechnics Faculty of Biotechnology and Biotechnics NTYY «KPI».

Purpose of the coursework is the formation of general theorems of dynamics and consequences derived from them give visual aids study of motion of the system. Skilfully using them, you can immediately get answers to questions or draw up a differential equation, the solution of which will outline the pattern of the system. However, in some cases using general theorems associated with certain difficulties. First of all, almost impossible to name the problem clearly indicating cases the effective use of a theorem, which would most likely led to the goal. In addition, in the preparation of the differential equations of motion of a system using general theorems of dynamics often have to break down the system, thereby increasing the number of equations, and finally enter unknown values (reaction elms), the definition of which is envisaged by the task. The most common methods for solving problems of mechanics analytical mechanics methods are based on the principle of virtual (possible) displacement principle, Lagrange, LaGrange because it gave this principle a complete form, putting it in a static basis. Combining this principle with the principle of D'Alembert, Lagrange received general equation of dynamics, from which derived the basic equations of motion of the system and basic theorems of dynamics. He instead used the concept of possible movements akin to the concept of virtual velocities. The principle of possible displacements appeared the result of research actions simplest generalization engines rychahiv, pulley, inclined plane and so on. The first generalizations and conclusions that led to the discovery of the possible movements principle, as stressed in LaGrange "Analytical mechanics" are Guido Ubaldo and Galileo. Later these ideas were in the work of Torricelli, Descartes and Willis. Trying detailed justification of possible movements principle belongs I. Bernoulli, who first drew attention to the feasibility of its use for solving various problems of statics. The principle of possible displacements is this assertion - if the system of material points with ideal stationary and hold constraints in equilibrium, then the amount of active forces work on possible movements zero. D'Alembert principle allows to extend possible movements principle to the case when the material system moving.

Developer summary *Karachun Vladimir Vladimirovich, Professor*