DEVELOPMENT OF A TRAINING COURSE ON MODERN MECHATRONICS AS ONE OF THE MOST IMPORTANT COMPONENTS OF ADITIVE TECHNOLOGIES

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Mechatronics studies a special methodological (conceptual) approach to designing machines with qualitatively new characteristics and makes a significant contribution to the development of additive technologies and mechanical engineering. Now considerable attention is paid to the study of mechatronics in technical universities in developed countries, since this discipline creates the technological foundations for the next industrial revolution. Significant changes are expected in construction engineering as 3D construction printer technology advances rapidly.

The modern definition of mechatronics is the synergistic integration of sensors, actuators, signal generation systems, power electronics, decision and control algorithms, and computer hardware and software to manage complexity, uncertainty, and communication in engineering systems. The author uses his experience in the field of electrical and computer engineering at the University of Technology in South Korea when choosing an educational material.

Based on experience with advanced software products such as Matlab and LabView, a course is being built that introduces students to the modeling of mechanical systems and modern electronic control systems. In modern mechatronic systems, advanced intelligent control methods are being developed to ensure the high-quality execution of complex tasks. This group of methods is based on new ideas in control theory, the use of hardware (intelligent sensors) and software tools for the development of computational methods, promising approaches to the synthesis of mechanical mechatronic systems. Attention is paid to new approaches of computer vision technology for practical problems of additive manufacturing [1].

The Matlab Simmechanics program is being studied, which is an effective tool for designing various mechanisms, including robotic systems. The effectiveness of Simmechanics is due to its foundation - the Matlab platform - and the ability to integrate systems of various physical nature (mechanics, electrical, hydraulics, etc.) on this platform. In addition, the Simmechanics functions provided by the Matlab core are available.

[1] Yuriy Vashpanov, Tatyana Podousova Optical Measurements of Surface Topography for Materials with Scattering Light Reflection by Images Processing using OriginLab *International Journal of Emerging Technology and Advanced Engineering* Scopus Indexed, 2022, Vol.12, Issue 10, pp.57-66.