

## *Educational component PN22*

<b>Discipline</b>	<b>Discrete-logic Automatic Control Systems</b>
<b>Educational level</b>	<b>First (bachelor's)</b>
<b>Course</b>	<b>3</b>
<b>ECTS Credits</b>	<b>6 ECTS credits</b>
<b>Language of instruction</b>	<b>Ukrainian</b>
<b>Department</b>	Applied hydroaeromechanics and mechatronics
<b>Teachers</b>	Oleksandr Gubarev, Oksana Ganpanturova, Alona Murashchenko
<b>Requirements for the beginning of the study</b>	Successful mastering of knowledge and skills acquired in the study of disciplines: "Theoretical Mechanics", "Computer Science", "Physics", "Fundamentals of design and engineering"
<b>What will be studied</b>	Principles of construction of control systems of executive devices of discrete action. Pneumatic, electric and hydraulic means of control and management. Elements of graph theory. Formal description of cyclic processes in objects of discrete action. Functional and system modules. Research and addition of system by memory. Synthesis of systems according to the cyclic-modular approach. Assembly, testing and debugging of discrete control systems of executive devices. The use of pneumoautomatics, electropneumatic, electro-relay schemes, electrohydroautomatics. Search for errors of a systemic nature. Combination of pneumatic automation tools, electric relay circuits and hydraulic automation in control systems of executive devices.
<b>Why it is interesting / necessary to study</b>	Discrete control systems of executive devices are the most common in the means of automation of various industries and areas of technic: aerospace engineering, microclimate systems, medical artificial systems, food industry. It is not possible to automate the operation of complex systems without understanding the physics of controlled executive devices. The process of developing control systems is the transformation of a complex physical and mechanical process into the logic of subordinating actions and functions. This is the main content of this discipline.
<b>Why you can learn (learning outcomes)</b>	To perform an analysis of executive device systems using various approaches and principles of the structure of discrete control systems. Cyclic-modular structure of systems of executive devices and their elements. Methods of development, research, addition and minimization of discrete control systems of executive devices. Develop, assemble and configure discrete control systems using electrical relay circuits, pneumatic and hydraulic automation devices.
<b>How to use the acquired knowledge and skills (competencies)</b>	To solve practical problems of automation of discrete action systems. Develop electric relay, pneumatic and hydraulic circuits of control systems of automated mechanical systems. Select a modern element base of control systems. Build, debug and diagnose control systems.
<b>Information support</b>	Curriculum and working programs of the discipline, RSD, lecture notes (electronic edition)
<b>Form of classes</b>	<b>Lectures, laboratory classes, independent work, individual task</b>
<b>Individual semester assignments</b>	<b>calculation and graphic work</b>
<b>Current control</b>	<b>Modular control work / implementation and protection of the results of laboratory and practical work, express control, etc</b>
<b>Semester control</b>	<b>Exam (written exam)</b>