

Summary

“Automatic Control Theory” for students of all forms of education

Credit module « Automatic Control Theory» is part of a cycle independent choice of educational institution in the direction of preparation Mechanical Engineering speciality Equipment of Pharmaceutical and Biotechnological Productions for students 3 course (6 semester).

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

Credit module "Automatic Control Theory " examines the gives the student the ability to:

- choice of automatic control systems of technological equipment and technological lines of production;
- operation of processing equipment and technological lines of production;
- completion of design work and development of technical projects;
- diagnostics of technical condition of technological equipment;
- ensuring the implementation of processes to obtain relevant indicators of quality marketable products;
- solve problems and process automation systems, pharmaceutical and biotech industries;
- to conduct patent research and develop new schemes, mechanisms, assemblies for submission of applications for invention or utility model
- to develop simulation technology stands for load equipment to be tested.

Get **knowledge:**

- basic principles of management systems, their classification according to the main features, features open and closed systems, the role of feedback;
- method of mathematical description of automatic systems with simple objects, methods of linearization of static characteristics of the elements of the system and set up the equations of statics and dynamics;
- form descriptions and representations the dynamic properties of components and systems - differential equations, transfer functions, frequency and time characteristics;
- the dynamic characteristics of units typical scheme of their connection;
- transformation rules block diagrams, getting the equivalent of transfer functions for closed automatic control systems;
- methods for evaluating the stability of automatic control systems (ACS), sustainability criteria, identifying areas of sustainability;
- indicators and benchmarks of quality of transient processes in the system;
- methods of synthesis of systems with given levels of quality and to optimize the parameters settings of automatic regulators;
- methods of analysis of discrete systems, evaluating their quality;
- characteristics and indicators of the quality of ACS under the influence of random signals;

- the features and characteristics of non-linear systems, application of the method of phase space to their analysis, methods of linearization and evaluation of the stability and quality of transients;

- characteristics and application of special systems: late, time-dependent, with distributed parameters;

- properties of optimal and adaptive systems.

the ability to:

- develop algorithmic structure of the ACS, to make it a mathematical model to determine the transfer functions of the main action;

- estimate the sustainability and quality of transient systems, the effect of the parameters of automatic regulators and properties of the ACS;

- calculate the optimum settings of automatic regulators;

- assess the performance management process under the influence of random disturbances;

- apply methods of harmonious and statistical linearization;

- apply methods of optimization and adaptation to create automated systems.

Developer summary *Mel'nyck Viktorija Mykolaivn, Professor, head of the Department of Bioengineering and Biotechnies*