SUMMARY OF DISCIPLINE

1. Name of discipline simulation of complex systems

2. Symbol (code) in the curriculum DISTS.V.M.2.3

3. Direction (PLO) 13/03/01 THERMAL POWER AND HEAT

4. Profile of training Computer technologies of designing thermal and nuclear power plants

5. Qualifications (degree) Master

6. Providing Unit Department of APEC ENIN

7. Teacher NN Galashev, tel. 564170 E-mail gal@tpu.ru

9. The results of the development of the discipline
P8: the ability to analyze scientific and technical information, put to decide and publish the results of solving complex engineering analysis with the use of basic and specialized knowledge, standard documentation of modern analytical techniques, methods of mathematical analysis and modeling of theoretical and experimental studies;
P11: the ability to use the methods of analysis and simulation of electric power facilities equipment.

10. Contents (list of the main topics (sections)

Section 1. Problems of modeling and optimization of thermal and nuclear power systems.

Lectures. Isolation of thermal and nuclear power from the general system of the fuel and energy complex. Identification of the internal structure of TPP and NPP. The hierarchical structure of thermal power plants and nuclear power systems. Equivalenting elements and relations of the object. Identify ways of information linkages systems within the hierarchy of an object. Construction of mathematical models of complex systems. optimize the formulation of the problem. Determination of the adequacy of the model.

Practical lessons.

Development of thermal power scheme on the basis of structural modeling.

Section 2. Properties of thermal and nuclear power as a complex system.

Lectures. Criteria for study design decisions. These costs as a selection criterion, its shortcomings. Terms of comparable options. Requirements for power plants. System optimization feasibility studies. Consideration of reliability factors, safety and environmental impact of thermal and nuclear power plants.

Practical lessons.

Development of thermal power scheme on the basis of object modeling.

Section 3. Statement of the problem of modeling the thermal circuit TPP and NPP.

Lectures. System representation TPP and NPP. Defining the objectives and criteria of optimization. Bringing energy to the same effect. Presentation scheme technological ties. Characteristics of elements. System balance equations. Description allowable operation region. objective function.

Section 4. Methods of modeling of thermal power plants.

Lectures. Algorithmic mathematical description and programming. Analysis of the functional connections of elements and parameters. The choice of method solving the system of equations. Selecting the input method in the allowable range. The choice of programming language. Checking the adequacy of the model. Using a mathematical model.

Practical lessons.

Optimization of thermal power schemes based on object modeling framework.

Section 5. Justification of parameters of thermal schemes and specifications.

Lectures.

The initial steam parameters and their impact on technical and economic parameters of the boiler and steam, feed water temperature optimum. Optimizing the parameters and characteristics of low-grade complex.

Practical lessons.

Optimization of parameters of thermal power scheme on the basis of object modeling.

11. Course 2 Semester 3 Number of credits 3

12. Prerequisites "Information Technology", "Mathematical modeling and optimization", "Engineering Thermodynamics", "Fluid Dynamics".

13. Korekvizity DISTS.V.M.2.2; DISTS.V.M.2.4; DISTS.V.M.2.5 ..

14. Type certification (exam, test) Exam

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