1. Modeling: basic concepts and definitions.

2. Goals and principles of modeling.

3. Axioms of the theory of modeling. Types of models and modeling.

4. Different types of models and simulations. Functions of models.

5. Object modelling. Factors affecting the object model.

6. Mathematical modeling: basic concepts and definitions.

7. Requirements for the mathematical model. The structure of the mathematical model.

8. Classification of mathematical models.

9. The goals of mathematical modeling for technical objects and technological processes.

10. Modeling technologies and software.

11. Algorithm for constructing an analytical model.

12. Algorithm for constructing an empirical model.

13. Brief description of the main stages of algorithms for constructing analytical and empirical models.

14. Development of empirical regression models: basic concepts, experiment planning.

15. Full factorial experiment, the choice of factor levels, experiment.

16. Regression models with one input variable: basic concepts.

17. Adequacy and Accuracy of Regression Models.

18. Types of regression models with one input variable.

19. Regression models with multiple input variables. Multivariate (multiple) linear regression.

20. Matrix approach to determining regression coefficients

21. Assessment of the adequacy and accuracy of a multivariate linear model.

22. Linear regression models with multiple input variables.

23. Nonlinear regression models with multiple input variables.

24. Step methods for building regression models

25. Interpretation and optimization of regression models.

26. Statistical modeling and its techniques.

27. Statistical modeling versus mathematical modeling. Statistical modeling software.

28. Statistical modeling versus machine learning.

29. Mathematical models of stochastic processes obtained by experimental and statistical methods.

30. Description of the investigated object in the local area of the space of variables.