

## **Abstract discipline « Chemical reactors»**

### *1. General information about the chemical reactors.*

Modeling of the chemical reactors and chemical processes that proceed inside. Structure of the mathematical model of a chemical reactor. The material balance equation for an elementary volume flow chemical reactor. Classification of chemical reactors and their modes of operation.

### *2. Chemical reactors with an ideal flow pattern in the isothermal mode.*

Ideal mixing reactor. A plug flow reactor. Comparison of the effectiveness of flow reactor with ideal mixing and plug flow. Cascade of ideal mixing reactors

### *3. Chemical reactors with non-ideal flow structure.*

The reasons for deviation from the idealness in flow reactors. Models with non-ideal flow structure.

### *4. The residence time distribution in the flow reactor.*

Function of the residence time distribution. Experimental study of the distribution function. Function of the residence time distribution of ideal and non-ideal flow reactors. Application of functions of the residence time distribution in the calculation of chemical reactors.

### *5. Heat transmission in the chemical reactors.*

The equation of heat balance. Thermal conditions of chemical reactors. The flow reactor ideal mixing in the isothermal mode. Periodic ideal mixing reactor in non-isothermal mode. A plug flow reactor in non-isothermal mode. Thermal stability of chemical reactors. Optimal temperature conditions and methods for its implementation in industrial reactors.

### *6. Industrial chemical reactors.*

Reactors for homogeneous processes. Reactors for heterogeneous processes with the solid phase. Reactors for gas-liquid processes. Reactors for heterogeneous catalytic processes.