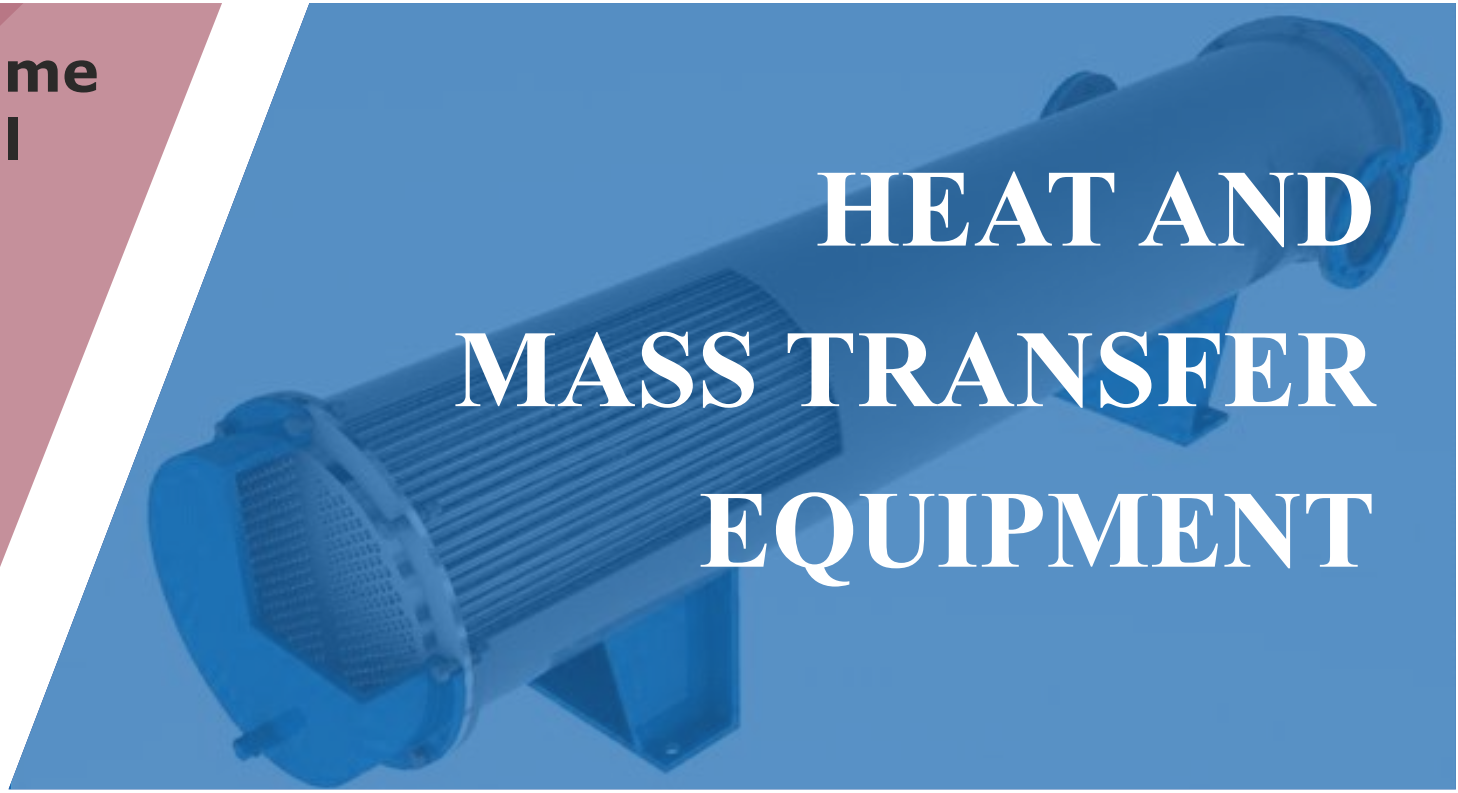
Program:
13.04.01 Heat Power Engineering, MSc

South Ural State University
National Research University

Form of training: Full-time
Department: of Thermal power engineering



HEAT AND MASS TRANSFER EQUIPMENT

Lecturer: Yurii Prikhodko,
Department: of Thermal power engineering

South Ural State University
National Research University

Course: Is worth 4 ECTS.

LEARNING Objectives

- To choose heat exchanging solution to meet the exact requirements of the industrial partner; to calculate and determine heat transfer coefficient; to calculate and minimize heat dissipation;
- To operate, maintain and optimize heat exchangers for various industrial applications.
- To develop heat exchangers of various designs

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Lectures

1	Introduction	The concept of heat exchangers. Terms and Definitions. Ways of using heat exchangers.
2	Heat Exchanger Classification	Classification by high temperature and low temperature coolant. Classification by design.
3	Traffic patterns of coolants	Direct-flow, counter-current, mixed flow patterns of coolants. The temperature head.
4	Types of finned heating surfaces	Methods of ribbing. External fining of smooth pipes.
5	Spiral heat exchanger	Spiral heat exchanger design. Layout calculation.
6	Double pipe heat exchanger	Heat exchanger design. The movement of coolants: characteristics.
7	Plate heat exchanger	Plate heat exchanger design. Plate Profiles.
8	Electric heater	The operation of electric water heaters. Heated industrial water.

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Practice tutorials

1	Introduction	Heat exchanger applications. Different solutions for different contexts.
2	Heat Exchanger Classification	Calculation of the temperature head for a direct-flow heat exchanger.
3	Traffic patterns coolants	Calculation of the temperature head for a counter-flow heat exchanger.
4	Types of finned heating surfaces	Calculation of finned tube bundles.
5	Spiral heat exchanger	Layout calculation of a spiral heat exchanger.
6	Double pipe heat exchanger	Calculation of the speeds of movement of coolants.
7	Plate heat exchanger	Calculation of the heat transfer coefficient in a plate heat exchanger.
8	Electric heater	Calculation of heat dissipation of an electric heater.

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Lab tutorials

1	Introduction	Applications of heat exchangers
2	Types of Heat Exchangers	The temperature range (temperature head) for a direct-flow (parallel flow) heat exchangers
3	Traffic patterns coolants	The temperature range (temperature head) for a counterflow heat exchanger.
4	Types of finned heating surfaces	Finned tube bundles
5	Spiral heat exchangers	The operation principle of a spiral heat exchanger
6	Double pipe heat exchangers	Movement of coolants: speed of movement
7	Plate heat exchangers	The heat transfer coefficient in a plate heat exchanger.
8	Electric heater	Heat dissipation in case of an electric heater.

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Laboratory Stands

The stand “Study of the operation
of the air heater. Heat transfer coefficient "

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Industrial Applications I

Design of heat exchangers for thermal power plants

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Industrial Applications II

Calculations: plate heat exchangers for industrial cold water

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Industrial Applications III

Labs provide students first-hand experience with heat exchangers of various designs, as well as with various types of heaters

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Thanks for attention!