2009. Industrial Refrigeration Systems

- Components of refrigeration installations.
- Compressors: reciprocating, rotary drum, screw, and centrifugal.
- Condensers: air-cooled and water-cooled.
- Evaporators: air cooling and water cooling.
- Throttling, control, regulation, and protection devices and components for refrigeration installations.
- Cooling of industrial storage spaces: cooling loads, industrial refrigerators, general principles.
- Location selection criteria, layout, and sizing of chambers; construction elements; pre-cooling, cooling, freezing.
- Controlled atmosphere cooling; storage and handling conditions for perishable products.
- Refrigerant leaks and environmental impacts.
- Open and closed refrigeration systems with liquid absorbents and solid adsorbent materials; solar cooling systems with thermal storage.

Laboratory Exercises:

- Performance and operational behaviour testing of a solar cooling system with solid adsorbent material, vacuum thermal solar collectors, and PVT, as well as a thermal storage system with phase-change materials.
- Performance and operational behaviour testing of an open-cycle cooling system with silica gel desiccant material in a rotating desiccant wheel.
- Performance testing of an open-cycle cooling system with liquid desiccant material LiCl.
- Performance and operational behaviour testing of a basic vapour compression refrigeration system.Building Energy Modelling (BEM) software: EnergyPlus, OpenStudio.
- Participation in the ASHRAE International Student Competition for net-zero energy buildings and minimal environmental footprint.

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