

Course name: Heating Ventilation and Air Condition (HVAC)

Course code: YARÉPGCBNF

Hours per week: 2 lecture / 0 practice / 0 laboratory; Exam/ 6 credit

Precondition for Erasmus students: none

In charge: Assoc. Prof. Talamon Attila PhD

OBJECTIVE OF THE COURSE:

The subject aims tasks and systems of building engineering. Water supply, sewerage, natural gas supply and heat supply of buildings.

Connecting to external networks, public utilities. Aspects of network design.

Principles of heating, ventilation and air conditioning.

Highly energy efficient buildings and their mechanical systems.

Aim: Presentation of the complex building engineering systems inside the building.

14 WEEKS SCHEDULE

- 1. week: Introduction: requirements of the semester**
- 2. week: GIS mapping of the micro-regional energy saving and renewable energy utilization potential of the Hungarian building stock**
- 3. week: Energy policy – Building energy – HVAC**
 - Trends
 - Short, medium and long-term energy policy
 - Buildings and HVAC systems
- 4. week: Water supply**
 - Plumbing
 - Sewerage**
 - Rainwater, rainwater storage;
- 5. week:**
 - Gas supply**
 - Definition
 - Indicators
 - Outdoor and indoor opportunities and specifications
 - Comfort parameters**
 - Overview
 - heat demand calculation;
 - Outdoor and indoor opportunities and specifications
 - Standards
- 6. week: Heating technology, heating systems**
 - Types of heating systems;
 - Oxygen diffusion and electron affinity;
 - Heat emitter
 - Heat generator.
- 7. week: SEMESTER PROJECT SUBMISSION AND CONSULTATION**

8. week: Heat pumps

- Difference between heat exchangers and heat pumps
- Horizontal, vertical geothermal heat pump;
- Types of water source heat pumps;
- Types of air source heat pumps (outdoor, indoor);
- Waste energy source heat pumps

9. week: Ventilation systems

- Determination of the amount of ventilated air;
- Heat and moisture content of the air;
- **Recuperators:** Installation and necessity of active and passive recuperators

10. week: Nearly zero energy buildings and HVAC systems

- Passive house
- Active house
- nZEB
- ZEB

11. week: Utilization of solar energy

- Types of solar collectors;
- Hot water production with solar collector;
- Electricity generation with solar panels.

Utilization of wind energy

- Horizontal
- Vertical

Utilization of biomass

- heating
- domestic hot water
- District heating

12. week: END-OF-SEMESTER DISSERTATION

13. week LATE END-OF-SEMESTER DISSERTATION

Assessment:

End-of-semester dissertation and semester project