GHENT UNIVERSITY

Course Specifications

Valid as from the academic year 2025-2026

Energy in Buildings (E032760)

Course size *(nominal values; actual values may depend on programme)*

Credits 3.0 **Study time 90 h**

Course offerings in academic year 2027-2028

A (semester 2)	English	Gent

Lecturers in academic year 2027-2028

Offered in the following programmes in 2027-2028	**crdts**	**offering**
Master of Science in Electromechanical Engineering	3	A
Master of Science in Mechanical and Electrical Systems Engineering	3	A

Teaching languages

English

Keywords

Heating, ventilation, air conditioning, refrigeration, heat pump, compression chiller, absorption chiller, Boiler, CHP

Position of the course

This course aims at teaching the students the basics of building energy engineering. This includes the basics of HVAC&R, assessing energy needs and evaluating the impact of then technical choices. It requires knowledge of engineering thermodynamics, heat and mass transfer, combustion technology, fan, pump and compressor technology and heat exchangers.

Contents

- Principles of comfort and indoor air quality in buildings
- Energy balance of a building, introduction to building physics
- Heat load, cooling load, moisture load : transmission, in/exfiltration, solar gains, internal gains,
- psychometrics
- HVAC installations : water/air/local systems
- Heat production : boilers, heat pumps, CHP
- Chillers: compression, absorption, part load behaviour, shut down, trigeneration
- Alternative techniques : free chilling, earth-air heat exchangers, evaporative chilling, dessicant chilling, ...

Initial competences

Competences gained in Engineering Thermodynamics, Fluid Machines and Thermal Machines.

Final competences

1 Understanding and describing components of HVAC&R systems
2 Describing part load behaviour of HVAC&R systems
3 Design of HVAC&R systems
4 Understanding Energy performance of building, building systems and components

Conditions for credit contract

Access to this course unit via a credit contract is determined after successful competences assessment

Conditions for exam contract

This course unit cannot be taken via an exam contract

Teaching methods

Extra information on the teaching methods

The theory is taught during lectures.

Study material

None

References

- Principles of Heating, Ventilation, and Air Conditioning in Buildings, Mitchell and J.E. Braun
- International Journals
  - Journal of Applied Thermal Engineering
  - Energy and Buildings
  - Building and Environment

Course content-related study coaching

Interactive support through the electronic learning platform (forums, e-mail), in person: after agreement on date, fixed contact hour: immediately before and after hearing classes

Assessment moments

end-of-term assessment

Examination methods in case of periodic assessment during the first examination period

Written assessment

Examination methods in case of periodic assessment during the second examination period

Written assessment

Examination methods in case of permanent assessment

Possibilities of retake in case of permanent assessment

not applicable

Extra information on the examination methods

Theory: Written exam (closed book)

Calculation of the examination mark

The end score (S) is determined as: S = 1*T, with T the score for the written theory exam.