GHENT UNIVERSITY

Course Specifications

Valid as from the academic year 2025-2026

Two-phase Heat Transfer (E032730)

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

Credits 3.0 **Study time 90 h**

Course offerings in academic year 2026-2027

A (semester 1) English Gent

Lecturers in academic year 2026-2027

De Paepe, Michel	TW08	lecturer-in-charge
Beyne, Wim	TW08	co-lecturer

Offered in the following programmes in 2026-2027	**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

Position of the course

This is an advanced academic elective course in the learning line thermo-fluids.

Contents

- Fundamentals of gas – liquid two phase flow: Flow regimes and pressure drop
- Boiling heat transfer:
  - Pool Boling: correlations for surfaces and bundles
  - Critical heat flux: correlations
  - Flow boiling: flow regime based methods
- Condensation heat transfer:
  - Condensation modes
  - Flim condemnation: heat transfer and pressure drop
  - Dropwise condensation: phenomenology & heat transfer correlations
- Technical applications:
  - Steam boilers: Boiler classification, Circulation and construction
  - Steam distribution: network component and steam traps
  - Condensers: types & construction
- Melting & solidification: heat transfer and physical phenomena
- Thermal energy storage
  - Types
  - Phase change materials
  - Heat exchanger design & system simulation

Initial competences

- Transport Phenomena
- Technical Thermodynamics
- Heat and Flow Engineering

Final competences

1 Understanding the physics of two phase gas liquid flow
2 Understanding the physics of melting and solidification
3 Designing heat exchangers which use two phase phenomena
4 Using software for heat exchanger design
5 Being able to explain the technical realisations in steam, refrigerant and thermal

energy storage technology

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

Seminar, Excursion, Lecture

Extra information on the teaching methods

- The theory is taught in lectures.
- Project work

Study material

None

References

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 lectures.
- Additional guidance by assistant for exercise classes.

Assessment moments

end-of-term assessment

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

Oral assessment, Written assessment

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

Oral assessment, 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

- Project work on boiling heat transfer
- end-of-term evaluation

Calculation of the examination mark

The end score (S) is determined as: S = 0.5*T + 0.5*E, with T the score for the theory exam and E the score for the exercises exam.