GHENT UNIVERSITY

Course Specifications

Valid as from the academic year 2022-2023

Basics of Process Engineering (I002406)

Due to Covid 19, the education and evaluation methods may vary from the information displayed in the schedules and course details. Any changes will be communicated on Ufora.

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

Credits 3.0 **Study time 75 h** **Contact hrs** 30.0 h

Course offerings and teaching methods in academic year 2022-2023

A (semester 2)	English	Gent	guided self-study	3.75 h
			online seminar: coached exercises	8.75 h
			online lecture	17.5 h

Lecturers in academic year 2022-2023

Ronsse, Frederik	LA24	lecturer-in-charge

Offered in the following programmes in 2022-2023	**crdts**	**offering**
International Master of Science in Environmental Technology and Engineering	3	A
International Master of Science in Sustainable and Innovative Natural Resource Management	3	A
Exchange Programme in Bioscience Engineering: Chemistry and Bioprocess Technology (master's level)	3	A
Exchange Programme in Bioscience Engineering: Environmental Technology (master's level)	3	A

Teaching languages

English

Keywords

Fluid, gas and bulk solids transport, cooling and heating technology, and engines

Position of the course

The aim of this course is to provide the student a basic education in terms of process engineering. The basics regarding the technical aspects of relevant unit operations in mass and energy transfer are detailed. The unit operations include: heating and cooling, transport of liquids, gases and bulk solids, mechanical drive systems.

Contents

Process engineering

1. Heating and cooling
1.1 Basics of thermodynamic cycles
1.2 Heating technology (steam cycle, heat pumps)
1.3 Cooling technology (reverse Carnot cycle, vapor compression and absorption cooling systems)
2. Transport systems
2.1 Liquid transport (hydraulic systems, pumps and valves)
2.2 Gas transport (fans, blowers and compressors)
2.3. Bulk solids transport (pneumatic transport, fluidisation)
3. Introduction to heat engines
3.1 External combustion engines: Brayton, Sterling and Rankine cycle based
3.2 Internal combustion engines: Diesel & Otto cycle based

Initial competences

Basic knowledge of physical transport phenomena (mass and heat balances)

Final competences

1 Having insight into the inner workings of cooling machines, heat pumps, steam generation, fluid transport systems and heat engines.
2 Design cooling/heating cycles and calculate their resulting energy efficiencies.
3 Evaluate a technical description of an (industrial) installation with respect to the unit operations of heating/cooling, pumping of fluids and driving processes using thermal energy.

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

Guided self-study, online lecture, online seminar: coached exercises

Extra information on the teaching methods

The theory is being taught by means of plenary lectures. The exercises are being taught by a combination by coached sessions. Additional exercises are made available through Ufora by means of which students can train themselves individually.

Learning materials and price

Presentation slides from the theory and exercises lectures will be electronically distributed to the students on Ufora. Course materials are in English.

References

Course content-related study coaching

The lecturer can provide coaching to students during and after the lectures (both plenary theory lectures as well exercise sessions). Individual coaching and guidance can be offered upon making an appointment.

Evaluation methods

end-of-term evaluation

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

Written examination

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

Written examination

Examination methods in case of permanent evaluation

Possibilities of retake in case of permanent evaluation

not applicable

Calculation of the examination mark

The final mark is distributed according to 50% on the theory part (open questions, closed book, oral examination with written preparation) and another 50% on the exercise part (exercises, written examination, closed book but a formularium is available to the student).
Students who eschew period aligned and/or non-period aligned evaluations for this course unit may be failed by the examiner.