

Unit Operations in Chemical Industry (E071200)

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 6.0 Study time 180 h Contact hrs 60.0 h

Course offerings and teaching methods in academic year 2020-2021

Offering	Language	Location	Teaching Methods	Hours
A (semester 1)	Dutch	Gent	seminar: coached	15.0 h
			exercises	
			guided self-study	30.0 h
B (semester 1)	English		practicum	15.0 h
			practicum	15.0 h
			seminar: coached	15.0 h
			exercises	
			lecture	30.0 h

Lecturers in academic year 2020-2021

Heynderickx, Geraldine TW11 lecturer-in-charge

Offered in the following programmes in 2020-2021

Programme	crdts	offering
Bridging Programme Master of Science in Chemical Engineering	6	B
Bridging Programme Master of Science in Chemical Engineering	6	A
Master of Science in Electromechanical Engineering (main subject Control Engineering and Automation)	6	B
Master of Science in Electromechanical Engineering (main subject Electrical Power Engineering)	6	B
Master of Science in Electromechanical Engineering (main subject Maritime Engineering)	6	B
Master of Science in Electromechanical Engineering (main subject Mechanical Construction)	6	B
Master of Science in Electromechanical Engineering (main subject Mechanical Energy Engineering)	6	B
Master of Science in Chemical Engineering	6	B
Master of Science in Sustainable Materials Engineering	6	B
Master of Science in Chemical Engineering	6	A

Teaching languages

Dutch, English

Keywords

distillation, absorption, liquid-liquid extraction, liquid-solid extraction, evaporation, condensation, boiling, drying, filtration, centrifugation, crystallisation, classification, sedimentation

Position of the course

Calculation and design of apparatus for a number of unit operations in chemical industry.

The goal is to learn the student how to describe, calculate, design and optimize a number of unit operations in chemical industry.

Contents

Study of a number of unit operations

- Introduction
- Phase equilibrium
- Distillation

- Absorption and Desorption
- Liquid-liquid extraction
- Liquid-solid extraction
- Condensation
- Boiling
- Evaporation
- Drying
- Filtration
- Centrifugation

Initial competences

The course 'Unit operations in chemical industry' builds on a number of final competences from the courses 'Momentum transport' (Transportverschijnselen), 'Heat and mass transfer' (Warmtetechniek en stoftransport), thermodynamics (Thermodynamica).

Final competences

- 1 To understand and to determine phase equilibria
- 2 To gain insight in physical, thermal and mechanical unit operations in chemical industry
- 3 To gain insight in the distillation process
- 4 To gain insight in the absorption process
- 5 To gain insight in the extraction process
- 6 To gain insight in the evaporation process
- 7 To gain insight in the condensation process
- 8 To gain insight in the boiling process
- 9 To gain insight in the drying process
- 10 To gain insight in the filtration process
- 11 To gain insight in the centrifugation process
- 12 To calculate and design apparatus for the above mentioned processes in chemical industry

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, lecture, practicum, seminar: coached exercises

Extra information on the teaching methods

Theory using projector.
Practical work and exercises in groups of 4 to 5 students. One report per group.

Learning materials and price

Syllabus (English): download on the electronic learning platform (Ufora) for free
Language Syllabus: English
Slides used during lectures available for free on Ufora

References

- Perry Chemical Engineers Handbook
- Chemical Engineering (Coulson and Richardson)
- Distillation : principles and practice (Stichlmair and Fair)
- Separation process technology ; Performance, Selection, Scale-up (Humphrey and Keller)

Course content-related study coaching

Practical work is supported by two assistants.
The exercises are supported by the lecturer.
The lecturer goes on excursions with the students.
The lecturer can be requested to give additional information during the complete semester.

Evaluation methods

end-of-term evaluation and continuous assessment

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

Oral examination

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

Oral examination

Examination methods in case of permanent evaluation

Skills test, report

Possibilities of retake in case of permanent evaluation

examination during the second examination period is possible

Extra information on the examination methods

During examination period: oral closed-book exam, written preparation. During semester: graded exercises reports; graded lab sessions.

Frequency: 12 weeks with practical work and exercised. The students work in groups (4 to 5 students). One report per group for practical work and exercises.

Calculation of the examination mark

Special conditions: Final Result = $0.25 \cdot (\text{result for semester work}) + 0.75 \cdot (\text{result semester examination})$.