GHENT UNIVERSITY

Course Specifications

Valid as from the academic year 2025-2026

Process Engineering 2 (I003071)

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

Credits 5.0 **Study time 150 h**

Course offerings in academic year 2025-2026

A (semester 1)	English	Gent
B (semester 1)	English	Gent

Lecturers in academic year 2025-2026

Van der Meeren, Paul	LA24	lecturer-in-charge
Dewulf, Jo	LA24	co-lecturer

Offered in the following programmes in 2025-2026	crdts	offering
Master of Science in Bioscience Engineering: Cell and Gene Biotechnology	5	A
Master of Science in Bioscience Engineering: Chemistry and Bioprocess Technology	5	A
Master of Science in Bioscience Engineering: Environmental Technology	5	A
Master of Science in Bioscience Engineering: Food Science and Nutrition	5	A
Master of Science in Pharmaceutical Engineering	4	B

Teaching languages

English

Keywords

Unit operations

Position of the course

This course is an extension of the course 'process engineering' that is taught in the bachelor degree. In the former course some unit operations have been addressed that are relevant for all Masters. Process engineering 2 deals with the unit operations that have not been dealt with in the Ba-level course and that are relevant for the Ma in Applied Biological Sciences.

Contents

This content is fully applicable for course offering A, while chapter 5.6 and 5.7 do not have to be known within course offering B.
1. Particle size analysis
1.1 Equivalent sphere diameter
1.2 Graphical representation of particle size distributions
1.3 Calculation of average particle diameters
1.4 Analytical distribution functions

2. Separation and classification of particles
2.1 Global efficiency
2.2 Sieving
2.3 Sedimentation
2.4 Centrifugation (centrifuges + cyclones)
2.5 Collision and adhesion
2.6 Electrophoretic separation

3. Mixing and fluidisation
3.1 mixing of solids
3.2 mixing of solid/gas mixtures (fluidisation)
3.3 Mixing of liquids

4. Particle technology
4.1 Size reduction
4.2 Segregation of dry particulates
4.3 Storage and transport of granular material

5. Vapour-liquid separation processes: distillation
5.1. Vapor-liquid equilibrium relations
5.2. Single-stage equilibrium contact for vapor-liquid system
5.3 Simple distlllatlon methods
5.4 Distillation with reflux and McCabe-Thiele method
5.5 Distillation and absorption efficiencies for tray and packed towers
5.6 Fractional distillation using enthalpy-concentration method
5.7 Distillation of multi-component mixtures

6. Liquid/solid separation processes (leaching)
6.1. Introduction and equipment for liquid-solid leaching
6.2 Equilibrium relations and single-stage leaching
6.3 Countercurrent multistage leaching

7. Crystallisation
7.1 Introduction and equipment for crystallization
7.2 Crystallyzation theory

Initial competences

Profound knowledge of unit operations and process technology.

Final competences

1 understand the basic principles of a number of unit processes that are used in bio-industrial production (understand)
2 apply the basic principles of a number of unit processes in calculations (apply)
3 simuate a number of unit processes (apply)
4 extract essential information out of a written text-based description (analyse)
5 logically reflect on the results obtained (analyse)

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, Lecture, Independent work

Extra information on the teaching methods

Theory: oral lectures (slides via Ufora)
Exercises: calculations, partly PC-based (Excel+Matlab)

Study material

Type: Syllabus

Name: Process Engineering 2
Indicative price: € 10
Optional: no
Language : English
Number of Pages : 200
Available on Ufora : No
Online Available : No

Type: Slides

Name: Process Engineering 2
Indicative price: Free or paid by faculty
Optional: no
Language : English
Available on Ufora : Yes

Type: Handouts

Name: Process Engineering 2
Indicative price: Free or paid by faculty
Optional: no
Language : English
Available on Ufora : Yes
Online Available : Yes

References

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Course content-related study coaching

Lecturer and assistants can be asked for additional coaching and help with numeric problems.

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: period aligned evaluation
Exercises: period aligned evaluation
Theory: written (open book)
Exercises: written (open book)

Calculation of the examination mark