

Balances of Biochemical and Chemical Processes (I700128)

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

Credits 4.0 Study time 110 h Contact hrs 36.0 h

Course offerings and teaching methods in academic year 2018-2019

A (semester 2)	Dutch	seminar: coached	24.0 h
		exercises	
		group work	12.0 h

Lecturers in academic year 2018-2019

De Gelder, Leen	LA25	lecturer-in-charge
Verwaeren, Jan	LA26	co-lecturer

Offered in the following programmes in 2018-2019

	crdts	offering
Bachelor of Science in Bioscience Engineering Technology	4	A
Preparatory Course Master of Science in Biochemical Engineering Technology	4	A

Teaching languages

Dutch

Keywords

Process balances, mass- and energy balances, steam

Position of the course

The main objective is for the students to acquire the skills to successfully analyse and solve quantitative problems regarding chemical and biochemical production processes. In the first part, the student gets acquainted with analyzing mass streams of production processes and the application of mass balances. In the second part, energy balances are introduced through looking at processes that use steam

Contents

Basics: quantities, units, fractions, chemical reaction nomenclature (stoichiometrics, limiting reactant, reactant in excess, selectivity, yield, degree of conversion)
 Mass balances (total and partial): with mixing point, with mixing point and chemical reaction, with mixing and distribution point, regarding topics such as filtration, crystallization, microbiological hydrolysis, distillation, dewatering
 Energy balances: heating (heat exchanger, steam injection), evaporation, drying through steam technology

Initial competences

General and inorganic chemistry I, organic chemistry

Final competences

- 1 Being able to analyse production systems through mass and energy balances.
- 2 Having insight in (bio)chemically industrially important unit operations.
- 3 Acquiring insight in parameters which influence system efficiency
- 4 Understanding a real life production process and being able to quantify its properties

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

Group work, seminar: coached exercises

Extra information on the teaching methods

Work college: students solve exercises with interaction amongst students and between students and professor, students are actively called upon to participate.
Guided independent work: Students describe a (bio)chemical production process, make a process schematic and simulate quantitatively the material streams within the process

Learning materials and price

Syllabus available

References

Richard M. Felder & Ronald W. Rousseau, 2005, Elementary Principles of Chemical Processes

Course content-related study coaching

During contact hours
By appointment

Evaluation methods

continuous assessment

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

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

Examination methods in case of permanent evaluation

Written examination, participation, assignment

Possibilities of retake in case of permanent evaluation

examination during the second examination period is possible in modified form

Extra information on the examination methods

Three written tests throughout the semester
Participation during work colleges, solving extra problems
Report on (bio)chemical process evaluation and quantification

Calculation of the examination mark

Tests and participation: 80%
Report: 20%