

## Course: Process Simulation & Modelling 2

credits: 5

|                     |                                  |                          |                            |
|---------------------|----------------------------------|--------------------------|----------------------------|
| <b>Course code</b>  | CTVH26PROCESSIM2                 | <b>Modes of delivery</b> | Practical / Training       |
| <b>Name</b>         | Process Simulation & Modelling 2 |                          | Project-based learning     |
| <b>Study year</b>   | 2026-2027                        | <b>Assessments</b>       | Project - Other assessment |
| <b>ECTS credits</b> | 5                                |                          |                            |
| <b>Language</b>     | Dutch, with parts in English     |                          |                            |
| <b>Coordinator</b>  | A. Kloekhorst                    |                          |                            |

### Learning outcomes

This module has the following learning outcomes

- You will model a process in the Aspen Plus® simulation programme and compare and evaluate experimental and model results.
- You will interpret and organise research results using models with a view to addressing the problem.
- You will work professionally in a group on a case study and present the findings clearly.

### Content

Process Simulation & Modelling 2 builds on the fundamental knowledge acquired in Process Simulation & Modelling 1. Whereas the first part focused on phase equilibria and distillation, this module focuses on the modelling, simulation and optimisation of chemical reactors and integrated process plants using Aspen Plus.

This module covers various types of chemical reactors, such as batch reactors, continuously stirred tank reactors (CSTRs) and plug flow reactors (PFRs). The module covers reaction kinetics, stoichiometry, energy and mass balances, and the influence of process conditions and reactor design on conversion, selectivity and yield.

In addition, students learn to construct complete chemical processes by linking reactors to separation and auxiliary processes, such as distillation, heat exchangers and recycle streams. Attention is paid to flowsheet design, the selection of thermodynamic models, convergence behaviour and the interpretation of simulation results.

Finally, Aspen Plus is used as a tool for process analysis and optimisation. Students learn how process parameters can be systematically varied to improve energy consumption, raw material consumption and product quality, and how simulations can be used to support design and decision-making in the chemical industry.

In the Chemport Challenge, students are paired with second-year Chemistry students and linked to a company, where they have one working week to develop a consultancy case. These are then presented to the companies.

The Process Simulation & Modelling 2 module covers the following components of the BOKS Chemical Technology:

Knowledge:

Unit Operations

Reactors

Heat exchangers

Thermodynamics

Chemical thermodynamics

Process engineering

Process design

Process modelling

Simulation and modelling

Optimisation

Skills

Research skills and systematic problem-solving

ICT skills

Use of Aspen Plus

Interpersonal and communication skills

**Included in programme(s)**

Chemical Engineering

**School(s)**

Engineering, Life Sciences & ICT

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