

## Process Engineering (E071010)

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

Credits	6.0	Study time	180 h	Contact hrs	60.0 h
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Course offerings and teaching methods in academic year 2018-2019

A (semester 1)	Dutch	seminar: coached	10.0 h
		exercises	30.0 h
		lecture	

Lecturers in academic year 2018-2019

Beyne, Antoon	TW11	lecturer-in-charge
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Offered in the following programmes in 2018-2019

	crdts	offering
<a href="#">Bachelor of Science in Chemical Engineering and Materials Science</a>	6	A
<a href="#">Master of Science in Chemical Engineering Technology</a>	6	A
<a href="#">Preparatory Course Master of Science in Chemical Engineering</a>	6	A

Teaching languages

Dutch

Keywords

design, engineering, process function, maintenance, rotating equipment, pumps, compressors, piping, pipeline components

Position of the course

Taking design and engineering as initial steps in the life cycle of a chemical plant, a number of specific equipments, namely rotating equipment, pipelines and pipeline components, are discussed, seen from the design, process function and maintenance point of view. The aim is to obtain optimized design and insight in functioning and possible process disturbances.

Contents

- Chemical plant construction: Levels
- The life cycle of a chemical plant: Life cycle of a chemical plant, Safety evaluation during chemical plant design
- Pumps: General concepts
- Piston and plunger pumps: Principles and operation
- Centrifugal pumps: Principles and operation
- Special pumps: Principles and operation
- Compressors: General concepts
- Piston compressors: Principles and operation
- Rotary volumetric compressors: Principles and operation
- Compressors for vacuum applications: Principles and operation
- Fans: Principles and operation
- Turbo compressors: Principles and operation
- Turbines: Principles and operation
- Cooling equipment: Types and operation
- Maintenance aspects of machines
- Piping: Theoretical principles
- Pipeline components: description

Initial competences

Transport phenomena

Final competences

- 1 Recognize the hierarchical structure of a chemical installation

- 2 Read and understand PFD's and P&ID's
- 3 Establish the logical links between the different steps of designing, engineering and construction of a chemical installation
- 4 Have a basic insight in the different aspects of the exploitation and maintenance of a chemical installation
- 5 Understand the importance and the contents of the safety studies at the different life stages of a chemical installation
- 6 Choose an appropriate maintenance tactic based on risk evaluation
- 7 Select and dimension an appropriate pump or pump combination as a function of given geometric and process conditions
- 8 Select an appropriate fan or compressor type for given process conditions
- 9 Calculate power requirement of a pump or compressor setup
- 10 Understand types and working principles of steam turbines
- 11 Optimize cold production and cold performance for given cooling requirements
- 12 Gain insight in the influence factors for design and construction of piping systems
- 13 Choose appropriate piping components as a function of the requirements to the piping system
- 14 Use the information in sources for process technical data (handbooks, vendor catalogues, norms, guidelines)
- 15 Cooperate as a team to gather necessary data and present a solution to a process technical question.

#### 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

Lecture, self-reliant study activities, seminar: coached exercises

#### Extra information on the teaching methods

Hearing college: 30h

Work college: 30h

Home Work: 5h

#### Learning materials and price

course notes free; Dutch

All course material retrievable from Minerva

#### References

Perry's Chemical Engineering Handbook

#### Course content-related study coaching

Interactive support via Minerva (email)

#### Evaluation methods

end-of-term evaluation

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

Open book examination

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

Open book examination

#### Examination methods in case of permanent evaluation

#### Possibilities of retake in case of permanent evaluation

not applicable

#### Extra information on the examination methods

During examination period: oral open-book exam, written preparation.

#### Calculation of the examination mark