Course Specifications
Valid as from the academic year 2019-2020

Course
Process Engineering (E071010)

Lecturers in academic year 2019-2020
Beyne, Antoon
TW11
lecturer-in-charge

Course offerings and teaching methods in academic year 2019-2020
A (semester 1) Dutch
lecture: 30.0 h
seminar: coached exercises: 10.0 h
group work: 20.0 h

Offered in the following programmes in 2019-2020

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<tr>
<th>Programme</th>
<th>credits</th>
<th>offering</th>
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<tbody>
<tr>
<td>Bachelor of Science in Engineering (main subject Chemical Engineering and Materials Science)</td>
<td>6</td>
<td>A</td>
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<tr>
<td>Bachelor of Science in Chemical Engineering and Materials Science</td>
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<td>A</td>
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<tr>
<td>Master of Science in Chemical Engineering Technology</td>
<td>6</td>
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<tr>
<td>Preparatory Course Master of Science in Chemical Engineering</td>
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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

(Approved)
Final competences
1. Recognize the hierarchichal 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
Group work, 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 on the electronic learning platform

References
Perry’s Chemical Engineering Handbook

Course content-related study coaching
Interactive support via the electronic learning platform (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

Calculation of the examination mark