Course Specifications
Valid as from the academic year 2019-2020

Advanced Waste Gas Treatment (I000675)

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

<table>
<thead>
<tr>
<th>Credits</th>
<th>Study time</th>
<th>Contact hrs</th>
</tr>
</thead>
<tbody>
<tr>
<td>3.0</td>
<td>75 h</td>
<td>30.0 h</td>
</tr>
</tbody>
</table>

Course offerings and teaching methods in academic year 2019-2020

A (semester 1)  
English  
self-reliant study activities  
15.0 h  
excursion  
3.75 h  
lecture  
7.5 h  
microteaching  
3.75 h

Lecturers in academic year 2019-2020

Demeestere, Kristof  
LA24 lecturer-in-charge

Offered in the following programmes in 2019-2020

<table>
<thead>
<tr>
<th>Programme</th>
<th>crdts</th>
<th>offering</th>
</tr>
</thead>
<tbody>
<tr>
<td>Master of Science in Environmental Sanitation</td>
<td>3</td>
<td>A</td>
</tr>
<tr>
<td>International Master of Science in Environmental Technology and Engineering</td>
<td>3</td>
<td>A</td>
</tr>
<tr>
<td>Exchange Programme in Bioscience Engineering: Environmental Technology (master's level)</td>
<td>3</td>
<td>A</td>
</tr>
</tbody>
</table>

Teaching languages

English

Keywords

air pollution, volatile organic compounds, nitrogen and sulphur oxides, carbon dioxide, particulate matter, advanced physical-chemical and biological treatment techniques

Position of the course

This course focuses on the principles and applications of innovative and advanced biological and physical-chemical treatment techniques to remove a broad variety of both gaseous and particulate contaminants from waste gases. Students are informed about recent evolutions in internationally applied prevention and reduction methods and strategies; and practical examples and specific case studies are discussed to illustrate the content of this course.

Contents

1. Introduction: air pollutants and control strategies
2. Advanced Oxidation Processes (AOPs) for waste gas treatment
3. Advanced concepts for biological waste gas treatment
4. CO2 capture and sequestration
5. Case studies

Initial competences

- A background in natural sciences and engineering; and basic knowledge on air pollution technology
- Advanced Waste Gas Treatment builds on certain learning outcomes of the course unit Analysis and Abatement of Air Pollution; or the learning outcomes have been achieved differently.

Final competences

1. Describe and have insight in modern approaches to reduce inorganic (NOx, SOx, CO2) and organic (VOCs) gaseous pollutants and particulate matter in waste gases with the aid of state-of-the-art and advanced strategies and techniques.
2. Critically assess advantages and disadvantages of different methods and be able to make argued choices between them.

(Approved)
3 Deal in an individual and independent way with a specific environmental problem related to waste gas emissions in the students’ home country, and be able to critically report on it through a plenary oral presentation and discussion.

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
Excursion, lecture, microteaching, self-reliant study activities

Extra information on the teaching methods
Theory is taught through plenary lectures. Next, each individual student has to work on a specific case study related to a waste gas emission problem in his home country, and report on it through a plenary didactic presentation followed by a discussion with the whole class. Finally, an excursion to an industrial company having different waste gas treatment technologies working in practice is organized.

Learning materials and price
Lecture notes and handout papers are made available through Minerva. Cost is estimated at 10 €.

References
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Course content-related study coaching
Contact hours with the lecturers for individual guidance

Evaluation methods
end-of-term evaluation and continuous assessment

Examination methods in case of periodic evaluation during the first examination period
Written examination with open questions

Examination methods in case of periodic evaluation during the second examination period
Written examination with open questions

Examination methods in case of permanent evaluation
Oral examination, participation

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
The theoretical knowledge is evaluated through period aligned evaluation by means of a written closed-book exam. Non-period aligned evaluation consists of an oral exam (presentation and discussion of the own case study) and participation during the excursion and the plenary discussions of the case studies.

Calculation of the examination mark
The final examination mark is calculated as the average of the two submarks obtained for the period aligned and non-period aligned evaluation, with an equal weight for both submarks.
Students who eschew period aligned and/or non-period aligned evaluations for this course unit may be failed by the examiner.

(Approved)