Due to Covid 19, the education and evaluation methods may vary from the information displayed in the schedules and course details. Any changes will be communicated on Ufora.

Course Specifications
Valid as from the academic year 2019-2020

Course size
(nominal values; actual values may depend on programme)
Credits 6.0
Study time 180 h
Contact hrs 60.0 h

Course offerings and teaching methods in academic year 2020-2021
A (semester 1) Dutch Kortrijk practicum 24.0 h
lecture 30.0 h
lecture: plenary exercises 6.0 h

Lecturers in academic year 2020-2021
Dumoulin, Ann LA24 lecturer-in-charge
Vanslambrouck, Bruno TW08 co-lecturer
Wiels, Danny LA27 co-lecturer

Offered in the following programmes in 2020-2021
Bachelor of Science in Bioindustrial Sciences crdts offering
6 A
Linking Course Master of Science in Environmental Engineering Technology
6 A

Teaching languages
Dutch

Keywords
Combustion Theory, Measurement Technology, Air Treatment, Air Policy

Position of the course
The course Air Treatment covers diverse aspects related to air. An extensive theoretical description of air policy, measurement techniques and technologies for prevention and treatment is given. Furthermore, the student will get practical insight on air immission and emission measurements and exhaust gas analysis.

Contents

THEORY - MEASURING TECHNIQUES AND METHODS AND AIR POLLUTION CONTROL TECHNOLOGY
- Definitions, concepts and spreading of air pollution
- measurement techniques and methods
- Air treatment
- (Liquid)particle removal: gravity based dust-removal, inertial separators and cyclones, gas washers, cloth filters, electrostatic dust separators
- Removal of gaseous pollutants: absorption, adsorption, condensation, thermal conversion, biological conversion techniques

THEORY - LEGISLATION
- Definitions, concepts according to international, European and Flemish policy (and legislation) concerning air quality and pollution prevention
- European policy: Directive 2008/50/EC on ambient air quality and cleaner air an link with the environmental permit
- Flemish policy: VLAREM II
- Introduction to the International policy: Climate convention (UNFCC): Kyoto protocol and climate conference Paris 2015 (COP21)

THEORY - EXHAUST GASES
- combustion reactions
- theoretical air mass related to a combustible
- determination excess air ratio via exhaust gas analysis

(Approved)
• calculation of chimney losses

**PRACTICE**

• Measurement of nitric vapors according to Griss-Saltzmann
• Software exercises
• Establishment of a VOC adsorption isotherm
• Exercises on spread of air pollution
• Literature review
• Exhaust gas analysis of a gas engine (cogeneration)
• Comparison of measurement results from previous topic with Flemish and German discharge limits
• Calculation of exhaust gas flowrate, excess air and chimney losses and comparison with technical data from the constructor
• reports should be written in correct, academic Dutch

Initial competences
• The course builds on certain learning outcomes of the following course units:
  'Environmental management', 'Introduction to Environmental Law' and 'Analytical chemistry 1 and 2'

Final competences
1 Knowledge about air pollution, air pollution dispersion and emission an immision measurements
2 To be able to apply the Best Available Techniques (BAT) related to air purification in order to prevent, restrict and remove environmental pollution
3 To be able to apply the environmental legislation related to air pollution at the level of an environmental coordinator
4 For a given combustible, to be able to determine the theoretical air mass and the excess air ratio and chimney losses via exhaust gas analysis
5 To be able to perform an exhaust gas analysis and verify the results with relevant legislation

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, practicum, lecture: plenary exercises

Extra information on the teaching methods
• Lecture with plenary exercises: during the lectures Theory-Legislation, students exercise on finding and consulting relevant environmental legislation (3h)
• Lecture: Theory-Legislation: 9h; theory-measurement techniques and methods and air pollution control technology: 18h; theory-exhaust gases: 6h;
• Practice: 24h

Learning materials and price
• Written course (measurement techniques and methods and air pollution control)-Ann Dumoulin - Course services, 18€
• Theory slides (legislation)
• Written course combustion theory and calculation of chimney losses - Bruno Vanslambrouck

Slides and additional information are posted on the electronic learning platform.

References
Most recent environmental legislation to be consulted using an online navigator (www.emis.vito.be/milnav-consult)

Course content-related study coaching
Questions during and after class. Lecturer availability for questions and additional explanations regarding theory and practice after appointment

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, open book examination, oral examination

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

(Approved)
Written examination with open questions, open book examination, oral examination

Examination methods in case of permanent evaluation

Job performance assessment, report

Possibilities of retake in case of permanent evaluation

examination during the second examination period is possible

Extra information on the examination methods

- Theory-legislation: part of the exam is closed book with open questions (written exam). For the other part (open book), students can use the course (slides) and environmental legislation to answer the questions (generally related to calculations and searches).
- Theory-technology: closed book exam with open questions and oral examination with written preparation time
- Theory-exhaust gases: exercise on combustion theory-calculation of chimney losses
- Practice: behavioral assessment and report

Calculation of the examination mark

Final score (on 20) = C1xP1 + C2xP2 + C3xP3
Where C1, C2, C3 are the weight factors and and P1, P2, P3 are the scores (on 20) of individual parts (or a sum of individual parts):
- C1, P1: Theory-Measurement techniques and methods and air pollution control Technology
- C2, P2: Theory-Legislation, Theory-Exhaust gases
- C3, P3: Practice

Where:
- C1 = 30%
- C2 = 30%
- C3 = 40%

1. First examination period:
To succeed for this course a minimum score of 8/20 must be achieved for P1, P2 and P3. If this condition is not met and only in case the calculated final score equals 10 or more, the final score will be 9.

2. Second examination period:
Practice (non-periodic evaluation) is repeatable for 30% with modified examination form: final score second examination period = 70 % of final score first examination period + 30% of score of second examination period.
The remaining parts are completely repeatable.
Also for the second examination period, the following restriction is applied:
To succeed for this course a minimum score of 8/20 must be achieved for P1, P2 and P3. If this condition is not met and only in case the calculated final score equals 10 or more, the final score will be 9.