

## Techniques for Monitoring Waste and Noise (I001669)

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

Credits 4.0      Study time 120 h      Contact hrs 45.0 h

Course offerings and teaching methods in academic year 2018-2019

A (semester 1)	English	lecture: plenary	15.0 h
		exercises	
		lecture	30.0 h

Lecturers in academic year 2018-2019

Botteldooren, Dick	TW05	lecturer-in-charge
Ronsse, Frederik	LA24	co-lecturer
Van Renterghem, Timothy	TW05	co-lecturer

Offered in the following programmes in 2018-2019

	crdts	offering
<a href="#">Master of Science in Environmental Sanitation and Management</a>	4	A

Teaching languages

English

Keywords

Part noise: environmental noise, noise pollution, noise control, sound propagation, remediation.

Part waste: material flows, waste streams, prevention, collection, reuse, recycling, landfilling, incineration, composting, digestion, physical transformations.

Position of the course

**Partim Waste:**

The course gives an overview of the different waste processing possibilities and techniques. Technical and organizational aspects of prevention, re-use, recycling, incineration and landfilling of waste are discussed against their environmental, legislative and economical background. Students should be able to propose solutions for solid waste problems.

**Partim Noise**

This course aims at providing the students insight in how sound is propagating in the outdoor and indoor environment, how sound is measured, what (statistical) parameters are used to express sound levels, and how noise is perceived by humans. The principles of noise legislation are taught. It is further studied how noise is generated by some important sources of noise (transport and industrial applications). The basic principles of the remediation of noise problems are indicated. Stress is on skills needed to perform a thorough acoustical investigation and to understand, analyse and compare measures.

Contents

**Partim Waste:**

1. Introduction
  - Material and waste streams
  - Waste, management and legislation in Europe and Flanders
  - Integrated waste management, logistics of waste
2. Landfilling
  - Types of landfills
  - Landfills and capacities in Flanders
  - Construction and management of sanitary landfills
  - Extraction and valorisation of landfill gas

- Treatment of landfill leachate
- 3. Incineration
  - Combustion
  - Flue gas treatment
  - Recovery of energy
- 4. Biological transformations
  - Composting
  - Anaerobic digestion
- 5. Physical transformations and unit processes in materials recovery
  - Densification
  - Size reduction
  - Separation

### **Partim Noise**

1. Effects of noise
2. Noise measurement
3. Noise legislation
4. Outdoor propagation
5. Indoor propagation
6. Noise sources: prevention and limitation
7. Noise control: remediation and improvement of urban soundscape

#### Initial competences

Chemistry, mathematics, physics : level of bachelors in exact sciences

#### Final competences

- 1 Students understand material streams and the technology for collecting and processing of solid waste.
- 2 Students can formulate a plan for prevention, application or final processing for a material or waste stream.
- 3 Students can estimate both quantitatively and qualitatively waste management processes.
- 4 Student have insight in the chain of disturbance for environmental noise including a basic understanding of noise sources over propagation to effects of noise on man.
- 5 For simple situations, the student can quantify noise immission outdoors and indoors on the basis of sound power.
- 6 Competence to autonomously set up measurement campaigns for assessing the impact of noise on the environment and for interpreting noise impact assessment reports and sanitation plans.

#### 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, lecture: plenary exercises

#### Extra information on the teaching methods

##### **Partim noise**

Theory : ex-cathedra lectures, electronic material available on Minerva

Exercises : calculation exercises with assistance

##### **Partim waste**

Theory : ex-cathedra lectures, electronic material available on Minerva

Exercises : paper, visit

#### Learning materials and price

A syllabus is available on Minerva

#### References

See lecture notes

#### Course content-related study coaching

Questioning (during and after the lecture); besides the lecturers are also on stand-by for questions and additional explanations concerning the theoretical classes and practical exercises.

+ Part waste: Visits to the different treatment plants offer a possibility to see the installation described during the course.

#### Evaluation methods

end-of-term evaluation

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

Written examination, open book examination, oral examination

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

Written examination, open book examination, oral examination

Examination methods in case of permanent evaluation

Possibilities of retake in case of permanent evaluation

not applicable

Extra information on the examination methods

**Partim Waste**

Theory: written

**Partim Noise**

Theory : focus is on understanding and applying the course material to practical noise-related problems. Oral without written preparation.

Exercises: applying the taught calculation models and calculations with dB values.

Written, open book, during the theoretical exam.

Calculation of the examination mark

Students who eschew periodic evaluations for this course unit may be failed by the examiner.

When a student fails for one of the partims, the examiner may declare him as failed for the entire course.