

Environmental Constructions (I001522)

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 size *(nominal values; actual values may depend on programme)*
Credits 5.0 **Study time** 135 h **Contact hrs** 60.0 h

Course offerings in academic year 2020-2021

A (semester 1) English Gent

Lecturers in academic year 2020-2021

Volcke, Eveline LA24 lecturer-in-charge

Offered in the following programmes in 2020-2021

	crdts	offering
Bachelor of Science in Environmental Technology	5	A
International Master of Science in Sustainable and Innovative Natural Resource Management	5	A
Exchange Programme in Bioscience Engineering: Environmental Technology (master's level)	5	A

Teaching languages

English

Keywords

environmental technology, design, process control, equipment

Position of the course

The aim of this course is to gain insight in the **design and control of environmental installations**, for the treatment of waste streams (solid waste, wastewater, off-gas, etc.) and/or in view of bio-energy production.

Particular attention is paid to the **practical implementation** of these installations, involving process engineering aspects, equipment needs, safety aspects, energy requirements and process control.

This course enables the students **to implement** the physical-chemical or biological unit processes known from other courses **in practice**, and **to integrate** them in **the context of larger installations**.

Contents

1. Introduction to design – process diagrams
2. Wastewater treatment
 - Design for COD and N removal
 - Instrumentation and process control
3. Air treatment
 - Installations for the removal of NH₃, NO_x, dust ...
4. Solid waste treatment
 - Design and automation of thermal and biological treatment units
5. Energy
 - Production of mechanical energy, heat and electricity
6. Design of an environmental installation
 - Coached exercises, PC room classes and group work concerning the design of (part of) an installation for the treatment of wastewater, solid waste or off-gas or for energy conversion.

Initial competences

Environmental Construction builds on certain learning outcomes of course units

'Physics 4: Physical Transport Phenomena', 'Process Technology', 'Process Control' ; or the learning outcomes have been achieved differently.

Final competences

- 1 Being capable of interpreting process diagrams, in particular P&IDs
- 2 To design unit processes and installations of limited scale in the field of environmental engineering
- 3 To have knowledge on the practical implementation of unit processes in the field of environmental engineering and on their integration in a larger whole

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

Guided self-study, excursion, group work, lecture, seminar: coached exercises, seminar: practical PC room classes

Extra information on the teaching methods

Theory: Lecture ; Plenary exercises

Exercises: Coached exercises ; Practical PC room classes ; Group work

Excursions

Learning materials and price

Available in electronic form through Minerva

References

Henze M., van Loosdrecht M.C.M., Ekama G. and Brdjanovic D. (Eds.) (2008).

Biological wastewater treatment. Principles, modelling and design. IWA publishing, London, U.K, 512 p.

Qasim S.R. (1999) Wastewater treatment plants. Planning, design and operation. 2nd edition, CRC press.

Olsson G., Nielsen M. K., Yuan Z., Lynggaard-Jensen A. and Steyer J.-P. (2005).

Instrumentation, Control and Automation in Wastewater Systems. IWA Scientific and Technical Report no. 15. IWA Publishing, London, U.K, 246 p.

Tchobanogous G., Theisen H. en Vigil S.A. (1993). *Integrated solid waste management. Engineering principles and management issues.* McGraw-Hill, Inc., 976 p.

Course content-related study coaching

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Evaluation methods

end-of-term evaluation and continuous assessment

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

Participation, assignment, peer assessment, report

Possibilities of retake in case of permanent evaluation

examination during the second examination period is possible

Extra information on the examination methods

Non-period aligned evaluation (40% of final mark): through group works

Period-aligned evaluation (60% of final mark): oral examination - part of which may be prepared in writing

Calculation of the examination mark

Combination of non-period aligned evaluation and period aligned evaluation.

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