Course Specifications
Valid in the academic year 2017-2018

Course
Clean Technology (I001512)

Lecturers in academic year 2017-2018
Dewulf, Jo
LA24 lecturer-in-charge

Course offerings and teaching methods in academic year 2017-2018
A (semester 1) English

- Seminar 2.5 h
- Guided self-study 2.5 h
- Group work 10.0 h
- Lecture 11.25 h
- Microteaching 3.75 h

Offered in the following programmes in 2017-2018 (crdts offering)
- Master of Science in Environmental Sanitation 3 A
- International Master of Science in Environmental Technology and Engineering 3 A
- Exchange Programme in Bioscience Engineering: Chemistry and Bioprocess Technology (master's level) 3 A
- Exchange Programme in Bioscience Engineering: Environmental Technology (master's level) 3 A
- Exchange Programme in Bioscience Engineering: Food Science and Nutrition (master's level) 3 A

Teaching languages
English

Keywords
Clean technology, sustainable technology, green chemistry, industrial ecology

Position of the course
The course focuses on making technological operations more sustainable and interpretation of environmental impact assessment results. It is studied how research intake, process efficiencies and avoidance of waste generation contribute to the sustainability of technology. Topics such as Sustainable Technology, Clean Technology, Industrial Ecology, Green Chemistry, pollution prevention at the unit operations and process integration are covered. Next, specific quantitative approaches such as mass and energy integration will be studied and taught how to apply them.

Contents
- Chapter 1: Technology and Sustainability
- Chapter 2: The Natural Environment: Resource Base and Sink for Emissions
- Chapter 3: Changing Technology Through New Concepts
- Chapter 4: Changing Technology at the Process
- Chapter 5: Changing technology through proper management
- Chapter 6: Assessment of Environmental impact

Initial competences
Natural sciences and engineering in general

(Course size: nominal values; actual values may depend on programme)
Credits: 3.0
Study time: 75 h
Contact hrs: 30.0 h

(Approved)
Final competences

1. Understanding how resource consumption and selection, process efficiency and emission patterns affect the contribution of technology to environmental sustainability. Also the importance of technology within industrial society has to be understood.
2. Have a knowledge of the nowadays (global) relevant environmental issues
3. Comprehend the concepts: industrial ecology, green chemistry (and its principles), green (chemical) engineering & clean technology
4. Comprehend and being able to apply approaches for energy integration & mass integration (source-sink mapping and mass exchange network synthesis)
5. Comprehend management approaches that improve sustainability, more specifically: design for sustainability (D4S) and, ecomanagement and audit scheme (EMAS)
6. Interpret results of and grasp environmental impact assessment methods (among which ecological footprint, carbon footprint) used to quantify the environmental impact of resource extraction and emissions.

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, group work, lecture, microteaching, seminar.

Extra information on the teaching methods

Theory: oral lectures
Exercises: calculations explained during oral lectures

Learning materials and price

A syllabus is available.

References


Course content-related study coaching

Contact hours with the lecturers for individual guidance

Evaluation methods

dead-of-term evaluation and continuous assessment

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

Assignment, report

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

Theory: period aligned evaluation
Students who eschew period aligned and/or non-period aligned evaluations for this course unit may be failed by the examiner.
Theory: written (open book) examination
Group work: presentation and report of group work, eventually with peer review assessment and differentiation within the groups

Calculation of the examination mark

PGE: 13
NPGE: 7
The examiner can delcare that a student has failed for the respective course if he/she has not participated in the period and/or non-periodic evaluations.

(Approved)