Clean Technology (I002506)

Valid as from the academic year 2019-2020

Course Specifications

Course size (nominal values; actual values may depend on programme)
- Credits: 3.0
- Study time: 90 h
- Contact hrs: 30.0 h

Course offerings and teaching methods in academic year 2019-2020

A (semester 1)
- English
- Seminar: coached exercises
- Lecture: 21.25 h
- Microteaching: 3.75 h
- Group work: 1.25 h

Lecturers in academic year 2019-2020
- Huysveld, Sophie
- LA24
- Lecturer-in-charge

Offered in the following programmes in 2019-2020
- Bachelor of Science in Bioscience Engineering (main subject Environmental Technology): 3 crdts A
- Exchange Programme in Bioscience Engineering: Chemistry and Bioprocess Technology (master's level): 3 crdts A
- Exchange Programme in Bioscience Engineering: Environmental Technology (master's level): 3 crdts A
- Exchange Programme in Bioscience Engineering: Food Science and Nutrition (master's level): 3 crdts 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

Final competences

(Approved)
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
Group work, lecture, microteaching, seminar: coached exercises

Extra information on the teaching methods
Lectures: theory. Dates will be announced in the first theory lecture and through the student platform.
Microteaching: presentation task to other students in week 13.
Seminar - coached exercises: exercises will be solved in group. Dates will be announced in the first theory lecture and through the student platform.
Groupwork: lecture to explain the task.

Learning materials and price
A syllabus is available and can be purchased from the student organization of the faculty (members €6.20 and non-members €7.20).

References

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, open book examination

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

Examination methods in case of permanent evaluation
Participation, assignment

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
Written exam (periodic evaluation):
• theory lectures + exercises
• written (open book) examination

Group work (non-periodic evaluation/permanent evaluation):
• Report and presentation of group work: deadline for submission of the report and the date of the presentation will be provided through the student platform.
• Presence/participation at presentations

Calculation of the examination mark
(Approved)
Written exam (periodic evaluation): 13/20
Group work (non-periodic evaluation/permanent evaluation): 7/20
Non-participation in the group work gives rise to a total score of maximum 9/20, regardless of the score obtained for the written periodic exam. If there is clearly a different input from the different group members, then the final score per student belonging to the same group may differ. The deadlines for the group work must be respected. If not, the final score may be reduced. If the student obtains a total score lower than 10/20, the score obtained for the group work during the first examination period can be transferred to the second examination period only if the student did not fail for the group work, i.e. did not have a score lower than 4/7.