

Clean Technology: Theory and Concepts (1002701)

Wegens Covid19 kan mogelijk afgeweken worden van de onderwijs- en evaluatievormen. Dergelijke afwijkingen zullen via Ufora worden gecommuniceerd.

Cursusomvang *(nominale waarden; effectieve waarden kunnen verschillen per opleiding)*
Studiepunten 3.0 **Studietijd 90 u** **Contacturen** 30.0 u

Aanbodsessies en werkvormen in academiejaar 2021-2022

A (semester 1)	Engels	Gent	hoorcollege	17.5 u
			microteaching	3.75 u
			werkcollege: geleide oefeningen	2.5 u
			groepswerk	2.5 u

Lesgevers in academiejaar 2021-2022

Nachtergaele, Pieter	LA24	Verantwoordelijk lesgever
Cadena Martinez, Erasmo	LA24	Medelesgever
Huysveld, Sophie	LA24	Medelesgever

Aangeboden in onderstaande opleidingen in 2021-2022

	stptn	aanbodssessie
Bachelor of Science in de bio-ingenieurswetenschappen (afstudeerrichting milieutechnologie)	3	A
Bachelor of Science in Environmental Technology	3	A
Master of Science in Environmental Science and Technology	3	A
Master of Science in de bio-ingenieurswetenschappen: levensmiddelenwetenschappen en voeding	3	A
Uitwisselingsprogramma bio-ingenieurswetenschappen: chemie en bioprocestechnologie (niveau master-na-bachelor)	3	A
Uitwisselingsprogramma bio-ingenieurswetenschappen: milieutechnologie (niveau master-na-bachelor)	3	A
Uitwisselingsprogramma bio-ingenieurswetenschappen: Food Science and Nutrition (niveau master-na-bachelor)	3	A

Onderwijstalen

Engels

Trefwoorden

Clean technology, sustainable technology, industrial ecology, green chemistry, process integration

Situering

This course focuses on making technological operations more sustainable and interpretation of (environmental) sustainability assessment results. Attention is paid how far the choice of resources, process efficiency and avoidance of waste streams all contribute to sustainable technology. Concepts of clean technology, industrial ecology and green chemistry/chemical engineering are discussed. Pollution prevention at the unit operations is covered, as well as process integration, which is taught how to apply it. Management approaches that improve sustainability, more specifically, design for sustainability (D4S) and ecomanagement and audit scheme (EMAS) are explained.

Inhoud

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
(equal to Chapters 1-5 of the course Clean Technology 5 Credits (1002700))

Begincompetenties

Natural sciences at the university level

Eindcompetenties

- 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 and clean technology.
- 4 Comprehend and being able to apply approaches for energy integration and mass integration.
- 5 Comprehend management approaches that improve sustainability, more specifically: design for sustainability (D4S) and, ecomanagement and audit scheme (EMAS).
- 6 Interpret results of (environmental) sustainability assessment methods used to evaluate technologies.

Creditcontractvoorwaarde

Toelating tot dit opleidingsonderdeel via creditcontract is mogelijk mits gunstige beoordeling van de competenties

Examencontractvoorwaarde

Dit opleidingsonderdeel kan niet via examencontract gevolgd worden

Didactische werkvormen

Groepswerk, hoorcollege, microteaching, werkcollege: geleide oefeningen

Toelichtingen bij de didactische werkvormen

Lectures: theory.

Seminar - coached exercises: 1 exercise session to solve exercises on process integration in group.

Groupwork: one lecture to explain the assignment and one feedback moment with lecturer.

Microteaching: presentation assignment to other students in week 13.

Leermateriaal

A syllabus is available and can be purchased during the first weeks from the student organization of the faculty (www.boerekot.be and vlk.cursus@gmail.com). Slides of the lectures will be uploaded to the student platform (Ufora).

Referenties

Anastas P.T. and Warner J.C. (1998) Green Chemistry: Theory and Practice. Oxford University Press, New York, 135p

Graedel T.E. and Allenby B.R. (1996) Design for Environment. Prentice Hall, New Jersey, 175p

Johansson A. (1992) Clean technology. Lewis Publishers, Boca Raton, 196p

Lowe E.A., Warren J.L. and Moran S.R. (1997) Discovering industrial ecology - An executive briefing and sourcebook. Battelle Press, Columbus, 191p

Vakinhoudelijke studiebegeleiding

Contact hours with the lecturers for individual guidance

Evaluatiemomenten

periodegebonden en niet-periodegebonden evaluatie

Evaluatievormen bij periodegebonden evaluatie in de eerste examenperiode

Schriftelijk examen met open vragen, openboekexamen

Evaluatievormen bij periodegebonden evaluatie in de tweede examenperiode

Schriftelijk examen met open vragen, openboekexamen

Evaluatievormen bij niet-periodegebonden evaluatie

Participatie, werkstuk

Tweede examenkans in geval van niet-periodegebonden evaluatie

Examen in de tweede examenperiode is enkel mogelijk in gewijzigde vorm

Toelichtingen bij de evaluatievormen

Periodic evaluation:

- written open book exam
- study material: theory lectures + exercise session

Non-periodic evaluation:

- Presence/participation at 1 exercise session and 1 lecture with assignment explanation
- Report and presentation of assignment (groupwork): The assignment is to discuss an emerging clean technology based on literature review of the technology and a relevant evaluation tool. Students can start the assignment after the lecture in which it is explained (around week 2). Deadline for submission of the assignment (around week 11 or week 12) and the date of the presentation (week 13) will be provided through the student platform.
- Presence/participation at assignment presentations of other students (a half day)

Eindscoreberekening

Periodic evaluation (written exam): 65% or 13/20

Non-periodic evaluation (assignment, and participation at 1 exercise session, participation at 1 lecture with task explanation and participation at the assignment presentations): 35% or 7/20

Students who eschew one or more parts of the evaluation may be failed by the examiner. Final scores of 10/20 and above may be reduced to the highest failing mark (9/20).

If there is clearly a different input from the different students in the assignment, then the final mark per student belonging to the same group may differ. The deadlines for the assignment must be respected. If not, the final mark may be reduced. If the student obtains a total mark lower than 10/20, the mark obtained for the non-periodic evaluation during the first examination period can be transferred to the second examination period only if the student did not fail, i.e. he/she did not have a mark lower than 3.5/7.