

Clean Technology: Assessment Methods (I002702)

Cursusomvang *(nominale waarden; effectieve waarden kunnen verschillen per opleiding)*

Studiepunten 3.0 **Studietijd 90 u**

Aanbodsessies en werkvormen in academiejaar 2024-2025

A (semester 1)	Engels	Gent	peer teaching
			groepswerk
			hoorcollege
			werkcollege

Lesgevers in academiejaar 2024-2025

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

Aangeboden in onderstaande opleidingen in 2024-2025

	stptn	aanbodsessie
Bachelor of Science in Environmental Technology	3	A
Master of Science in de industriële wetenschappen: elektrotechniek(afstudeerrichting automatisering)	3	A
Master of Science in de industriële wetenschappen: elektrotechniek(afstudeerrichting elektrotechniek)	3	A
International Master of Science in Environmental Technology and Engineering	3	A
Master of Science in Biology	3	A
Master of Science in de bio-ingenieurswetenschappen: milieutechnologie	3	A
Master of Science in de industriële wetenschappen: elektromechanica	3	A
Master of Science in Environmental Science and Technology	3	A
Uitwisselingsprogramma bio-ingenieurswetenschappen: chemie en bioprocestechnologie (niveau master-na-bachelor)	3	A
Uitwisselingsprogramma bio-ingenieurswetenschappen: Food Science and Nutrition (niveau master-na-bachelor)	3	A
Uitwisselingsprogramma bio-ingenieurswetenschappen: milieutechnologie (niveau master-na-bachelor)	3	A

Onderwijstalen

Engels

Trefwoorden

sustainability, circular economy (metrics), process assessment metrics, exergy, material flow analysis, life cycle thinking, life cycle sustainability assessment

Situering

This course focuses on the sustainability (assessment) of technological operations (human activities) and how to make them more sustainable from an environmental perspective in the first place, but also attention is paid to economic and social aspects. On the one hand, assessment methods are covered in a theoretical way. On the other hand, some methods (e.g. life cycle assessment, process assessment metrics, exergy) are also taught how to conduct them in a practical way.

Inhoud

- Introduction clean technology toolbox
- Material Flow Analysis, circular economy metrics, etc.
- Life Cycle Assessment (LCA), social LCA, Life Cycle Costing, Techno-economic assessment, etc.

- Process assessment metrics and exergy

Begincompetenties

Students are expected to have a scientific background at a university level (physics, chemistry, life sciences) and basic engineering skills (such as unit conversions, mass and energy balances).

Eindcompetenties

- 1 Grasp Material Flow Analysis and metrics to assess circularity.
- 2 Conduct a basic life cycle assessment study using specialized software and critically discuss the study's limitations and results.
- 3 Explain methods to assess environmental, economic and social effects of technological operations.
- 4 Critically interpret the results from methods used to assess the sustainability of technological operations.
- 5 Grasp process assessment metrics and the concept of exergy and exergy analysis.
- 6 Quantify the exergy of a flow to the extent defined by presented data and equations.
- 7 Assess the sustainability performance of a process by quantifying relevant process assessment metrics.

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, Werkcollege, Hoorcollege, Peer teaching

Toelichtingen bij de didactische werkvormen

Lectures: theory and guestspeakers from industry. Some lectures can be supplemented with online video material.

Seminar - coached exercises: 1 exercise session to solve exercises on process assessment metrics/exergy.

Seminar - practical PC room classes: 2 coached PC sessions to prepare for the LCA assignment (groupwork).

Groupwork: feedback moment with lecturers for the LCA assignment.

Peer teaching: presentation assignment to other students in week 13.

Studiemateriaal

Geen

Referenties

Background material will be made available through the student platform (Ufora).

Vakinhoudelijke studiebegeleiding

Contact hours with the lecturers for individual guidance

Evaluatiemomenten

periodegebonden en niet-periodegebonden evaluatie

Evaluatievormen bij periodegebonden evaluatie in de eerste examenperiode

Schriftelijke evaluatie met open vragen

Evaluatievormen bij periodegebonden evaluatie in de tweede examenperiode

Schriftelijke evaluatie met open vragen

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 exam
- study material: theory lectures + guest lectures + exercise session on process assessment metrics/exergy

Non-periodic evaluation:

- Presence/participation at 2 coached PC sessions

(Goedgekeurd)

- Report and presentation of assignment (groupwork): The assignment is to perform an LCA of a product with the aid of software. Students can start the assignment after the first coached PC session to prepare for the assignment (around week 4). Deadline for submission of the assignment (around week 11) and the date of the presentation (week 13) will be provided through the student platform.
- Presence/participation at assignment presentations of other students

Eindscoreberekening

Periodic evaluation (written exam): 50% or 10/20

Non-periodic evaluation (assignment, participation at 2 coached PC sessions, and participation at the task presentations): 50% or 10/20

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).

Peer assessment will be performed for the groupwork, hence 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 5/10.