GHENT UNIVERSITY

Course Specifications

Valid as from the academic year 2020-2021

Environmental Constructions in Practice (I002684)

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 7.0 **Study time 210 h** **Contact hrs** 70.0 h

Course offerings in academic year 2020-2021

A (year)	Dutch	Gent

Lecturers in academic year 2020-2021

Volcke, Eveline	LA24	lecturer-in-charge

Offered in the following programmes in 2020-2021	**crdts**	**offering**
Master of Science in Bioscience Engineering: Environmental Technology	7	A

Teaching languages

Dutch

Keywords

design, environmental engineering, practical implementation, multidisciplinarity, integration

Position of the course

This course is an integration course unit considered as a final graduation course in Master of Science in Bioscience Engineering: Environmental technology. The core assignment in this course unit is a group work focused on integrated process design of an environmental installation with free choice of the application. Throughout the course, different typical aspects in the various stages of process design, as usual in environmental technology, must be followed. In addition, also attention is being paid to other skills, such as project planning and management, teamwork, discipline, leadership, result-oriented working, scientific communication, etc. Coaching sessions are foreseen by an multidisciplinary team of lecturers from the Faculty of Bioscience Engineering, the Faculty of Engineering and Architecture, as well as guest lecturers with a specific expertise from industry.
Throughout the various stages of process design, students will reflect on the technical realization and implementation in practice of the different physical-chemical and/or biological unit processes, which they know from other course units, as well as their integration in a larger whole. A multidisciplinary approach is paramount, with the emphasis on the integration of knowledge built up throughout the entire curriculum and preferably with aspects from the three learning lines: (1) environmental analysis and diagnostics, (2) environmental technology and engineering and (3) social framework. Throughout this process, the link is made to the cohesion of the various (mandatory or elective) courses within the curriculum of the Master of Science in Bioscience Engineering: Environmental Technology.

Contents

The focus of this course is to carry out an integrated assignment concerning the design of an environmental installation, in group. All aspects that are discussed during classes, as well as knowledge and skills built up in other courses, are gradually integrated. This assignment will already be communicated to students in their first year of Master of Science in Bioscience Engineering: Environmental Technology during an information session/ symposium. The case studies are preferably taken from engineering practice. The group assignment will be elaborated during the second master year, concerning both broadening (multidisciplinary) and in-depth (elaboration of a specific case study)

aspects.
A. Multidisciplinary aspects of process design (1st semester)
Theory lectures provide the necessary knowledge about various aspects of process design and process implementation. Lectures are always followed by coaching sessions by the (guest) teacher involved. In addition, online learning material (flipped classroom) is used to introduce several aspects that have not yet been covered in other course units. The following aspects are discussed:
1. Introduction to systematic process design
2. Process diagrams (block flow diagrams, process flow diagrams, P & IDs, study of practical examples)
3. Reactor theory (basic reactor types, residence time distribution, concentration profile, energy balances, time constants, scale-up, etc...
4. Choice of materials
5. Instrumentation and automation
6. Sustainability and social relevance
7. (Environmental) legislation
8. Occupational safety and process safety
9. Economic aspects
10. Management
11. Company visits (live and virtual)

B. Further elaboration of the specific case study (2nd semester)
Further elaboration of the specific case study per group, under the supervision of an academic contact person and a contact person from the professional field.

After the first and second semesters, students report in groups through a report and a presentation. To prepare for this, mandatory feed forward / feedback moments are organized.

Initial competences

This course integrates and builds on certain learning outcomes of prior course units in the curriculum of Master of Science in Bioscience Engineering: Environmental Technology, such as 'Physical Transport Phenomena', 'Process Technology', and 'Process Control'.

Final competences

1 *Being capable of interpreting process diagrams, in particular P&IDs.*
2 *To dimension and design environmental installations, including technical, material and safety aspects.*
3 *To have knowledge on the practical implementation of environmental installations and on the integration of unit processes in a larger whole.*
4 *To have a multidisciplinary approach on process design.*
5 *Being at the level of a beginning professional to – independently and having a mindset for defined target to be obtained - plan and execute the process design of an environmental installation.*
6 *Being able to trade off technical, economic and social boundary conditions and to estimate the feasibility.*
7 *To have the required social and communication skills to function in a team.*

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, self-reliant study activities

Extra information on the teaching methods

Theory: lecture, online learning material
Practical exercises: group work

Study visits

Independent work provides each student to take their own initiative within his group in order to elaborate the task assigned to her/him within the group. The student thus needs to undertake independent research work and report findings to the group and contribute to write parts in the final report of the assignment.

Learning materials and price

Available in electronic form

References

Course content-related study coaching

In addition to the planned theory classes and coaching sessions, study coaching is foreseen as face to face contact during contact hours or via e-mail with the main lecturer being available for additional information and/or clarification of the course material or task given.

Evaluation methods

end-of-term evaluation and continuous assessment

Examination methods in case of periodic evaluation during the first examination period

Oral examination, participation, peer assessment, report

Examination methods in case of periodic evaluation during the second examination period

Oral examination, assignment

Examination methods in case of permanent evaluation

Participation, report

Possibilities of retake in case of permanent evaluation

examination during the second examination period is not possible

Calculation of the examination mark

Participation during mandatory feedforward-feedback sessions: 5% of final mark
Report: 65% of final mark
Oral examination - presentation: 30% of final mark
Peer assessment is organized leading to possible score adjustment with up to 10% of the final mark.