GHENT UNIVERSITY

Course Specifications

Valid as from the academic year 2023-2024

Resource Recovery and Recycling Technologies (I002767)

Course size *(nominal values; actual values may depend on programme)*

Credits 5.0 **Study time 150 h**

Course offerings in academic year 2023-2024

A (year)	English	Gent

Lecturers in academic year 2023-2024

Hennebel, Tom	LA25	lecturer-in-charge
De Gusseme, Bart	LA25	co-lecturer
Du Laing, Gijs	LA24	co-lecturer
Frisch, Gero	FREIBE01	co-lecturer

Offered in the following programmes in 2023-2024	**crdts**	**offering**
International Master of Science in Sustainable and Innovative Natural Resource Management	5	A
Exchange Programme in Bioscience Engineering: Environmental Technology (master's level)	5	A

Teaching languages

English

Keywords

resource, recovery, recycling technology, waste

Position of the course

This course is structured around the “metallurgical toolbox”. This toolbox contains a range of novel and more established technologies that may be integrated into process chains to be set up for recovery of (mineral) resources from solid and liquid wastes and secondary resources.

Contents

The toolbox is constructed based on four typical, subsequent steps in metallurgical flowsheets.
In each of the steps, different metallurgical tools will be discussed:
1. Pretreatment
2. Metal extraction: hydrometallurgy, bioleaching, solvo-metallurgy and pyrometallurgy
3. Metal recovery: electrowinning, biosorption/bioprecipitation, physicichemical separations
4. Residue valorization

For each tool, the relevant thermodynamic modelling will be discussed.

Initial competences

The requested initial competences for entering the SINREM MSc programme

Final competences

1 capable to comprehend the engineering principles of the (unit) processes covered in the course
2 can evaluate a technical description of a waste treatment system/installation
3 able to specify the requirements which a waste treatment installation needs to fulfil
4 has insights in the potential use of the different processes when designing technologies for recovery of resources from waste

5 By going through the (online) learning materials offered within the different elements of the toolbox, students will be able to gain basic/general knowledge on the mechanisms behind the different technologies, their working principles, their potential applications, boundary conditions for their use, their (dis)advantages, economic aspects, environmental impact, etc. The learning materials should allow students that have at least a bachelor degree in a broad range of scientific disciplines (e.g., chemists, bioscience engineers, civil engineers, geologists,...) to become familiar with the technologies involved.

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, peer teaching, independent work

Learning materials and price

References

Course content-related study coaching

Evaluation methods

end-of-term and continuous assessment

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

Written assessment

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

Written assessment

Examination methods in case of permanent evaluation

Oral assessment, assignment

Possibilities of retake in case of permanent evaluation

examination during the second examination period is not possible

Calculation of the examination mark

Students who eschew period aligned and/or non-period aligned evaluations for this course unit may be failed by the examiner.