

# Course Specifications

From the academic year 2019-2020 up to and including the academic year

# Metal Extraction and Recycling (E065471)

Course size	(nominal values; actual values may depend on programme)					
Credits 3.0	Study time 90	h	Contact hrs	30.0h		
Course offerings and	teaching methods in academic ye	ar 2022-2023				
A (semester 2)	English	Gent		excursion		5.0h
				lecture: plenary e	exercises	5.0h
				lecture		15.0h
				seminar		5.0h
Lecturers in academi	c year 2022-2023					
Vervynckt, Stepl	nanie		TW11	lecturer-in-charge		
Offered in the following programmes in 2022-2023				crdts	offering	
International Master of Science in Sustainable and Innovative Natural Resource Management				3	А	

Tunugement		
Master of Science in Chemical Engineering	3	
Master of Science in Chemical Engineering	3	
Master of Science in Materials Engineering	3	
Master of Science in Sustainable Materials Engineering	3	

# Teaching languages

English, Dutch

# Keywords

Metal extraction, pig iron, steel, copper, lead, zinc, environmental issues, recycling

# Position of the course

Acquirement of insight in the problem areas and the potential of recycling of metals in general. Acquirement of insight in the production process of diverse non-ferrous metals (copper, lead, precious metals). Acquirement of insight in the basic building stones of a metallurgical flowsheet (applied thermodynamics, leaching and precipitation, explosion limits, solvent extraction, ion exchange, biometallurgy, electrometallurgy). Continuously linking the principles with industrial applications and reality. Acquirement of know how in the field of flow sheet design of metal production processes.

#### Contents

- Introduction: Recycling of complex waste streams
- Pyrometallurgy: production of Cu and Pb: thermodynamics and technologies
- Hydrometallurgy: basic principles and industrial application
- Elektrometallurgy en biometallurgy: basic principles and industrial application
- Flowsheet design: General rules for the design of a flowsheet
- Knowledge management

# Initial competences

Materiaalkundige Thermodynamica

#### Final competences

- 1
- 2
- 3

# Conditions for credit contract

Access to this course unit via a credit contract is determined after successful competences assessment

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#### Conditions for exam contract

This course unit cannot be taken via an exam contract

# Teaching methods

Lecture: plenary exercises, Seminar, Excursion, Lecture

#### Learning materials and price

Syllabus #Winningsmetallurgie & recyclage van metalen#.

# References

- ·F. Habashi, #Handbook of extractive metallurgy#, Wiley, 1997 (ISBN 3 527 28792 2)
- Extractive metallurgy of Copper 5th Edition, 2011. Authors: Mark E. Schlesinger, Matthew J. King, Kathryn C. Sole, William G. Davenport.

# Course content-related study coaching

#### Assessment moments

end-of-term and continuous assessment

# Examination methods in case of periodic assessment during the first examination period

Written examination, Oral examination

# Examination methods in case of periodic assessment during the second examination period

Written examination, Oral examination

# Examination methods in case of permanent assessment

Report

#### Possibilities of retake in case of permanent assessment

examination during the second examination period is possible in modified form

#### Extra information on the examination methods

During examination period: oral closed-book exam, written preparation. During semester: graded lab sessions (preparation, participation, report)

#### Calculation of the examination mark

30% NPE: Practical (preparation + reporting practical) 70% PE: Examen written & oral – 3 parts (pyro, hydro elektro)