

# Course Specifications

Valid in the academic year 2024-2025

# Materials for Energy Applications (C004523)

Course size		(nominal values; actual valu	ies may depend on programme	e)		
C	Credits 6.0	Study time 1	80 h			
Course offerings in academic year 2024-2025						
	A (semester 1)	English	Gent			
Lecturers in academic year 2024-2025						
	Detavernier, Christophe WE04				lecturer-in-ch	arge
	Dendooven, Jolien		V	VEO4	co-lecturer	
Offered in the following programmes in 2024-2025					crdts	offering
	Master of Science in Teaching in Science and Technology(main subject Physics and Astronomy)				6	А
	Master of Science in	Physics and Astronomy			6	А
	Exchange Program	me in Physics and Astronomy	(Master's Level)		6	А

#### Teaching languages

English

#### Keywords

# Position of the course

#### Contents

Introduction: the energy issue: basic aspects, scope, timeframe, challenges Theoretical aspect: electrochemistry (reduction/oxidation, ionic conductivity, solidelectrolyte interfaces), band diagrams (PN junction, LEDs, diodes), thermal behavior of materials (thermal conductivity, porous materials, microelectronics) Material-technical aspect: Batteries and hydrogen fuel cells (electrode materials, surface modifications, storage...). Photovoltaics (materials, structures, tandems, anti-reflection coatings...), thermal behavior of materials (emissivity, coatings for windows...). Low power computing and power conversion. Efficiency in (LED) lighting.

#### Initial competences

Solid-state and Nanophysics

#### **Final competences**

- 1 Understanding the importance of material properties and material development in the sustainability issue.
- 2 Identifying connections between fundamental physical principles and energy applications.
- 3 Quantifying material properties.

# 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**

#### Extra information on the teaching methods

Lectures

Study material

None

References

#### 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 assessment with open-ended questions

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

# Examination methods in case of permanent assessment

Assignment

# Possibilities of retake in case of permanent assessment

not applicable

## Calculation of the examination mark

50/50