GHENT UNIVERSITY

Course Specifications

Valid as from the academic year 2025-2026

Materials for Energy Applications (C004523)

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

Credits 6.0 **Study time 180 h**

Course offerings and teaching methods in academic year 2026-2027

A (semester 1)	English	Gent	lecture	0.0h

Lecturers in academic year 2026-2027

Detavernier, Christophe	WE04	lecturer-in-charge
Dendooven, Jolien	WE04	co-lecturer

Offered in the following programmes in 2026-2027	**crdts**	**offering**
Master of Science in Teaching in Science and Technology(main subject Physics and Astronomy)	6	A
Master of Science in Physics and Astronomy	6	A
Exchange Programme in Physics and Astronomy (Master's Level)	6	A

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, solid-electrolyte interfaces), band diagrams (PN junction, LEDs, diodes).
Material-technical aspect: Batteries and hydrogen fuel cells (electrode materials, surface modifications, storage...). Photovoltaics (materials, structures, tandems, anti-reflection coatings...). Materials for nuclear reactors. Thermal behavior of materials (emissivity, IR reflective coatings). Materials for (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

Lecture

Extra information on the teaching methods

Lectures

Study material

Type: Slides

Name: Slides
Indicative price: Free or paid by faculty
Optional: no
Language : English
Number of Slides : 1
Oldest Usable Edition : 2025
Available on Ufora : Yes
Available in the Library : No
Available through Student Association : No

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

Presentation, Assignment

Possibilities of retake in case of permanent assessment

examination during the second examination period is not possible

Calculation of the examination mark

The final score is the weighted average of the scores for the permanent assessment (6/20) and for the periodic assessment (14/20).