

## Photovoltaic Energy Conversion (E900132)

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

**Credits** 4.0      **Study time** 120 h      **Contact hrs** 30.0 h

**Course offerings and teaching methods in academic year 2022-2023**

A (semester 2)	English	Gent	excursion	5.0 h
			seminar: practical PC room	2.5 h
			classes	
			seminar	15.0 h
			lecture	17.5 h

O (semester 2)	English	Gent		
----------------	---------	------	--	--

**Lecturers in academic year 2022-2023**

Strubbe, Filip	TW06	lecturer-in-charge
Khelifi, Samira	WE04	co-lecturer

**Offered in the following programmes in 2022-2023**

	crdts	offering
<a href="#">Bridging Programme Master of Science in Photonics Engineering</a>	4	A
<a href="#">European Master of Science in Photonics</a>	4	A
<a href="#">Master of Science in Photonics Engineering</a>	4	A, O

**Teaching languages**

English

**Keywords**

photovoltaics, solar energy, sustainable energy

**Position of the course**

To get familiar to solar energy and its conversion to electrical work, by means of the photovoltaic effect.

Ecologic advantages of sustainable energy.

Positioning of the sustainable energies within a broader thermodynamic context.

**Contents**

- Availability of solar energy
- Thermal conversion
- Principles of photovoltaic conversion
- Realistic efficiency
- Classical silicon solar cells (mono and polycrystalline)
- Amorphous solar cells
- GaAs solar cells
- Heterojunction solar cells
- Ecology and economy

**Initial competences**

basics of thermodynamics, quantum physics, solid-state physics, semi-conductor physics, diode theory

### **Final competences**

- 1 **INSIGHTS:** Understanding the basic principles of photovoltaic energy conversion. Understanding the limitations of realistic solar panels.
- 2 **INSIGHTS:** The ecological benefits of sustainable energy. Understanding the efficiency and limitations of photovoltaic and thermal energy conversion.
- 3 **PROFICIENCIES:** Calculations of the available solar energy.
- 4 **PROFICIENCIES:** Calculations of the conversion and the conversion efficiency of solar energy.

### **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**

Excursion, lecture, seminar, seminar: practical PC room classes

### **Learning materials and price**

course notes

### **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 examination, oral examination

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

Written examination, oral examination

### **Examination methods in case of permanent evaluation**

Report

### **Possibilities of retake in case of permanent evaluation**

examination during the second examination period is possible

### **Extra information on the examination methods**

During examination period: written closed-book exam; oral closed-book exam  
non-period-bound evaluation: computer practicum with report

### **Calculation of the examination mark**

period-bound evaluation: written+oral examination: 80%  
non-period-bound evaluation: report computer practicum: 20%