

## Physics of Waves and Particles (E702070)

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

**Credits 3.0**                      **Study time 90 h**

**Course offerings and teaching methods in academic year 2023-2024**

A (semester 1)	Dutch	Gent	lecture
			practical

**Lecturers in academic year 2023-2024**

Van Loo, Sven	TW17	lecturer-in-charge
Keunen, Koen	TW17	co-lecturer

**Offered in the following programmes in 2023-2024**

	<b>crdts</b>	<b>offering</b>
<a href="#">Bachelor of Science in Engineering Technology(main subject Chemical Engineering Technology)</a>	3	A
<a href="#">Bachelor of Science in Engineering Technology(main subject Civil Engineering Technology)</a>	3	A
<a href="#">Bachelor of Science in Engineering Technology(main subject Electronics and ICT Engineering Technology)</a>	3	A
<a href="#">Bachelor of Science in Engineering Technology(main subject Information Engineering Technology)</a>	3	A
<a href="#">Linking Course Master of Science in Chemical Engineering Technology</a>	3	A

**Teaching languages**

Dutch

**Keywords**

Waves, particles

**Position of the course**

Understanding and applying basic concepts of the physics of waves and particles.  
Acquiring related basic research skills.

**Contents**

- Reflection and transmission of waves and applications (sonar, radar, lidar, fiberoptics, birefringence, 3D imaging)
- Special relativity
- Temperature radiation and applications
- Photometry
- Electron emission and photoelectric effect
- Emission and absorption of electromagnetic radiation by atoms
- Röntgen radiation and Röntgen diffraction
- Laser and applications
- Matter waves and applications
- Movement of charges in electric and magnetic fields – electron optics, electron microscopy, mass spectrometry
- The atomic nucleus – radioactive radiation – nuclear energy

**Initial competences**

Final competences of Physics (E701056)

**Final competences**

- 1 Understand and apply the basic laws and concepts of the physics of waves and particles.
- 2 Be able to solve simple problems about the physics of waves and particles.
- 3 Execute experiments concerning the physics of waves and particles using correct and

accurate measurement methods.

4 Be able to interpret the results of experiments concerning the physics of waves and particles based among other things on an error analysis.

5 Write academic reports about experiments related to the physics of waves and particles with attention to language, style and structure.

#### **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, Practical

#### **Extra information on the teaching methods**

The lectures and practica happen partly online and partly on campus.

In the practicum, exercises are carried out in small teams of students.

#### **Learning materials and price**

Own notes, presentation pdfs, videos, syllabus.

#### **References**

D.C. Giancoli, Physics parts 1 and 2, Pearson Prentice Hall

#### **Course content-related study coaching**

Students can get extra information at the student counseling service, the practicum, before or after the lectures and by appointment.

#### **Assessment moments**

end-of-term and continuous assessment

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

Written assessment with multiple-choice questions, Written assessment with open-ended questions, Written assessment

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

Written assessment

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

Skills test, Assignment

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

examination during the second examination period is not possible

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

The written exam can be a combination of open and multiple choice questions and can happen online or on campus.

Participation in the practical exercises (introductory lessons included) is mandatory.

The result of the permanent evaluation is based on the results of reports and ability tests. For the permanent evaluation is retake not possible. In case this result is being transferred from the first exam session to the second exam period.

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

The end quotation is calculated using following weights.

Theory (written examination) : 70 %

Practicum (permanent evaluation) : 30 %

However, if the end result is 10 or more following the foregoing weights and the score at one of the parts of the training items (theory or practicum) is less than 8 on 20, there will be derogated from this calculation and the student will get 9/20 as final score.