

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

Bachelor of Science in Engineering Technology(main subject Chemical Engineering Technology)

crdts

offering

3

A

Bachelor of Science in Engineering Technology(main subject Civil Engineering Technology)

3

A

Bachelor of Science in Engineering Technology(main subject Electronics and ICT Engineering Technology)

3

A

Bachelor of Science in Engineering Technology(main subject Information Engineering Technology)

3

A

Linking Course Master of Science in Chemical Engineering Technology

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.