GHENT UNIVERSITY

Course Specifications

Valid as from the academic year 2019-2020

Physics 4: Optics and Physical and Chemical Thermodynamics (O000094)

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

Credits 5.0	Study time 150 h	Contact hrs	60.0 h

Course offerings and teaching methods in academic year 2019-2020

A (semester 2)	English	seminar: coached exercises	20.0 h
		lecture	30.0 h
		guided self-study	10.0 h

Lecturers in academic year 2019-2020

Zhuiykov, Serge	KR01	lecturer-in-charge

Offered in the following programmes in 2019-2020	crdts	offering
Bachelor of Science in Environmental Technology	5	A
Bachelor of Science in Food Technology	5	A
Bachelor of Science in Molecular Biotechnology	5	A
Joint Section Bachelor of Science in Environmental Technology, Food Technology and Molecular Biotechnology	5	A

Teaching languages

English

Keywords

Optics, Thermodynamics, Chemical equilibrium, Molecules and solids, Processes on solid surfaces

Position of the course

Introduction in the field of electricity and magnetism

Contents

1. Introduction to light: Reflection and refraction
2. Lenses and optical instruments
3. The wave nature of light; Interference
4. Diffraction and polarization
5. Thermodynamic aspects of phase transitions
6. The thermodynamics of mixtures
7. Chemical equilibrium
8. Molecules and Solids
9. Molecules in motion
10. Chemical kinetics
11. Processes on solid surfaces

Initial competences

Competences acquired in the yearlong course Physics 1 & 2. (O000134)

Final competences

1 *Possess in-depth knowledge about both optics and thermodynamic phenomena and apply various physics, chemistry and electrochemistry laws for practical applications.*

2 *Have insight and skills about the basic principle of optics and physical chemistry.*
3 *Possess in-depth knowledge about the basic principle of thermodynamic aspects of phase transitions.*
4 *Demonstrate in-depth knowledge about optical phenomena and comprehend*

relevant latest developments in the discipline.

5 *Know how to utilize the knowledge about chemical equilibrium and processes in liquids and on solid surfaces.*
6 *Demonstrate how represent the optical phenomena schematically to apply these skills for solving problems analytically.*
7 *Substantiate the relationship between the electrical and magnetic phenomena utilized in the practical devices.*
8 *Transfer the obtained knowledge to the modern electrical devices and analytical instruments.*
9 *Have insight in supporting disciplines, in particular, organic and inorganic chemistry.*

Conditions for credit contract

This course unit cannot be taken via a credit contract

Conditions for exam contract

This course unit cannot be taken via an exam contract

Teaching methods

Guided self-study, lecture, seminar: coached exercises

Learning materials and price

Power-point slides will be available on Minerva

References

D. C. Giancoli (2009), Physics for scientists & engineers with modern physics, Chapters 21-31, Pearson-PrenticeHall.

P. Atkins, J. de Paula, Physical Chemistry, Chapters 4,5,6,19,20,22; Oxford University Press, 2014.

Course content-related study coaching

The course trains physics, with a focus on both basic principles of optics and thermodynamics and their practical applications. The purpose of the course is to
i) make the students familiar with the numerous practical applications of optical devices and their main components as well as with thermodynamic of mixtures,
ii) teach students about scientific experiments and measurement methods,
iii) teach students how to report their findings, and
iv) provide the foundations that will allow students to successfully participate in specialize courses.

Evaluation methods

end-of-term evaluation and continuous assessment

Examination methods in case of periodic evaluation during the first examination period

Written examination with open questions

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

Written examination with open questions

Examination methods in case of permanent evaluation

Participation

Possibilities of retake in case of permanent evaluation

examination during the second examination period is not possible

Extra information on the examination methods

Practicals, written examination

Calculation of the examination mark

Final written examination with open questions: 80%
Practical exercises: 20%