Course Specifications

Valid as from the academic year 2015-2016

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 2016-2017

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

Lecturers in academic year 2016-2017

Zhuiykov, Serge	LA08	lecturer-in-charge

Offered in the following programmes in 2016-2017	crdts	offering
Bachelor of Science in Food Technology	5	A
Joint Section Bachelor of Science in Environmental Technology, Food Technology and Molecular Biotechnology	5	A
Bachelor of Science in Environmental Technology	5	A
Bachelor of Science in Molecular Biotechnology	5	A

Teaching languages

English

Keywords

Basic Physics, Optics, Thermodynamics, Chemical equilibrium, Molecules and Solids, Processes on solid surfaces

Position of the course

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.

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 Physics 1: Mechanics; Physics 2: Vibration, Waves and Thermodynamics; Physics 3: Electricity and Magnetism

Final competences

The student will have the ability to describe and analyze both optical and thermodynamic phenomena, to use and apply the various physics laws of optics and thermodynamics. The student will have knowledge about the basic principle of optics, thermodynamic aspects of phase transitions, chemical equilibrium and processes in liquids and on solid surfaces. The student will be able to transfer this obtained knowledge to the modern electrical and optical devices and instruments.

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

Guided self-study, lecture, lecture: plenary exercises, seminar: coached exercises

Learning materials and price

D. C. Giancoli (2009), Physics for scientists & engineers with modern physics, Chapters 32-35, 40, Pearson-Prentice Hall.
P. Atkins, J. de Paula, Physical Chemistry, Chapters 4,5,6,19,20,22; Oxford University Press, 2014.

References

Course content-related study coaching

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, written examination with multiple choice questions

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

Examination methods in case of permanent evaluation

Participation

Possibilities of retake in case of permanent evaluation

examination during the second examination period is possible in modified form

Extra information on the examination methods

End-of-term evaluation and continuous assessment

Calculation of the examination mark

Final written exam with open questions and with multiple choice questions: 80%
Seminar Participation: 20%