Physics 4: Optics and Physical and Chemical Thermodynamics (O00094)

Course Specifications
Valid as from the academic year 2015-2016

Zhuiykov, Serge
LA08 lecturer-in-charge

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

Offered in the following programmes in 2016-2017
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

(Approved)
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
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%

(Approved)